Roy E. Welsch

Eastman Kodak Leaders for Global Operations Professor of Management
Professor of Statistics and Data Science
Director, MIT Center for Computational Research in Economics and Management Science

Sloan School of Management and Statistics and Data Science Center (IDSS)
Massachusetts Institute of Technology
100 Main Street, E62-564
Cambridge, MA 02139
(617)253-6601
(617)258-7579 (fax)
(617)460-2283 (cell)

EDUCATION

Princeton University, 1961-1965

Degree:	Bachelor of Arts, 1965
	(Magna Cum Laude, Phi Beta Kappa, Sigma Xi)
Major:	Mathematics
Thesis:	Conditional Monte Carlo and Measures of Significance
	for a New Multiple Range Test
	Supervisors: J. W. Tukey and J. A. Hartigan

Stanford University, 1965-1969

Degrees:	Master of Science (Mathematics), 1966
	Doctor of Philosophy (Mathematics), 1969
Thesis:	Weak Convergence of Extreme Order Statistics from
	ϕ-mixing Processes
	Supervisor: Samuel Karlin

SCHOLARSHIPS AND FELLOWSHIPS

Andrew H. Brown Prize Scholarship in Mathematics, 1964
Woodrow Wilson Fellow (Honorary), 1965
National Science Foundation Graduate Fellowship, 1965-1969

EMPLOYMENT

17 March 2014- 28 March 2014	Professor, Singapore University of Technology and Design, Singapore
1 July 2009-	Eastman Kodak Leaders for Global Operations Professor of Management
1 July 2009- 1 Jan. 2018	Head of the Management Science Area, Sloan School of Management, MIT
1 Jan. 2007- 30 June 2011	Adjunct Professor, Nanyang Technological Univ. Singapore
1 July 2005 -	Professor of Engineering Systems, MIT
1 July 1988 - 30 June 1993	Leaders for Manufacturing Professor, MIT
1 July 1986 - 30 June 1989	Co-Director, MIT Statistics Center
1 July 1986 -	Director, MIT Center for Computational Research in Economics and Management Science
1 July 1984 - 30 June 1986	Director, MIT Statistics Center
1 July 1981 - 30 June 1984	Co-Director, MIT Statistics Center
1 July 1979 -	Professor of Statistics and Management Science, MIT
1 July 1979 - 30 June 1986	Associate Director, MIT Center for Computational Research in Economics and Management Science
1 July 1973 - 30 June 1979	Associate Professor of Statistics and Management Science, MIT
1 July 1973 - 31 January 1978	Senior Research Associate, Computer Research Center for Economics and Management Science, National Bureau of Economic Research
1 July 1969 - 30 June 1973	Assistant Professor of Management, Massachusetts Institute of Technology
Spring 1969	Assistant in Instruction, Mathematics Department, Stanford University
Fall 1968	Research Assistant, Mathematics Research Center, University of Wisconsin
Summer 1968	Research Assistant, Mathematics Department, Stanford University
Summer 1965	Research Assistant, Division of Mathematics and Physics, Midwest Research Institute, Kansas City, Missouri

Summer 1964	Research Assistant, Operations Research Dept., Hallmark Cards, Inc., Kansas City, Missouri

VISITING POSITIONS

Summer 1978	Department of Computer Science, Stanford University
Winter 1977	Bell Telephone Laboratories, Murray Hill, New Jersey

PROFESSIONAL SOCIETIES

American Statistical Association (Fellow)
Institute of Mathematical Statistics (Fellow)
International Association for Statistical Computing (ISI)
International Statistical Institute (Full Member)
American Association for the Advancement of Science (Fellow)

PUBLICATIONS

Articles

1971   A Weak Convergence Theorem for Order Statistics from Strong-Mixing Processes, *Annals of Mathematical Statistics*, *42*, pp. 1637-1646.

1972   Limit Laws for Extreme Order Statistics from Strong-Mixing Processes, *Annals of Mathematical Statistics, 43,* pp. 439-446.

1973   A Convergence Theorem for Extreme Values from Gaussian Sequences, *Annals of Probability, 1,* pp. 398-404. Translated into Russian.

1975   (with R. Becker) Robust Nonlinear Regression Using the DOGLEG Algorithm, *Proceedings of the Computer Science and Statistics Eighth Annual Symposium on the Interface.* Edited by J. W. Frane, Health Sciences Computing Facility, University of California at Los Angeles, pp. 272-279. (Invited paper.)

1975   Algorithms and Plots for Model Validation, *Proceedings of the NSF Vail Conference on Model Formulation, Validation, and Improvement.* Edited by E. P. Howrey. National Bureau of Economic Research, Cambridge, MA, pp. 84-92. (Invited paper.)

1976   Graphics for Data Analysis, *Computers and Graphics,* 2, No. 1, pp. 31-37.

1976   (with P. Velleman) Some Evaluation Criteria for Interactive Statistical Program Packages, *Communications in Statistics, B5(4)*, pp. 197-205.

1976   Confidence Regions for Robust Regression, *1975 Proceedings of the ASA Statistical Computing Section,* American Statistical Association, Washington, D. C., pp. 36-42. (Invited paper.)

1976   (with David Hoaglin and Steve Peters) MIT-SNAP: An Interactive Data Analysis System, *Proceedings of the Ninth Interface Symposium on Computer Science and Statistics,* edited by David C. Hoaglin and Roy E. Welsch; Prindle, Weber, and Schmidt, Boston: pp. 245-249.

1976   (with Edwin Kuh) The Variances of Regression Coefficient Estimates Using Aggregate Data, *Econometrica, 44,* pp. 353-363. Translated into French.

1977   Stepwise Multiple Comparison Procedures, *Journal of the American Statistical Association, 72,* pp. 566-575.

1977   Discussion of "Do Robust Estimators Work with Real Data?" by Stephen M. Stigler, *Annals of*

Statistics, 5, pp. 1095-1096.

1977   (with P. Holland) Robust Regression Using Iteratively Re-Weighted Least-Squares, *Communications in Statistics, Part A, 6(9)*, pp. 813-827.

1977   Nonlinear Statistical Data Analysis, *Proceedings of the Tenth Interface Symposium on Computer Science and Statistics,* edited by D. Hogben and D. Fife: National Bureau of Standards, Washington, D. C., pp. 77-86. (Invited paper.)

1978   Computing Regression Diagnostics, *Proceedings of the Stanford Conference on Numerical and Statistical Computing,* edited by Gene Golub and Virginia Klema. MIT Center for Computational Research in Economics and Management Science, Cambridge, MA (Microfiche, p. 6.)

1978   (with John Dennis) Techniques for Nonlinear Least-Squares and Robust Regression, *Communications in Statistics, B7,* pp. 345-359.

1978   (with David Hoaglin) The Hat Matrix in Regression and ANOVA, *The American Statistician, 32,* pp. 17-22 and *Corrigenda, 32*, p. 146.

1978   Discussion of "Statisticians Can Matter" by Harry V. Roberts, *The American Statistician, 32,* pp. 52-53.

1978   (with Steve Peters) Finding Influential Subsets of Data in Regression Models. *Proceedings of the Eleventh Interface Symposium on Computer Science and Statistics,* edited by A. R. Gallant and T. M. Gerig, Institute of Statistics, North Carolina State University, Raleigh, N. C., pp. 240-244.

1978   History of Bounded-Influence Estimation and Comments on Paper by Frank Hampel, David Hinkley, and R. Douglas Martin. *1978 Proceedings of the A. S. .. Statistical Computing Section,* American Statistical Association, Washington, D. C., pp. 65-67. (Invited paper.)

1979   Data Analysis, Communication, and Control, *Communications and Control in Society,* edited by Klaus Krippendorf, Gordon and Breech, Inc., London, pp. 99-114.

1979   Discussion of "Teaching Statistical Computing Using Computer Packages" by Ronald A. Thisted, T*he American Statistician, 33*, p. 34.

1979   Discussion of "Nonparametric Statistical Data Modeling" by Emanuel Parzen, *Journal of the American Statistical Association, 74*, pp. 123-124.

1979   Improving the Reliability of Econometric Models, *1979 Proceedings of the Social Statistics Section,* American Statistical Association, Washington, D. C. pp. 79-86. (Invited paper.)

1980   Robust and Bounded-Influence Regression, *Proceedings of the 42nd Session of the International Statistical Institute*, Voorburg, Netherlands. (Invited paper.)

1980   (with Edwin Kuh) Econometric Models and Their Assessment for Policy: Some New Diagnostics Applied to the Translog Energy Demand in Manufacturing. *Proceedings of the Workshop on Validation and Assessment Issues of Energy Models,* edited by S. Gass. National Bureau of Standards, Washington, D. C., pp. 445-475. (Invited paper.)

1980   Regression Sensitivity Analysis and Bounded-Influence Estimation, *Evaluation of Econometric Models*, edited by Jan Kmenta and James Ramsey: New York: Academic Press, pp. 153-167.

1980   Regression Diagnostics for Desktop Computers, *COMPSTAT 1980: Proceedings in Computational Statistics,* ed. by M. M. Barritt and D. Wishart, Physica-Verlag, pp. 283-289.

1981   (with Paul Velleman) Efficient Computing of Regression Diagnostics, *The American Statistician,*

25, pp. 234-242.

1981   (with John Dennis and David Gay) An Adaptive Nonlinear Least-Squares Algorithm. *Transactions on Mathematical Software, 7,* pp. 348-383.

1982   Influence Functions and Regression Diagnostics, *Modern Data Analysis,* edited by R. Launer and A. Siegel. Academic Press, Inc., pp. 149-169.

1982   (with William Krasker) Efficient Bounded-Influence Regression Estimation, *Journal of the American Statistical Association, 77,* pp. 596-604.

1982   Discussion of "Regression Diagnostics, Transformations, and Constructed Variables," by A. C. Atkinson, *J. R. Statist. Soc. B, 44,* 1982, pp. 1-36.

1982   (with A. Samarov) Computational Procedures for Bounded-Influence Regression, *COMPSTAT 1982: Proceedings in Computational Statistics,* edited by H. Caussinus, P. Ettinger, and R. Tomassone, Physica-Verlag Wein, pp. 412-418.

1982   Discussion of "Robust Methods in Econometrics," by Roger Koenker, *Econometric Reviews, 1*, pp. 279-284.

1983   Discussion of "Minimax Aspects of Bounded-Influence Regression," by Peter Huber, *Journal of the American Statistical Association, 78*, pp. 72-73.

1983   (with W. S. Krasker) The Use of Bounded-Influence Regression in Data Analysis: Theory, Computation and Graphics, *Computer Science and Statistics: Fourteenth Symposium on the Interface,* New York: Springer-Verlag, pp. 45-51.

1983   Diagnostics and Graphics for Influential Data, *American Society for Quality Control 37th Annual Quality Congress Transactions*, ASQC, Milwaukee, WI, pp. 7-9.

1983   Leverage, *Encyclopedia of Statistical Sciences Volume 4,* edited by S. Kotz and N. L. Johnson, New York: Wiley, pp. 610-611.

1983   Influential Data, *Encyclopedia of Statistical Sciences Volume 4,* edited by S. Kotz and N. L. Johnson, New York: Wiley, pp. 119-212.

1983   Discussion of "Developments in Linear Regression Methodology: 1959-1982," by R. R. Hocking, *Technometrics, 25,* pp. 245-246.

1983   (with W. S. Krasker and E. Kuh) Estimation for Dirty Data and Flawed Models, *Handbook of Econometrics, 1,* edited by Z. Griliches and M. D. Intrilligator, North-Holland, Amsterdam, pp. 651-698.

1985   An Introduction to Regression Diagnostics. *Proceedings of the Thirtieth Conference on the Design of Experiments in Army Research, Development, and Testing,* Report No. 85-23, U. S. Army Research Office, Research Triangle Park, N. C., pp. 1-29. (Invited paper.)

1985   (with W. S. Krasker) Resistant Estimation for Simultaneous-Equations Models Using Weighted Instrument Variables, *Econometrica, 53,* pp. 1475-1488.

1986   (with Stephen Swartz) Applications of Bounded-Influence and Diagnostic Methods in Energy Modeling, *Model Reliability*, edited by D. A. Belsley and E. Kuh, MIT Press, Cambridge, MA, pp. 154-190.

1987   Discussion of "Influential Observations, High Leverage Points, and Outliers in Linear Regression" by S. Chatterjee and A. Hadi, *Statistical Science 1,* pp. 379-416.

1987   The Next Generation: Statistical Computing in the 1990's, *Proceedings of the 46th Session of the International Statistical Institute* (Tokyo), *4*, pp. 409-413. (Invited paper.)

1988   (with David M. Gay) Maximum Likelihood and Quasi-Likelihood for Nonlinear Exponential Family Regression Models. *Journal of the American Statistical Association, 83* pp. 990-998.

1988   (with David Belsley) Modeling Energy Consumption: Using and Abusing Regression Diagnostics, *Journal of Business and Economic Statistics, 6,* pp. 442-447.

1988   (with D. A. Belsley and A. Venetoulias) Computer Guided Diagnostics, *COMPSTAT Proceedings in Computational Statistics,* edited by D. Edwards and N. E. Raun, Heidelberg: Physica-Verlag, pp. 99-106. (Invited paper.)

1989   An Alternative to C_p Model Selection that Emphasizes the Quality of Coefficient Estimation, in Probability, Statistics, and Mathematics: Papers in Honor of Samuel Karlin, edited by T. W. Anderson, K. B. Athreya and D. L. Iglehart, New York: Academic Press, pp. 357-371.

1989   Discussion of "Regression Diagnostics with Dynamic Graphics" by R. D. Cook and S. Weisberg, *Technometrics, 31*, pp. 307-308.

1989   (with D. A. Belsley and A. Venetoulias) Hypercard as an Environment for Guided Computing in Statistics. *Proceedings of the Twentieth Symposium on the Interface*. Also, Technical Report TR-67, MIT Center for Computational Research in Economics and Management Science, Cambridge, MA.

1990   (with E. Newton and A. Venetoulias) Collinearity Diagnostics: VIF's Revisited. Technical Report TR-68, MIT Center for Computational Research in Economics and Management Science, Cambridge, MA.

1992   Invited discussion of "Statistical Consulting is Scholarship" by W. J. Wilson. *The American Statistician*, 46, 302-304.

1993   (with D. Bunch and D. Gay) Subroutines for Maximum Likelihood and Quasi-Likelihood Estimation of Parameters in Nonlinear Regression Models. *Transactions on Mathematical Software*, 83, 990-998. (Also, Technical Report TR-71, MIT Center for Computational Research in Economics and Management Science.)

1995   (with P. Kempthorne and K. Chui). Generalized Gaussian Analysis of Market Risk in Multinational Financial Markets. *Bulletin of the International Statistical Institute*, 50, 209-211,

1996   (with L. Wein and M. Longtin). Sequential Screening in Semiconductor Manufacturing, II: Exploiting Spatial Dependence, *Operations Research*, 44, 173-195.

1997   (with V. Sharma). Research on Variation Reduction Using Massive Data Streams. *Bulletin of the International Statistical Institute*, 51, 289-290.

1998   (with A. Sylla and A. Samarov). Portfolio Optimization Using Non-Gaussian Return Distributions (Technical Report, Finance Research Center, Massachusetts Institute of Technology, Cambridge, MA.)

1998   (with V. Sharma, D. Boning, and S. Eppinger). A New Modeling Methodology Combining Engineering and Statistical Modeling Methods: A Semiconductor Manufacturing Application (Technical Report, Leaders for Manufacturing Program, Massachusetts Institute of Technology, Cambridge, MA.)

1998   (with H. Chen and D. Boning). Partial Least Squares (PLS) Models Using Kodak Roll-Coating Data Technical Report, Leaders for Manufacturing Program, Massachusetts Institute of Technology, Cambridge, MA.

1999   (with G. Lemus and A. Samarov). Portfolio Analysis Based on Value-at-Risk, *Bulletin of the International Statistical Institute*, Helsinki, 52, 221-222.

2000   Is Cross-Validation the Best Approach for Principal Component and Ridge Regression? *Proceedings of the 32nd Symposium on the Interface: Computing Science and Statistics*, 32, 356-361. Reprinted in corrected format in *Proceedings of the 33rd Symposium on the Interface: Computing Science and Statistics*, 33, 670-675.

2001   Cross-validated Regression Estimation. *Bulletin of the International Statistical Institute*, Seoul, 53, 223-224.

2001   (with J. Demain, K. Johnson, S. Prakashan, and A. Samarov) The Use of Machine Check Architecture (MCA) to Perform Reliability Studies on Servers. *Proceedings of the 2001 American Statistical Association Quality and Productivity Research Conference*, http://www.sematech.org/public/news/conferences/qp2001/index.htm.

2002   (with K. Chen and D. Boning) Multivariate Statistical Process Control and Signature Analysis Using Eigenfactor Detection Methods. *Proceedings of the 33rd Symposium on the Interface: Computing Science and Statistics*, 33, 271-291.

2002   (with G. Lauprete and A. Samarov) Robust Portfolio Optimization. *Metrika*, 55, 139-149. Also appeared in Dutter, R., Filzmoser, P., Gather, U., Rouseeuw, P. *Developments in Robust Statistics*, Physica-Verlag, Heidelberg, 2002, 235-245.

2002   (with E. Newton and A. Venetoulias) Collinearlity Diagnostics: VIF's Revisited, *Proceedings in Computational Statistic:s COMPSTAT 2002*, 10-11.

2003   (with G. Lauprete and A. Samarov) High Dimensional Portfolio Risk Estimation.   *Bulletin of the International Statistical Institute*, Berlin, 54th Session, CPM-014-1.

2004   (with S. Morgenthaler and A. Zenide) Algorithms for Robust Model Selection in Linear Regression in *Theory and Applications of Recent Robust Methods*, edited by M. Hubert, G. Pison, A. Struyf and S. Van Aelst, Series: Statistics for Industry and Technology, Birkhauser, Basel, 195-206.

2004   (with L. McCann) Diagnostic Data Traces Using Penalty Methods in *Proceedings in Computational Statistics: COMPSTAT 2004* edited by J. Antoch, Physica-Verlag, Heidelberg, 1481-1488.

2006   (with R. Menjoge) Comparing Variable Selection Methods in Gene Selection and Classification of Microarray Data. *Interface 2006-Computing Science and Statistics*, Vol. 38.

2007   J. Su, X. Jiang, R. Welsch, G. Whitesides, and P. So, Geometric Confinement Influences Cellular Mechanical Properties I -- Adhesion Area Dependence .   *Molecular Cellular Biomechanics,* 4, 87-104.

2007   (with X. Zhou) Application of Robust Statistics to Asset Allocation Models. *REVSTAT*, 5, 97-114. http://www.ine.pt/revstat/pdf/rs070106.pdf

2007   (with R. Menjoge and T. Nguyen) Robust Estimation or Robust Optimization for Portfolio Selection: Which Should You Use? *Bulletin of the International Statistical Institute 56th Session*, CPM019, Lisboa. (Refereed)

2007   (with L. McCann) Robust Variable Selection Using Least Angle Regression and Elemental Set Sampling*. Computational Statistics and Data Analysis.* 52, 249-257. Available at http://dx.doi.org/10.1016/j.csda.2007.01.012.

2007   Visualization and Analysis of High Resolution Cell Image Data, *Proceedings of the 2007 Interface Symposium on Computer Science and Statistics*, Pasadena, CA.

2008   A. Ng, V. Horodincu, J. Rajapakse, P. Madsudaira, R. Welsch, and J. Evans, Statistical Analysis of Drug Treated Cell Morphologies from HCS Image Data, *Proceedings of the Third IAPR Conference on Pattern Recognition in Bioinformatics*, Melbourne, 257-260.

2008   Robust Risk: Using Robust Methods to Improve Investment Performance, *Proceedings of the 2008 Interface Symposium on Computer Science and Statistics*, Durham, NC.

2008   A. Ng, J. C. Rajapakse, J. G. Evans and R. E. Welsch, "Statistical Analysis of Macrophage Cell Morphology after Microtuble Disruption," *Proceedings of the12th International Conference on Research in Computational Molecular Biology (RECOMB 2008)*, 248-249, Singapore, March 2008.

2008   M. Veronika, J. G. Evans, P. Matsudaira, R. Welsch, and J. C. Rajapakse, "Size-Specific and Brightness-Weighted Cell Tracking in 2D images," *Proceedings of the 12th International Conference on Research in Computational Molecular Biology (RECOMB 2008)*, 256-257, Singapore, March 2008.

2009.   (with R. Menjoge) Comparing and Visualizing Gene Selection and Classification Methods for Microarray Data, Chapter 2 of *Machine Learning in Bioinformatics* edited by J. Rajapakse and Y. Zhang 2009, pp. 47-68.

2009   M. Veronika, J. Evans, P. Matsudaira, R. Welsch and J. Rajapakse, Sub-population   analysis based on temporal features of high content images, *BMC Bioinformatics,* 10:   Suppl. 15, art. no. S4, Dec. 2009.

2010.   (with R. Menjoge) A Diagnostic Method for Simultaneous Feature Selection and Outlier Identification in Linear Regression, *Computational Statistics and Data Analysis*, 54, 3181-3193.

2010   (with Tri-Dung Nguyen) Robust Regression Using Semi-Definite Programming, *Computational Statistics and Data Analysis*, 54, 3212-3226

2010   (with Tri-Dung Nguyen) Outlier Detection and Robust Covariance Estimation Using Mathematical Programming, *Advances in Data Analysis and Classification*, 4(4), 301-334.

2010   (with R. Menjoge) Visualizing the Sampling Variability of Plots, *Proceedings of COMPSTAT 2010*, 1375-1382, Springer. (Refereed)

2010   A. Ng, J. C. Rajapakse, R. Welsch, P. Matsudaira, and J. Evans, A Cell Profiling Framework for Modeling Drug Responses from HCS Imaging, *Journal of Biomolecular Screening* 15(7), 858-868.

2010   Zhu, S., Matsudaira, P., Welsch, R., Rajapakse, J., Quantification of cytoskeletal protein co-localization from high content images" *Proceedings of 5th IAPR International Conference on Pattern Recognition in Bioinformatics* (PRIB 2010), Nijmegen, The Netherlands, *Lecture Notes in Bioinformatics,* LNBI 6282, pp. 289 - 300, Nov 2010. (Refereed)

2010   He, Y., Kang, C., Xu, S., Tuo, X., Trasti, S., Tai, D., Raja, A., Peng, Q., So, P., Rajapakse, J., Welsch, R., Yu, H., Towards Surface Quantification of Liver Fibrosis   Progression, *Journal of Biomedical Optics* 15(5), 1-11.

2010   Naegle, K., Gymrek, M., Joughin, B., Wagner, J., Welsch, R., Yaffe, M., Lauffenburger,   D., White, F.), PTMSCOUT: A Web Resource for Analysis of High-throughput Post-Translational Proteomic Studies, *Molecular and Cellular Proteomics*, 9(11), 2558-2570.

2011   Zheng, B., Tan, L., Mo, X., Yu, W., Wang, Y., Tucker-Kellogg, L., Welsch, R., So, P., Yu, H. Predicting *in vivo* Anti-Heptatofribrotic Drug Efficacy based on *in vitro* High-Content Analysis. *PLoS ONE* 6(11): e26230. http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0026230

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2011   S. Xu, D. Tai, A. Wee, R. Welsch, P. So, H. Yu, J. Rajapakse, Automatic scoring of liver fibrosis through combined features from different collagen groups, *Proceedings of the 33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society* (EMBC' 11), Boston, USA, Aug 28 – Sep 3, 2011. (Refereed)

2011   M. Veronika, R. Welsch, P. Matsudaira, J. Rajapakse, Correlation of cell membrane dynamics and cell motility," *BMC Bioinformatics*, 12 (Suppl.13), S19, 2011.

2011   F. Ivan, R. Welsch, V. Chow, J. Rajapakse, Estimation of the population of neutrophils induced to differentiate from the MPRO mouse promyelocytic cell line, *Proceedings of the 33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, 2011:6001-6004. doi:10.1109/IEMBS.2011.6091483. PubMed PMID: 22255707. (Refereed)

2011   (with R. Menjoge) Outlier Detection for Covariance Estimation via Feature Selection Algorithms. *Proceedings of the 58th International Statistical Institute World Statistics Congress*, Dublin, Ireland, 2011. http://www.isi2011.ie/content/access-congress-proceedings.html (Refereed)

2012   Ivan, F., Rajapakse, J., Welsch, R., Rozen, S., Narasaraju, T., Xiong, G., Englewood, B., Chow, V., Differential pulmonary transcriptomic profiles in murine lungs infected with low and highly virulent influenza H3N2 viruses reveal dysregulation of TERM1 signaling, cytokines, and chemokines. *Functional and Integrative Genomics*, 2012 Mar;12(1):105-17. doi: 10.1007/s10142-011-0247-y. Epub 2011 Aug 28. PubMed PMID: 21874528.

2012   P. A. Mundra, J. C. Rajapakse, R. E. Welsch, Bootstrapping of short time-series multivariate gene-expression data, *Proceedings of COMPSTAT 2012* (ISBN 978-90-73592-32-2), 605-616 (Refereed)

2012   Ivan FX, Tan KS, Phoon MC, Engelward BP, Welsch RE, Rajapakse JC, Chow VT. Neutrophils infected with highly virulent influenza H3N2 virus exhibit augmented early cell death and rapid induction of type I interferon signaling pathways. Genomics. 2012 Nov 27. pii: S0888-7543(12)00228-5. doi: 10.1016/j.ygeno.2012.11.008. [Epub ahead of print] PubMed PMID: 23195410.

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2013   Y. Tang and R. Welsch, Measuring the Distance Between Images and Image Uncertainty Using Wavelet Decompositions and the Earth Mover's Distance, *Proceedings of the International Statistical Institute World Statistics Congress, Hong Kong, August 2013*, pages 3767-3772 (Refereed)

2014   Z. Zhu, R. Welsch, Statistical Learning for Variable Annuity Policyholder Withdrawal Behavior,

Applied Stochastic Models in Business and Industry. January 2014 doi: 10.1002/asmb.2009
http://onlinelibrary.wiley.com/doi/10.1002/asmb.2009/abstract

2014   L. Rivera, Y. Sheffi, R. Welsch, Logistics Agglomeration in the US, *Transportation Research Part A: Policy and Practice*, Volume 59, January 2014, 222-238.

2014   S. Xu, Y. Wang, D. Tai, S. Wang, C. Cheng, Q. Peng, J. Yan, Y. Chen, J. Sun, X. Liang , Y. Zhu, J. Rajapakse, R. Welsch, P. So, A. Wee, J. Hou, H. Yu, "qFibrosis: A fully-quantitative innovative method incorporating histological features to facilitate accurate fibrosis scoring in animal model and chronic hepatitis B patients", *Journal of Hepatology* 2014 Aug; 61(2):260-9.

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2015   A. Raja, S. Xu, D. Tai, W. Sun, P. So, R. Welsch, C. Chen, H. Yu, "Differential remodeling of extra-cellular matrices by breast cancer initiating cells", *Journal of Biophotonics,* **8** 10 pp. 804-815.

2015   R. Welsch, Comments on: Robust Estimation of Multivariate Location and Scatter in the Presence of Cellwise and Casewise Contamination by C. Agostinelli, A. Leung, V. Yohai, R. Zamar *TEST 24(3),* 482-483.

2015   R. Welsch, Leadership and Scholarship: Conflict or Synergy? Chapter in *Leadership and Women in Statistics*, edited by A. Golbeck, I. Olkin, and Y. Gel, Chapman and Hall.

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2015   S. Xu, C. Kang, X. Gou, Q. Peng, J. Yan, Y. Kang, C. Cheng, W. Xia, Y. He, R. Welsch, P. So, J. Rajapakse, H. Yu, "Quantification of liver fibrosis via surface imaging of the Glisson's capsule", *Journal of Biophotonics*, July 2015.

2015   A. Anderson, R. Welsch, D. Newman, "Statistical Evaluation of the Causal Mechanisms Associated with Astronaut Shoulder Injury in Space Suits", *Aerospace Medicine and Human Performance*, Volume 86, Number 7, July 2015, pp. 606-613

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1976   *Proceedings of the Ninth Interface Symposium on Computer Science and Statistics:* Boston: Prindle, Weber and Schmidt, (co-editor with David C Hoaglin).

Working Papers and Manuscripts

1972   A Modification of the Newman-Keuls Procedure for Multiple Comparisons, Sloan School of Management Working Paper 612-72.

1972   A Multiple Comparison Procedure Based on Gaps, Sloan School of Management Working Paper 628-72.

1976   Comparing Relative and Total Cost Multiple Comparison Procedures Via James-Stein Estimators, Sloan School of Management Working Paper 892-76.

1977   (with Edwin Kuh) A Monte Carlo Study of Aggregation Effects on Regression Parameter Estimates, Sloan School of Management Working paper 950-77.

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1982   (with E. Kuh, S. Lahiri, A. Minkoff and S. Swartz) Analysis of the Validity of the Coefficient Estimates and Forecasting Properties of the RDFOR Models, Department of Energy Technical Report.

1984   (with A. Samarov) TROLL Program BIV: Bounded-Influence Instrumental Variables, Technical Report No. 44, M.I.T. Center for Computational Research in Economics and Management Science.

1992   (with P. Kempthorne and A. Samarov). Exploratory Statistical Analysis of Currency and Equity Market Volatility. IFSRC Working Paper No. 204-92.

1998   (with P. Kempthorne and A. Samarov). Measuring and Updating Currency and Equity Market Volatility. IFSRC Working Paper.

1998   (with Henri Jeancard). Forecasting Capabilities and Model Diagnostics for Auto-Regressive Conditionally Heteroskedastic Time Series. CCREMS Working Paper.

Computing Documentation

1974   TROLL Experimental Programs. CLOUDS, STARS, FACES, M.I.T. Information Processing Center.

1975	MIT-SNAP User' Manual, Sloan School of Management.
1975	TROLL Experimental Programs: Robust and Ridge Regression, M.I.T. Information Processing Center.
1978	(with Steve Peters) TROLL Experimental Programs, SENSSYS (Model Sensitivity Analysis), M.I.T. Information Processing Center.
1981	(with L. Roseman and D. Gay) NLS: Nonlinear Least-Squares Regression, TROLL Documentation Series, M.I.T. Information Processing Center.

PROFESSIONAL ACTIVITIES

Associate Editor, *Journal of Computational and Statistical Graphics*, 1992.

Associate Editor, *SIAM Review,* 1979-1981.

Associate Editor, *Journal of the American Statistical Association*, 1976-1979.

Associate Editor, *Communications in Statistics, Series B: Simulation and Computation,* 1977-1979.

Associate Editor, *Annals of Statistics*, 1974-1977.

Publications Liaison Officer, 1975, ASA Statistical Computing Section.

Secretary-Treasurer, 1978, ASA Statistical Computing Section.

IMS Committee on Special Papers, 1974-1976.

IMS Nominating Committee, 1982.

IMS Liaison to AAAS, Section T, 1982-1984.

Co-organizer of the Ninth Interface Symposium on Computer Science and Statistics (held at Harvard University, 1 and 2 April, 1976).

Co-Chairman of the Data Analysis Working Group of the Faculty Seminar on Human Experimentation in Health and Medicine, Harvard School of Public Health, 1974-1975.

Review panel for NSF Postdoctoral Fellowships, 1976-1979 (Chairman 1978).

Lecturer, 1982 Gordon Research Conference on Statistics in Chemistry and Chemical Engineering.

IMS Representative to AAAS.

AAAS, Section U, Electorate Nominating Committee, 1984-87.

Chairman, ASA Management Committee for the *Journal of Business and Economic Statistics,* 1988-89.

Member, Board of Directors of the ASA, 1990.

Vice-Chairman, Council of Sections, ASA, 1991.

Member, Board of Directors of the Quality and Productivity Research Conference, 1992

Chair-Elect, Chair, Past-Chair Section on Statistical Graphics, ASA, 1993-95

Statistical Graphics Section Representative to the ASA Council of Sections 1997-2000

Member of the Scientific Committee for ICORS (International Conference on Robust Statistics) 2005-

Associate Editor, *Computational Statistics and Data Analysis* 2008-2010

Member of the Executive Council for the International Association of Statistical Computing (IASC), 2009-2015

Member (Chair 2010-2012) of the Management Committee for the *Journal of Computational and Graphical Statistics* 2010-

Head, Management Science Area of the MIT Sloan School, 2010-2017

Chair of the ASA Journal of Computational and Graphical Statistics (JCGS) Management Committee 2020-

CONSULTING

Boston Statistical Consultants	IBM Yorktown Research Laboratory
Massachusetts Rate Setting Commission	Blue Cross of Massachusetts
Cambridge Project	Lee, Toomey and Kent
Compugraphic Corporation	Decision Research Corporation
Harvard Medical School - PBBH	Gillette North America
Management Decision Systems	Blue Cross of Maine
Bell Telephone Laboratories	Stone and Webster
Baylor College of Medicine	Beneficial Finance
Tufts New England Medical Center	Acrison, Inc.
Honeywell	Cabot Corporation
Tektronix Corporation	Cravath, Swaine and Moore
PSTAT, Inc.	Massachusetts Financial Services
United States Army	New York Stock Exchange
Tech. Ops., Inc.	Instrumentation Laboratory, Inc.
Food and Drug Administration	Fidelity Investments
World Bank	Citibank
Kodak	Lotus Development
Schlumberger, Inc.	Shawmut Bank
SAS Institute, Inc.	Numeric Investors
Rath and Strong	Lucent Technologies
Office of the Vermont Attorney General	Heater Advertising
Freedom Capital	Integral, Inc.
The Analysis Group	Inventum, Inc.
Manatt, Phelps, Phillips	Intuit
Dyson, Inc.	GMO
Analog Devices	Fieldturf
Bank of America	Analysis Group
Goodwin Proctor	UNUM
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Apple Computer	