

## CURRICULUM VITAE

### Daniel William Apley

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### 1 EDUCATION

- Ph.D.** Mechanical Engineering, The University of Michigan, August 1997.  
Concentration: Manufacturing Process Modeling, Diagnosis, and Adaptive Control  
Dissertation Committee Co-Chairs: Jan Shi and Jun Ni
- M.S.** Electrical Engineering, The University of Michigan, December 1995.  
Concentration: Signal Processing and Automatic Control
- M.S.** Mechanical Engineering, The University of Michigan, May 1992.  
Concentration: Manufacturing
- B.S.** Mechanical Engineering, The University of Michigan, May 1990.  
Concentration: Design and Automatic Control

### 2 PROFESSIONAL EXPERIENCE

- Professor**, Department of Industrial Engineering and Management Sciences, Northwestern University, Evanston, IL, 2013 – present.
- Associate Professor**, Department of Industrial Engineering and Management Sciences, Northwestern University, Evanston, IL, 2003 – 2013.
- Director**, Manufacturing and Design Engineering Program, Northwestern University, Evanston, IL, 2004 – 2008.
- Assistant Professor**, Department of Industrial Engineering, Texas A&M University, College Station, TX, 1998 – 2003.
- Post-Doctoral Research Fellow**, Department of Industrial and Operations Engineering, The University of Michigan, Ann Arbor, MI, June 1997 – July 1998.
- Visiting Researcher**, Institute for Machine Tools and Manufacturing Technology, Technical University of Berlin/Fraunhofer Society, Berlin, Germany, January – June 1995.
- Graduate Student Research Assistant**, Department of Mechanical Engineering and Applied Mechanics, The University of Michigan, Ann Arbor, MI, May 1990 – August 1993.
- Engineering Intern**, Advanced Technology Department, General Electric Company, Cleveland, OH, Fall 1988 and Summer 1989.

### 3 HONORS AND AWARDS

- Editor-in-Chief**, *Elect Technometrics*, 2016.

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**Editor-in-Chief**, *Journal of Quality Technology*, 2009—2012.

**Wilcoxon Prize**, for best practical application paper appearing in *Technometrics* in 2008, for "Blind Identification of Manufacturing Variation Patterns by Combining Source Separation Criteria," 50(3), pp. 332—343.

**2002-2003 IIE Transactions Best Paper Award**, Quality and Reliability focus, for "The Dynamic T<sup>2</sup> Chart for Monitoring Feedback-Controlled Processes," 34, pp. 1043-1053.

**Morris E. Fine Professorship in Manufacturing**, 2003 – 2006 (awarded to one junior faculty every three years in the McCormick School of Engineering and Applied Science, Northwestern University).

**Chair**, INFORMS Section on Quality, Statistics & Reliability, 2003.

**NSF CAREER AWARD**, 2001 – 2006.

**TEES Select Young Faculty Award**, 2001 (in recognition of outstanding research, this is the highest award given to untenured faculty by the Texas A&M College of Engineering and includes an unrestricted research grant).

**AT&T Bell Laboratories Ph.D. Fellowship**, Manufacturing Science, 1993 – 1997.

## 4 TEACHING AND STUDENT MENTORING

### 4.1 Courses Taught

#### Northwestern University

- IEMS 201: Introduction to Statistics
- IEMS 303: Statistics I
- IEMS 304: Statistical Tools for Data Mining
- IEMS 305: Statistical Methods for Quality Improvement
- IEMS 490: Data Mining Methods in Engineering
- IEMS 428: Quality Engineering Tools
- IEMS 401: Intermediate Statistics
- MSiA 420: Predictive Analytics

#### Texas A&M University

- INEN 689: Industrial Applications of Taguchi Methods (co-taught with G. Taguchi)
- INEN 414: Total Quality Engineering
- INEN 314: Statistical Control of Quality
- INEN 614: Advanced Quality Control
- INEN 689: Diagnosis and Control of Manufacturing Quality

### 4.2 Student Mentoring

#### Ph.D. Committees Chaired

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Jeongbae Kim, Ph.D. "A Cautious Approach to Minimizing Industrial Process Variability," 2002, Pukyong National University, Korea.

Ho-Young Lee, Ph.D. "Diagnosing Spatial Variation Patterns in Manufacturing Processes," 2003, Samsung.

Hyun-Cheol Lee, Ph.D. "Robust Design of Control Charts for Autocorrelated Processes with Model Uncertainty," 2004, Korea Aerospace University.

Chang-Ho Chin, Ph.D. "Optimal Filter Design Approaches to Statistical Process Control for Autocorrelated Processes," 2004, Kyung Hee University, Korea.

Feng Zhang, Ph.D. "Diagnosing Nonlinear Spatial Variation Patterns in Multivariate Manufacturing Processes," 2004, Fairchild Semiconductor.

Xuemei Shan, Ph.D. "Optimal Identification and Visualization of Variation Patterns," 2010, Discover Financial Services.

Paul Arendt, Ph.D. (co-chaired with Wei Chen) "Quantification and Mitigation of Multiple Sources of Uncertainty in Simulation Based Design, and Identifiability", 2012, co-advised with Wei Chen, CNA Insurance.

Joon-Ku Im, "Understanding Product and Process Variation with Complex Data," 2012, Discover Financial Services.

Ning Zhang, "Fractional Brownian Fields for Engineering Response Surface Metamodeling", 2013, Credit Suisse.

Zhen Jiang, "Model Uncertainty Quantification and Uncertainty Reduction in Simulation-Based Systems Design", co-advised with Wei Chen, 2015, Ford Research and Innovation Center, Analytics Group.

Edwin Shi, "Manifold Learning for Identifying and Visualizing Variation in High Dimensional Data", 2015, KPMG, Data & Analytics.

Liwen Ouyang, "An Optimal Design of Experiments Approach for Reliable Risk Assessment with Error-prone Electronic Medical Records", co-advised with Sanjay Mehrotra, 2016, American Express.

#### Current Ph.D. Students (Northwestern University)

Kungang Zhang, "TBD".

Ran Yang, "Handling Computational Challenges in the Analysis of Simulation Experiment Data"

Anh Bui, "Statistical Process Control of Textured Surfaces".

#### M.S. Students

Hongmei Xu, MS, June 2012.

Minjae Ok, MS, December 2009.

Kun Liu, MS, December 2008, Inner Workings.

Dongyan Xu, M.S., "Three-Dimensional Surface Measurement Using a Laser Scanner: Data Analysis and Visualization," December 2001.

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Song, Jungho, M.S., "Robustness of EWMA Control Charts on Residuals and on Observations for Autocorrelated Processes," December 2000.

Lee, Ho-Young, M.S., "Diagnosis of Manufacturing Variation using Blind Separation Methods," December 2000.

Murray, Chase, M.S., "Statistical Process Control for Composite Airframe Fabrication," August 2000.

Chin, Chang-Ho, M.S., "Dimensional Statistical Process Control for Low Volume Production," December 1999.

Lee, Hyun-Cheol, M.S., "Analysis of a GLRT for SPC of Autocorrelated Processes," August 1999.

Dissertation Committee Service, other than as Chair

Evren Baysal, "Empirical Likelihood for Value at Risk and Expected Shortfall," IEMS, Northwestern, 2008.

Ying Xiong, "Using Predictive Models in Engineering Design: Combining Computer & Physical Experiments for Uncertainty Quantification and Model Validation," ME, Northwestern, 2008.

Hai Lan, "Two-Level Simulation of Expected Shortfall: Confidence Intervals, Efficient Simulation Procedures, and High-Performance Computing," IEMS, Northwestern, 2010.

Yunpeng Sun, "Efficient Simulation and Applications in Finance," IEMS, Northwestern, 2012.

Weizeng Zhang, "Segmentation Modeling: Applications of Finite Mixture Regression Models to Management of Transportation Infrastructure and University Fundraising," CEE, Northwestern, 2014.

Ramón Torres, "Dynamic Segmentation Modeling: Application of Finite Mixture Models to Explain the Giving Behavior of Donors in the University Setting," CEE, Northwestern, 2014.

Hongyi Xu, "Stochastic Analysis and Design of Heterogeneous Microstructural Material Systems," ME, Northwestern, 2014.

He Zhang, "Distributionally Robust Optimization Models and Process Mining in Healthcare Systems," IEMS, Northwestern, 2014.

Phillip Howard, "Nonlinear Variation Pattern Discovery Using Autoassociative Networks," IE, Arizona State Univ.

Zhe Li, "Stochastic Game Models for Organ Acceptance in Liver Transplant," IEMS, Northwestern.

Xiaolei Yin, "Multiscale Design under Uncertainty" ME, Northwestern.

Yichi Zhang, "Computational Method for Design of Nanodielectric Material System", ME, Northwestern.

Undergraduate Special Projects and Directed Research

Sail Wu, "Boids Simulation and Analysis," Spring 2013.

Mun Tham, "State-of-the-Art in Laser Scanning," Fall 2004.

April Ewing, "Optical Dimensional Metrology and Data Analysis," Fall 2002.

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Nicole Rippole, "Using Designed Experiments to Optimize Detection of Bacterial Contamination in Food Testing," Spring 2000.

Paul Vo, "Survey of Commercial SPC Software for Low-Volume Production," Summer 1999.

Numerous senior design projects supervised at Northwestern and Texas A&M.

## **5 RESEARCH**

### **5.1 Research Interests**

My broad areas of research and teaching interest are:

- Industrial/engineering statistics
- Statistical learning, data mining, and predictive analytics
- Statistical quality control and six sigma variation reduction
- Manufacturing process diagnosis and automatic control

I am an industrial statistician with research interests that lie at the interface of engineering modeling, statistical analysis, and predictive analytics, especially with large and complex data structures. Much of my work addresses the problem of how to transform large amounts of data into useful information. One important application domain involves developing quantitative six sigma process improvement tools that are suitable for modern manufacturing and design processes inundated with high-dimensional, high-volume data from automated measurement, data collection, and process control technologies, coupled with CAD/CAM and computer simulation data. Some of my research in this area develops statistical methodologies for discovering and visualizing pieces of information buried in large databases that will help engineers systematically identify and eliminate root causes of product and process variation. Another body of my research in this area develops methodologies for designing and analyzing computer simulation experiments, sometimes coupled with data from physical experiments. I also conduct research solving data-intensive problems in other application domains that include business intelligence, healthcare engineering, product/process design optimization, and financial risk assessment. Recent projects in these areas include developing predictive models for strategic management of credit risk based on large-scale customer databases; Bayesian statistical analyses for product and process design optimization based on finite element computer simulations; reliable assessment of disease risk factors from error-prone electronic medical records; and statistical modeling of microstructure behavior for predictive materials science.

### **5.2 Grants and Contracts**

1. "SNM: Robust Scalable Nanomanufacturing of Photonic Structures," NSF, Cheng Sun (PI), T. Xu (Co-PI), W. Chen (Co-PI), D. Apley (Co-PI), \$1,467,239, 8/15/2015—7/31/2019.
2. "Collaborative Research: Model-Based Multidisciplinary Dynamic Decisions in Design," NSF, Daniel W. Apley (PI), W. Chen (Co-PI), \$300,000, 9/1/15—8/31/18.
3. "An Optimal Design of Experiments Approach for Reliable Risk Assessment with Error-prone Electronic Medical Records," NSF, Daniel W. Apley (PI), S. Mehrotra (Co-PI), \$399,999, 9/1/14—8/31/17.

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4. "ABC Stochastic Multiresolution Theory for Microstructure Based Predictive Materials Science," AFOSR, C. Brinson (PI), D. Apley, W. Chen, W. Liu (Co-PIs), 12/1/13—11/30/16.
5. "Collaborative Research: Leveraging Noncontact Dimensional Metrology to Understand Complex Part-to-Part Variation," NSF, Daniel W. Apley (PI), \$182,600, 8/15/13—7/31/16.
6. "Enhancing Identifiability of Computer Simulation Models via Design for Calibration," NSF, Daniel W. Apley (PI), Wei Chen (Co-PI), \$320,000, 08/01/12-07/31/15.
7. "Quantification of Model Uncertainty with Enhanced Identifiability," Battelle Memorial Institute, Wei Chen (PI), Daniel W. Apley (Co-PI), \$46,078, 09/01/11-02/29/12.
8. "Collaborative Research: Blind Discovery of Variation Sources for Visualization by Multidisciplinary Teams," NSF, Daniel W. Apley (PI), \$189,862, 8/08-8/11.
9. "Predictive Modeling for Strategic Management of Credit Risk," Discover Financial Services, Daniel W. Apley (PI), \$59,974, 6/08-12/08.
10. "A Bayesian Treatment of Uncertainty in Simulation-Based Methods for Enhancing Process and Product Robustness," NSF, Daniel W. Apley (PI), Wei Chen (Co-I), Jian Cao (Co-I), \$319,982, 6/08-6/11.
11. "CAREER: A Methodology to Systematically Characterize and Diagnose Manufacturing Variation with In-Process Measurement Data," NSF, Daniel W. Apley (PI), \$373,825, 6/01-6/08.
12. "Predictive Quality Modeling," Applied Materials, Daniel W. Apley (Co-PI), J. Leon (Co-PI), S. Thompson (Co-PI), \$85,000, 3/02-8/03.
13. "Extracting and Visualizing Manufacturing Variability Information from Coordinate Metrology Data," State of Texas Advanced Technology Program, Daniel W. Apley (PI), A. Banerjee (Co-PI), \$149,900, 1/02-12/03.
14. "Equipment Grant: Optical Coordinate Metrology Data Analysis," Texas A&M College of Engineering Permanent Equipment Fund, Daniel W. Apley (PI), A. Banerjee (Co-PI), Y. Ding (Co-PI), \$100,000, 9/01.
15. "A Thermal Signature-Based Test for Rechargeable Battery Inspection," Center for Energy and Mineral Resources, Texas A&M University, Sheng-Jen Hsieh (PI), Daniel W. Apley (Co-PI), \$24,991, 5/00-4/01.
16. "An Information-based Approach to Fully Utilize In-Process Sensing for Manufacturing Quality Control," Ford University Research Program, Daniel W. Apley (PI), \$150,000, 1/00-12/02.
17. "Defect Detection and Prevention in Printed Circuit Board Assembly Via Information Integration," Solectron Texas, Daniel W. Apley (PI), \$24,900, 1/00-8/02.
18. "Defect Detection and Prevention in Printed Circuit Board Assembly Via Information Integration," State of Texas Advanced Technology Program, Daniel W. Apley (PI), \$124,100, 1/00-8/02.
19. "Statistical Process Control for Low-Volume Composite Manufacturing," Bell Helicopter Textron Inc., Daniel W. Apley (PI), Sheng-Jen Hsieh (Co-PI), \$53,081, 6/99-6/00.

## 6 PUBLICATIONS

### 6.1 Refereed Journals (\* indicates a coauthor who was a student under my supervision)

#### *Published or Accepted*

- A1. McElroy, L. M., Khorzad, R., Rowe, T. A., Abecassis, Z. A., Apley, D. W., Barnard, C., and Holl, J. L., "Fault Tree Analysis: Assessing the Adequacy of Reporting Efforts to reduce Postoperative Bloodstream infection," American Journal of Medical Quality, to appear.
- A2. Li, W., Chen, S., Jiang\*, Z., Apley, D. W., Lu, Z., Chen, W., "Integrating Bayesian Calibration, Bias Correction, and Machine Learning for the Validation Challenge Problem," ASME Journal of Verification, Validation and Uncertainty Quantification, to appear.
- A3. Bostanabad\*, R., Bui\*, A. T., Xie, W., Apley, D. W., and Chen, W., "Stochastic Microstructure Characterization and Reconstruction via Supervised Learning," Acta Materialia, doi:10.1016/j.actamat.2015.09.044, 103, pp. 89—102.
- A4. Xu, H., Jiang\*, Z., Apley, D. W., and Chen, W., "New Metrics for the Validation of Data-Driven Random Process Models in Uncertainty Quantification," ASME Journal of Verification, Validation and Uncertainty Quantification, DOI: 10.1115/1.4031813, 1(1), pp. 011002-1—011002-14.
- A5. Chen, S., Jiang\*, Z., Yang, S., Apley, D. W., and Chen, W., "Nonhierarchical Multi-model Fusion Using Spatial Random Processes," International Journal for Numerical Methods in Engineering, to appear.
- A6. Ouyang\*, L., Apley, D. W., and Mehrotra, S., "A Design of Experiments Approach to Validation Sampling for Logistic Regression Modeling with Error-Prone Medical Records," Journal of the American Medical Informatics Association, to appear, DOI: 10.1093/jamia/ocv132.
- A7. Zhang\*, N. and Apley, D. W., "Brownian Integrated Covariance Functions for Gaussian Process Modeling: Sigmoidal Versus Localized Basis Functions," Journal of the American Statistical Association, to appear, DOI:10.1080/01621459.2015.1077711.
- A8. Arendt\*, P., Apley, D. W., and Chen, W., "A Preposterior Analysis to Predict Identifiability in Experimental Calibration of Computer Models," IIE Transactions, to appear, DOI: 10.1080/0740817X.2015.1064554.
- A9. Jiang\*, Z., Li, W., Apley, D. W., and Chen, W., "A Spatial-Random-Process Based Multidisciplinary System Uncertainty Propagation Approach with Model Uncertainty," ASME Journal of Mechanical Design, 137(10), pp. 101402, October, 2015.
- A10. Jiang\*, Z., Apley, D. W., and Chen, W., "Surrogate Preposterior Analyses for Predicting and Enhancing Identifiability in Model Calibration," International Journal for Uncertainty Quantification, DOI: 10.1615/Int.J.UncertaintyQuantification.2015012627, 5(4), pp. 341–359, October, 2015.
- A11. Shi\*, Z., Apley, D. W., and Runger, G. C., "Discovering the Nature of Variation in Nonlinear Profile Data," Technometrics, to appear.

- A12. Gramacy, R. B. and Apley, D. W., "Local Gaussian process approximation for large computer experiments," Journal of Computational and Graphical Statistics, DOI:10.1080/10618600.2014.914442, 24(2), pp. 561—578, April, 2015.
- A13. Sahu, A., Apley, D. W. and Runger, G., "Feature selection for noisy variation patterns using kernel principal component analysis," Knowledge-Based Systems, DOI: 10.1016/j.knosys.2014.08.027, 72, pp. 37—47, December, 2014.
- A14. Zhang\*, N. and Apley, D. W., "Fractional Brownian Fields for Response Surface Metamodeling," Journal of Quality Technology, 46(4), pp. 285—301, October, 2014.
- A15. Shinde, A., Sahu, A., Apley, D., and Runger, G., "Preimages for Variation Patterns from Kernel PCA and Bagging," IIE Transactions, 46(5), pp. 429—456, June, 2014.
- A16. Arendt\*, P. D., Apley, D. W., and Chen, W., "Objective - Oriented Sequential Sampling for Simulation Based Robust Design Considering Multiple Sources of Uncertainty," ASME Journal of Mechanical Design, 135(5), doi: 10.1115/1.4023922, May, 2013.
- A17. Arendt\*, P. D., Apley, D. W., and Chen, W., "Quantification of Model Uncertainty: Calibration, Model Discrepancy, and Identifiability," ASME Journal of Mechanical Design, 134(10), 100908-1—100908-12, doi:10.1115/1.4007390, October, 2012.
- A18. Arendt\*, P. D., Apley, D. W., Chen, W., Lamb, D. and Gorsich, D., "Improving Identifiability in Model Calibration Using Multiple Responses," ASME Journal of Mechanical Design, 134(10), 100909-1—100909-9, doi:10.1115/1.4007573, October, 2012.
- A19. Apley, D. W., "Posterior Distribution Charts: A Bayesian Approach for Graphically Exploring a Process Mean," Technometrics, 54(3), pp. 296 – 310, October, 2012.
- A20. Im\*, J. K., Apley, D. W., and Runger, G., "Tangent Hyperplane Kernel Principal Component Analysis for Denoising," IEEE Transactions on Neural Networks and Learning Systems, 23(4), pp. 644—656, April, 2012.
- A21. Im\*, J. K., Apley, D. W., Shan, X., and Qi, C., "A Time Dependent Proportional Hazards Survival Model for Credit Risk Analysis," Journal of the Operational Research Society, 63(3), pp. 306—321, March, 2012.
- A22. Sun\*, Y. Apley, D. W., and Staum, J., "Efficient Nested Simulation for Estimating the Variance of a Conditional Expectation," Operations Research, 59(4), pp. 998–1007, July–August 2011
- A23. Apley, D. W. and Kim\*, J. B., "A Cautious Approach to Robust Parameter Design with Model Uncertainty," IIE Transactions, 43(7), pp. 471-482, 2011.
- A24. Lee\*, H. C. and Apley, D. W., "Improved Design of Robust Exponentially Weighted Moving Average Control Charts for Autocorrelated Processes," Quality and Reliability Engineering International, 27(3), pp. 337-352, 2011.
- A25. Apley, D. W. and Lee\*, H. C., "The Effects of Model Parameter Deviations on the Variance of a Linearly Filtered Time Series," Naval Research Logistics, 57(5), pp. 460-471, August, 2010.
- A26. Apley, D. W., "Discussion of Nonparametric Profile Monitoring by Mixed Effects Modeling," Technometrics, 52(3), pp. 277-280, August, 2010.



- A27. Apley, D. W. and Lee\*, H. Y., "Simultaneous Identification of Premodeled and Unmodeled Variation Patterns," Journal of Quality Technology, 42(1), pp. 36—51, January, 2010.
- A28. Xiong, Y., Chen, W., Tsui, K. L., and Apley, D. W., "A Better Understanding of Model Updating Strategies in Validating Engineering Models," Computer Methods in Applied Mechanics and Engineering, 198, pp. 1327—1337, March, 2009.
- A29. Apley, D. W. and Lee\*, H. C., "Robustness Comparison of Exponentially Weighted Moving Average Charts on Autocorrelated Data and on Residuals," Journal of Quality Technology, 40(4), pp. 428-447, October, 2008.
- A30. Jiang, W., Shu, L., and Apley, D. W. "Adaptive CUSUM Procedures with EWMA-based Shift Estimators," IIE Transactions, 40(10), pp. 992-1003, October, 2008.
- A31. Shan\*, X. and Apley, D. W., "Blind Identification of Manufacturing Variation Patterns by Combining Source Separation Criteria," Technometrics, 50(3), pp. 332—343, August, 2008. Received the **Wilcoxon Prize** for best practical application paper appearing in Technometrics in 2008.
- A32. Chin\*, C. H. and Apley, D. W., "Performance and Robustness of Control Charting Methods for Autocorrelated Data," Journal of the Korean Institute of Industrial Engineers, 34(2), pp. 122—139, June, 2008.
- A33. Ding, Y. and Apley, D. W., "Guidelines for Placing Additional Sensors to Improve Variation Diagnosis in Assembly Processes," International Journal of Production Research, 45(23), pp. 5485-5507, December, 2007.
- A34. Xiong, Y., Chen, W., Apley, D. W., and Ding, X. "A Nonstationary Covariance Based Kriging Method for Metamodeling in Engineering Design," International Journal for Numerical Methods in Engineering, 71(6), pp. 733--756, August, 2007.
- A35. Apley, D. W., and Zhang\*, F., "Identifying and Visualizing Nonlinear Variation Patterns in Multivariate Manufacturing Data", IIE Transactions, 39(6), pp. 691-701, June, 2007.
- A36. Apley, D. W. and Chin\*, C. H., "An Optimal Filter Design Approach to Statistical Process Control," Journal of Quality Technology, 39(2), pp. 93-117, April, 2007.
- A37. Chin\*, C. H. and Apley, D. W. "Optimal Design of Second-Order Linear Filters for Control Charting," Technometrics, 48(3), pp. 337-348, August, 2006.
- A38. Apley, D. W., Liu\*, J. and Chen, W. "Understanding the Effects of Model Uncertainty in Robust Design With Computer Experiments," ASME Journal of Mechanical Design, 128(4), pp. 945-958, July, 2006.
- A39. Apley, D. W. and Ding, Y., "A Characterization of Diagnosability Conditions for Variance Components Analysis in Assembly Operations," IEEE Transactions on Automation Science and Engineering, 2(2), pp. 101-110, April, 2005.
- A40. Lee\*, H. Y. and Apley, D. W. "Diagnosing Manufacturing Variation Using Second-Order and Fourth-Order Statistics," International Journal of Flexible Manufacturing Systems, 16, pp. 45-64, 2004.
- A41. Apley, D. W. and Kim\*, J.B., "Cautious Control of Industrial Process Variability with Uncertain Input and Disturbance Model Parameters," Technometrics, 46(2), pp. 188-199, 2004.

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- A42. Ding, Y., Gupta, A., and Apley, D. W., "Singularity Issues in Fixture Fault Diagnosis for Multi-Station Assembly Processes," ASME Journal of Manufacturing Science and Engineering, 126(1), pp. 200-210, 2004.
- A43. Apley, D. W., "A Cautious Minimum Variance Controller with ARIMA Disturbances," IIE Transactions, 36(5), pp. 417-432, 2004.
- A44. Shiu, B. W., Apley, D. W., Ceglarek, D., and Shi, J., "Tolerance Allocation for Compliant Beam Structure Assemblies," IIE Transactions, 35(4), pp. 329-342, 2003.
- A45. Apley, D. W. and Lee\*, H. Y., "Identifying Spatial Variation Patterns in Multivariate Manufacturing Processes: A Blind Separation Approach," Technometrics, 45(3), pp. 220-234, 2003.
- A46. Apley, D. W. and Lee\*, H. C., "Design of Exponentially Weighted Moving Average Control Charts for Autocorrelated Processes with Model Uncertainty," Technometrics, 45(3), pp. 187-198, 2003.
- A47. Tsung, F. and Apley, D. W., "The Dynamic  $T^2$  Chart for Monitoring Feedback-Controlled Processes," IIE Transactions, 34(12), pp. 1043-1053, 2002. Received the 2002-2003 IIE Transactions Best Paper Award for Quality and Reliability.
- A48. Apley, D. W., "Time Series Control Charts in the Presence of Model Uncertainty," ASME Journal of Manufacturing Science and Engineering, 124(4), pp. 891-898, 2002.
- A49. Shu, L., Apley, D.W., and Tsung, F. "Autocorrelated Process Monitoring Using Triggered Cuscore Charts," Quality and Reliability Engineering International, 18(5), pp. 411-421, 2002.
- A50. Apley, D. W. and Tsung, F., "The Autoregressive  $T^2$  Chart for Monitoring Univariate Autocorrelated Processes," Journal of Quality Technology, 34(1), pp. 80-96, 2002.
- A51. Apley, D. W. and Shi, J., "A Factor Analysis Method for Diagnosing Variability in Multivariate Manufacturing Processes," Technometrics, 43(1), pp. 84-95, 2001.
- A52. Apley, D. W. and Shi, J., "The GLRT for Statistical Process Control of Autocorrelated Processes," IIE Transactions, 31(12), pp. 1123-1134, 1999.
- A53. Apley, D. W. and Shi, J., "An Order DOWDATING Algorithm for Tracking System Order and Parameters in Recursive Least Squares Identification," IEEE Transactions on Signal Processing, 47(11), pp. 3134-3137, 1999.
- A54. Apley, D. W. and Shi, J., "Diagnosis of Multiple Fixture Faults in Panel Assembly," ASME Journal of Manufacturing Science and Engineering, 120(4), pp. 793-801, 1998.
- A55. Shi, J. and Apley, D. W., "A Suboptimal N-step-ahead Cautious Controller for Adaptive Control Applications," ASME Journal of Dynamic Systems, Measurement, and Control, 120(3), pp. 419-423, 1998.
- A56. Apley, D. W., Seliger, G., Voit, L., and Shi, J., "Diagnostics in Disassembly Unscrewing Operations," International Journal of Flexible Manufacturing Systems, 10(2), pp. 111-128, 1998.

Under Review (Submitted or Revised)

- B1. Ouyang\*, L., Apley, D. W., and Mehrotra, S., "Batch Sample Design from Databases for Logistic Regression," submitted.

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- B2. Ouyang\*, L., Apley, D. W., and Mehrotra, S., "Designed Sampling from Databases for Controlled Trials," submitted.
- B3. Anh\*, B., Im\*, J. K., Apley, D. W., and Runger, G. "Contour Gradient Kernel Principal Component Analysis for Denoising," submitted.
- B4. Hazen, G. Apley, D. W., and Parikh, N., "ANOVA models for Brownian motion," submitted.
- B5. Yang\*, R., Apley, D. W., and Staum, J., "A Quadratic Programming Approach to Density Deconvolution with Additive Measurement Errors," submitted.
- B6. Jiang\*, Z., Arendt\*, P.D., Apley, D.W., Chen, W., "Multi-Response Approach to Improving Identifiability in Model Calibration" in Ghanem, R., Higdon, D., Owhadi, H. (eds.), Handbook of Uncertainty Quantification, Springer, submitted.
- B7. Steckley, S. G., Henderson, S. G., Ruppert, D., Yang\*, R., Apley, D. W., and Staum, J., "Estimating the Density of a Conditional Expectation," submitted.
- B8. Shi\*, Z., Apley, D. W., and Runger, G. C., "Identifying and Visualizing Part-to-Part Variation with Optical Dimensional Metrology Data," submitted.
- B9. Jiang\*, Z., Chen, S., Apley, D. W., and Chen, W "Reduction of Epistemic Uncertainty in Simulation-Based Multidisciplinary Design," submitted.
- B10. Anh\*, B. and Apley, D. W., "A General Monitoring and Diagnostic Approach for Textured Surfaces," submitted.
- B11. Plumlee, M. and Apley, D. W., "Smoothed Brownian Kriging Models for Computer Simulations," submitted.
- B12. Apley, D. W., "Visualizing the Effects of Predictor Variables in Black Box Supervised Learning Models", submitted to Journal of the American Statistical Association – Theory and Methods.
- B13. Howard, P., Apley, D. W., and Runger, G., "Identifying Nonlinear Variation Patterns with Deep Autoencoders," submitted.
- B14. Howard, P., Apley, D. W., and Runger, G., "Distinct Variation Pattern Discovery using Alternating Nonlinear Principal Component Analysis," submitted.

#### Work in Progress

- C1. Xu\*, H. and Apley, D. W., "Dual-Model Kriging for Engineering Response Surface Metamodeling."
- C2. \*Zhang, F., and Apley, D. W., "A Nonlinear Blind Source Separation Method for Diagnosing Variation Patterns in Multivariate Manufacturing Processes."

## **6.2 Books and Book Chapters**

- D1. Jiang, Z., Arendt, P. D., Apley, D. W., and Chen, W., "Multi-Response Approach to Improving Identifiability in Model Calibration," Ghanem, R., Higdon, D., and Owhadi, H. (Eds.), Handbook of Uncertainty Quantification, to appear.
- D2. Apley, D. W., "Principal Components and Factor Analysis," in N. Ye (Ed.), Handbook of Data Mining, Lawrence Erlbaum Associates, Mahwah, NJ, 2003.

### 6.3 Refereed Conference Proceedings

- E1. Zhang, Y., Apley, D. W., and Chen, W. "A Structural Equation Modeling Based Approach for Identifying Key Descriptors Microstructural Materials Design," Proceedings of the ASME IDETC/CIE 2015, Boston, Massachusetts, August 2-5, 2015.
- E2. Jiang, Z\*, Chen, S., Apley, D. W., and Chen, W., "Resource Allocation for Reduction of Epistemic Uncertainty in Simulation-Based Multidisciplinary Design," Proceedings of the ASME IDETC/CIE 2015, Boston, Massachusetts, August 2-5, 2015.
- E3. Jiang, Z\*, Li, W., Apley, D. W., and Chen, W., "A System Uncertainty Propagation Approach with Model Uncertainty Quantification in Multidisciplinary Design", Proceedings of the ASME IDETC/CIE 2014, Paper 34708, Buffalo, NY, August 17-20, 2014.
- E4. Jiang, Z\*, Chen, W. and Apley, D. W. "Preposterior Analysis to Select Experimental Responses for Improving Identifiability in Model Uncertainty Quantification", Proceedings of the ASME IDETC/CIE 2013, Paper 12457, Portland, OR, August 4-7, 2013.
- E5. Arendt, P., Apley, D., and Chen, W., "Objective-Oriented Sequential Sampling for Simulation Based Robust Design Considering Multiple Sources of Uncertainty," Proceedings of the ASME IDETC/CIE 2012, paper 70639, Chicago, IL, August 12—15, 2012.
- E6. Sahu, A., Runger, G., and Apley, D., "Image Denoising with a Multi-Phase Kernel Principal Component Approach and an Ensemble Version", IEEE Applied Imagery and Pattern Recognition Workshop, doi:10.1109/AIPR.2011.6176339, Washington, DC, October 11-13, 2011.
- E7. Arendt, P., Apley, D., and Chen, W., "Improving Identifiability in Model Calibration through Multiple Responses," Proceedings of the ASME IDETC/CIE 2011, Washington, DC, August 29—31, 2011.
- E8. Im, J. K. and Apley, D. W., "Tangent Hyperplane Kernel Principal Component Analysis for Denoising," Finalist, Student Best Paper Competition, Data Mining Section, INFORMS Annual Conference, Austin, TX, November 7—10, 2010.
- E9. Arendt, P. Chen, W. and Apley, D., "Towards a Better Understanding of the Role of Calibration and Bias Correction in Model Validation," Proceedings of the ASME IDETC/CIE 2010, Montreal, Quebec, August 15—18, 2010.
- E10. Xiong, Y., Chen, W., Apley, D., and Ding, X., "A Nonstationary Covariance Based Kriging Method for Metamodeling in Engineering Design", 11th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Portsmouth, VA, September 6-8, 2006.
- E11. Liu, J., Apley, D. W., and Chen, W., "Understanding the effects of model uncertainty in robust design with computer experiments," Proceedings of the ASME Design Engineering Technical Conference, 2006.
- E12. Apley, D. W. and Shi, J., "The Inverse QR Decomposition in Order-recursive Calculation of Least Squares Coefficients," Proceedings of the American Control Conference, Vol. 1, pp. 544–548, 1995.

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- E13. Apley, D. W. and Shi, J., "A Fault Detection, Isolation, and Identification Technique for Complex MISO Linear Systems," Proceedings of the American Control Conference, Vol. 3, pp. 2633–2637, 1994.
- E14. Shi, J. and Apley, D. W., "An Adaptive Cautious Predictive Controller for Real-time Implementation," Proceedings of the ASME International Mechanical Engineering Congress and Exposition, DSC-Vol. 55-1, pp. 167–174, 1994.
- E15. Apley, D. W. and Shi, J., "A Statistical Process Control Method for Autocorrelated Data Using a GLRT," Proceedings of the International Symposium on Manufacturing Science for the 21st Century, pp. 165–170, 1994.

#### **6.4 Non-refereed Conference Proceedings**

- F1. Arendt, P.D., Chen, W., Apley, D.W., and Zhu, P., "Multiple Responses and Design of Experiments for Improving Identifiability in Model Calibration", 9th World Congress on Structural and Multidisciplinary Optimization, June 13-17, 2011, Shizuoka, Japan.
- F2. Apley, D. W., Chen, W., and Cao, J., "A Bayesian Treatment of Uncertainty in Simulation-Based Methods for Enhancing Process and Product Robustness," Proceedings of the 2011 NSF CMMI Research and Innovation Conference, Atlanta, GA, January 2011.
- F3. Apley, D. W., "Identifying Variation Patterns in Manufacturing Measurement Data," Proceedings of 2008 NSF CMMI Grantees Conference, Knoxville, TN, January, 2008.
- F4. Apley, D. W., "Diagnosing Manufacturing Variation Root Causes with High-Dimensional Data," Proceedings of 2006 NSF DMII Grantees Conference, St. Louis, MO, July 24–26, 2006.
- F5. Apley, D. W., "Identifying and Visualizing Root Causes of Manufacturing Variation with In-Process Measurement Data," Proceedings of 2005 NSF DMII Grantees Conference, Scottsdale, Arizona, Jan. 3-6, 2005.
- F6. Apley, D. W. "A Methodology to Systematically Characterize and Diagnose Manufacturing Variation with In-Process Measurement Data," Proceedings of the 2003 National Science Foundation Design, Service and Manufacture and Industrial Innovation Grantees and Research Conference, Birmingham, AL, January 6-9, 2003.
- F7. Apley, D. W. and Kim, J. B. "A Cautious Approach to Robust Design with Model Uncertainty," Proceedings of the 2002 IIE Annual Conference, paper # 2164, Orlando, FL, May 19-21, 2002.
- F8. Apley, D. W., "A Methodology to Systematically Characterize and Diagnose Manufacturing Variation with In-Process Measurement Data," NSF DMII Grantees Conference, San Juan, Puerto Rico, Jan 7-10, 2002.

#### **6.5 Industrial Reports**

- G1. Apley, D. W., "SPC for Low Volume Composite Manufacturing at BHTI," Technical Report for Bell Helicopter Textron Inc., Texas A&M University, College Station, TX, 2000.

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- G2. Apley, D. W. and Guo, Y., "2mm Variation Reduction for the DN Body Assembly," Technical Report for Chrysler Corporation, The University of Michigan, Ann Arbor, MI, 1998.

## 7 INVITED TALKS AND CONFERENCE PRESENTATIONS

### 7.1 Invited Talks

1. "Removing the Bumps: Sigmoidal Versus Localized Basis Functions in Gaussian Process Modeling," University of Michigan invited seminar, September 16, 2015.
2. "Smoothing the Bumps: Sigmoidal Versus Localized Basis Functions in Gaussian Process Modeling," INFORMS Annual Conference, Philadelphia, PA, November 1-4, 2015.
3. "Brownian Integrated Covariance Functions for Gaussian Process Modeling of Computer Experiments," Journal of Quality Technology Invited Paper, ASA/ASQ Spring Research Conference, Cincinnati, OH, May 21, 2015.
4. "Brownian Integrated Covariance Functions for Gaussian Process Modeling of Simulation Response Surfaces: Sigmoidal Versus Localized Basis Functions," University of Wisconsin invited seminar, March 3, 2015.
5. "A DOE Approach to Validation Sampling for Logistic Regression with Error-Prone Medical Records," INFORMS Annual Conference, San Francisco, CA, November 9-12, 2014.
6. "Manifold Learning and Visualization of Variation Sources in Dimensional Metrology Data," INFORMS Annual Conference, San Francisco, CA, November 9-12, 2014.
7. Invited Discussant, Technometrics invited session on Better Statistical Modelling of Computer Experiments," Joint Statistical Meeting, Boston, MA, August 3—7, 2014.
8. "Manifold Learning for Discovering Variation Patterns in Noncontact Dimensional Metrology Data," INFORMS Annual Conference, Minneapolis, MN, October 6—9, 2013.
9. "Discussion on Directions in Statistical Process Control," INFORMS Annual Conference, Phoenix, AZ, October 14—17, 2012.
10. "Discussion on Flexible And Powerful Approaches To Process Optimization Using Bayesian Methods," Joint Statistical Meeting, San Diego, CA, August 1, 2012.
11. "Journal Editors Panel Discussion," INFORMS Annual Conference, Charlotte, NC, November 15, 2011.
12. "Statistical Process Control for Image and High-Dimensional Data," INFORMS Annual Conference, Charlotte, NC, November 15, 2011.
13. "Engineering Response Surface Metamodeling Using Fractional Brownian Fields (and other Kriging Fixes)," Illinois Institute of Technology, Chicago, IL, March 7, 2011.
14. "Tangent Hyperplane Kernel Principal Component Analysis for Denoising," INFORMS Annual Conference, Austin, TX, November 7, 2010.
15. "Discovering Nonlinear Variation Patterns in Complex Data Sets," INFORMS Annual Conference, Austin, TX, November 8, 2010.

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16. "Fractional Brownian Random Fields for Kriging," INFORMS Annual Conference, Austin, TX, November 7, 2010.
17. "Manifold Learning: Discovering Nonlinear Variation Patterns in Complex Data Sets," Georgia Tech, Atlanta, GA., March 12, 2010.
18. "Vision for the Journal of Quality Technology," Journal Editors Panel Discussion, INFORMS Annual Conference, San Deigo, October 11, 2009.
19. "Status and Vision for the Journal of Quality Technology," JQT Editorial Review Board meeting, ASA Joint Statistical Meeting, Washington DC, August 3, 2009.
20. "Identifying and Visualizing Nonlinear Variation Patterns in Multivariate Manufacturing Data," IIE Transactions Editor's Choice invited paper session, INFORMS Annual Conference, Washington D.C., October 12, 2008.
21. "Blind Identification of Manufacturing Variation Patterns by Combining Source Separation Criteria," (Xuemei Shan presenting) QSR Best Student Paper Competition, INFORMS Annual Conference, Seattle, WA, November 12, 2007.
22. "An Optimal Filter Design Approach to Statistical Process Control," Journal of Quality Technology Invited Paper, Fall Technical Conference of the American Statistical Association and the American Society for Quality, Jacksonville, FL, October 12, 2007.
23. "Using Complex Measurement Data to Discover Sources of Manufacturing Variation," University of Tennessee, Knoxville, TN, September 24, 2007.
24. "An Optimal Filter Design Approach to Statistical Process Control," Journal of Quality Technology Invited Paper, Joint Statistical Meetings of the American Statistical Association, Salt Lake City, UT, August 1, 2007.
25. "Discovering Sources of Manufacturing Variation with High-Dimensional Data," Arizona State University, Tempe, AZ, November 14, 2006.
26. "Six Sigma Tools for Modern Manufacturing and Design Processes: Making Effective Use of Data and Information," Northwestern Mornings at McCormick Seminar, Evanston, IL, Oct. 12, 2006.
27. "Quantifying Simulation Uncertainty in Computer Experiments for Robust Design," INFORMS Annual Conference, San Francisco, CA, Nov. 13, 2005.
28. "Blind Identification and Visualization of Manufacturing Variation Sources," Center for Quality and Productivity Improvement, University of Wisconsin, Madison, WI, Nov. 19, 2004.
29. "The Dynamic T<sup>2</sup> Chart for Monitoring Feedback-Controlled Processes," IIE Transactions Best Paper Presentation, Industrial Engineering Research Conference, Houston, TX, May 18, 2004.
30. "Blind Identification and Visualization of Manufacturing Variation Sources," Department of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, GA, May 11, 2004.
31. "Identifying and Visualizing Root Causes of Manufacturing Variation Using Multivariate In-Process Measurement Data," Ford Motor Company, Dearborn, MI, February 5, 2004.

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32. "Blind Source Separation Methods for Identifying Root Causes of Manufacturing Variation," Department of Systems & Industrial Engineering, University of Arizona, Tucson, AZ, November 13, 2003.
33. "Identifying Spatial Variation Patterns in Multivariate Manufacturing Processes," Highlights of NSF-Sponsored Research Presentation, INFORMS, Atlanta, GA, Oct 19-21, 2003.
34. "Model Sensitivity Analysis of EWMA Control Charts for Autocorrelated Data," Technometrics Best Paper Presentation, INFORMS, Atlanta, GA, Oct 19-21, 2003.
35. "Diagnosis and Control of Manufacturing Variation with In-Process Measurement," Department of Mechanical and Industrial Engineering Seminar, University of Illinois at Urbana-Champaign, February 2003.
36. "Monitoring, Diagnosis and Control of Manufacturing Variation with In-Process Measurement," Department of Industrial Engineering and Management Sciences Seminar, Northwestern University, January 2003.
37. "The GLRT for Statistical Process Control of Autocorrelated Processes," IIE Transactions Best Paper Presentation, INFORMS, Miami Beach, FL, Nov 3-7, 2001.
38. "Statistical Process Diagnosis Tools for Printed Circuit Assembly," Solectron Texas, Austin, TX, June 8-9, 2000.
39. "SPC for Low Volume Composite Manufacturing," Bell Helicopter Textron, Inc., Fort Worth, TX, March 17, 2000.
40. "Statistical Process Monitoring, Diagnosis, and Control in Manufacturing," Department of Industrial Engineering Seminar Series, Texas A&M University, March 1999.
41. "Model-Based Statistical Methods for In-Process Quality Improvement in Manufacturing," Department of Industrial Engineering Seminar, Texas A&M University, February 1998.
42. "Model-Based Statistical Methods for In-Process Quality Improvement in Manufacturing," Department of Industrial and Manufacturing Engineering Seminar, Penn State University, March 1998.
43. "Adaptive Vibration Control of a Coordinate Measuring Machine," NSF Industry/University Cooperative Research Center, April 1994.

## 7.2 Other Conference Presentations

1. Zhang, N, and Apley, D. W., "Filtered Brownian Fields for Engineering Response Surface Metamodeling," INFORMS Annual Conference, Phoenix, AZ, October 14—17, 2012.
2. Sahu, A., Apley, D. W., and Runger, G. "Preimages for Visualization of Variation Patterns from Kernel Distance and Bagging," INFORMS Annual Conference, Phoenix, AZ, October 14—17, 2012.
3. Hazen, G., Parikh, N., Baker, T. and Apley, D. W., "Random Effects ANOVA for Testing Heterogeneity of Brownian Motion Cancer Growth," INFORMS Annual Conference, Phoenix, AZ, October 14—17, 2012.



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4. Xu, H. and Apley, D. W., "Dual-Response Kriging for Engineering Response Surface Metamodeling," Spring Research Conference on Statistics in Industry and Technology, Evanston, June 22-24, 2011.
5. Zhang, N. and Apley, D. W., "Fractional Brownian Fields for Engineering Response Surface Metamodeling," Spring Research Conference on Statistics in Industry and Technology, Evanston, June 22-24, 2011.
6. Im, J. K. and Apley, D. W., "Discovering Nonlinear Variation Patterns in High-Dimensional Data," Spring Research Conference on Statistics in Industry and Technology, Evanston, June 22-24, 2011.
7. Chin, C. H. and Apley, D. W., "Optimal Numerical Design of Control Charts," INFORMS Annual Conference, San Deigo, October 14, 2009.
8. Chin, C. H. and Apley, D. W., "A Generic Numerical Look at the Optimality of Control Charts," INFORMS Annual Conference, Washington D.C., October 12, 2008.
9. Apley, D. W., "Linear Control Chart Filters: Performance Optimization and Robustness," INFORMS Annual Conference, Seattle, WA., Nov. 4-7, 2007.
10. Shan, X. and Apley, D. W., "Blind Sequential Identification of Manufacturing Variation Sources", INFORMS Annual Conference, Pittsburgh, PA., Nov. 5-8, 2006.
11. Liu, J. Apley, D. W., and Chen, W., "Understanding the Effects of Model Uncertainty in Robust Design with Computer Experiments," Proceedings of the ASME 2006 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE), Philadelphia, PA, September 10-13, 2006.
12. Shan, X. and Apley, D. W., "Optimally Combining Blind Source Separation for Identifying Root Causes of Manufacturing Variation," INFORMS Annual Conference, San Francisco, CA, Nov. 12-15, 2005.
13. Apley, D. W. and Lee, H. C., "Treatment of Time Series Modeling Errors in Control Charts for Autocorrelated Data," INFORMS Annual Conference, Denver, CO, Oct. 24-27, 2004.
14. Apley, D. W., "Linear Filtering Methods for Statistical Process Control with Autocorrelated Data," INFORMS Annual Conference, Denver, CO, Oct. 24-27, 2004.
15. Zhang, F. and Apley, D. W., "Nonlinear Blind Source Separation for Diagnosing Multiple Manufacturing Variation Patterns," INFORMS Annual Conference, Denver, CO, Oct. 24-27, 2004.
16. Chin, C. H. and Apley, D. W., "Optimal Design of General Linear Filters for Statistical Process Control," Industrial Engineering Research Conference, Houston, TX, May 18, 2004.
17. Lee, H. C. and Apley, D. W., "Robust Design of Residual-Based EWMA Control Charts," Industrial Engineering Research Conference, Houston, TX, May 16, 2004.
18. Lee, H. C. and Apley, D. W., "Model Sensitivity Analysis of EWMA Control Charts for Autocorrelated Data," INFORMS Annual Conference, Atlanta, GA, Oct 19-21, 2003.
19. Chin, C. H. and Apley, D. W., "Optimal Linear Filters for Control Charting," INFORMS Annual Conference, Atlanta, GA, Oct 19-21, 2003.

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20. Apley, D. W., "A Cautious Approach to Robust Design with Model Uncertainty," INFORMS Annual Conference, San Jose, CA, Nov 17-20, 2002.
21. Zhang, F. and Apley, D. W., "Nonlinear Principal Components Analysis for Diagnosing Manufacturing Variation," INFORMS Annual Conference, San Jose, CA, Nov 17-20, 2002.
22. Lee, H. Y. and Apley, D. W., "Identifying Root Causes of Manufacturing Variation Using Blind Source Separation," INFORMS Annual Conference, San Jose, CA, Nov 17-20, 2002.
23. Apley, D. W., "Diagnosing Manufacturing Variation Via Blind Source Separation," 2002 Spring Research Conference on Statistics in Industry and Technology, Ann Arbor MI, May 20-22, 2002.
24. Apley, D. W. and Shi, J., "The GLRT for Statistical Process Control of Autocorrelated Processes," IIE Transactions Best Paper Presentation, INFORMS, Miami Beach, FL, Nov 3-7, 2001.
25. Chin, C. H. and Apley, D. W., "An Optimal Filter Design Approach to SPC for Autocorrelated Processes" INFORMS Fall Conference, San Antonio, TX, Nov 4-8, 2000.
26. Kim, J. B. and Apley, D. W., "Robust Minimum Variance Control with Model Uncertainty" INFORMS Fall Conference, San Antonio, TX, Nov 4-8, 2000.
27. Apley, D. W., "Model Uncertainty in SPC for Autocorrelated Processes" INFORMS Spring Conference, Salt Lake City, UT, May 7-10, 2000.
28. Apley, D. W., "A Multivariate Approach to Monitoring Univariate Autocorrelated Processes" INFORMS Spring Conference, Salt Lake City, UT, May 7-10, 2000.
29. Apley, D. W., "Model-based Factor Rotation for Diagnosing Root Causes of Variation in Multivariate Processes" INFORMS Spring Conference, Cincinnati, OH, May 1-4, 1999.
30. Apley, D. W. and Shi, J., "Statistical Methods for Diagnosing Tooling Failures in Autobody Assembly," INFORMS Spring Conference, Montreal, Canada, April 26-29, 1998.
31. Apley, D. W. and Shi, J., "Diagnosis of Multiple Fixture-Related Faults in Panel Assembly," Industrial Engineering Research Conference, Miami Beach, FL, May 16-18, 1997.
32. Apley, D. W. and Shi, J., "A GLRT for SPC of Autocorrelated Processes," Industrial Engineering Research Conference, Miami Beach, FL, May 16-18, 1997.

## 8 SERVICE

### 8.1 Editorial

**Editor-in-Chief, Elect *Technometrics***, 2016.

**Editor-in-Chief, *Journal of Quality Technology***, 2009—present.

**Associate Editor, *Technometrics***, July 2002—2009.

**Editorial Review Board, *Journal of Quality Technology***, January 2004 – present.

**Referee:**

- *Journal of the American Statistical Association*
- *Technometrics*
- *Journal of Quality Technology*
- *Naval Research Logistics*
- *American Institute of Aeronautics and Astronautics (AIAA) Journal*
- *IIE Transactions on Quality and Reliability Engineering*
- *ASME Journal of Manufacturing Science and Engineering*
- *ASME Journal of Dynamic Systems, Measurement, and Control*
- *IEEE/ASME Transactions on Mechatronics*
- *IEEE Transactions on Reliability*
- *IEEE Transactions on Antennas and Propagation*
- *IEEE Transactions on Neural Networks*
- *IEEE Transactions on Neural Networks and Learning Systems*
- *SME Journal of Manufacturing Systems*
- *Quality Engineering*
- *Quality and Reliability Engineering International*
- *International Journal of Adaptive Control and Signal Processing*
- *Shock and Vibration Digest*
- *International Journal of Flexible Manufacturing Systems*
- *International Journal of Management Science*
- *Annals of the Institute of Statistical Mathematics*
- *International Journal of Production Research*
- *ASME Journal of Mechanical Design*
- *Journal of Statistical Computation and Simulation*
- *Computers & Industrial Engineering*
- *Communications in Statistics – Theory and Methods*
- *Journal of Structural and Multidisciplinary Optimization*
- *Transportation Science*
- *Computational Mechanics*
- *Operations Research*

## **8.2 Government and Professional Institutions**

**Editor Search Committee**, *Journal of Quality Technology*, 2011.

**Nominating Committee**, *Technometrics Youden and Wilcoxon Awards*, 2006.

**Awards Committee**, *IIE Transactions Best Paper Award*, 2005.

**Chair**, *INFORMS Section on Quality, Statistics & Reliability*, 2003.

**Vice-Chair**, *INFORMS Section on Quality, Statistics & Reliability*, 2002.

**Secretary and Treasurer**, *INFORMS Section on Quality, Statistics & Reliability*, 2000 and 2001 (two terms).

**Proposal Review**, *NSF IRES Program*, Nov 2007.

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**Proposal Review**, Hong Kong Research Grant Council, May 2007.

**Panelist**, NSF proposal review panel, May, 2013.

**Panelist**, NSF proposal review panel, April, 2009.

**Panelist**, NSF proposal review panel, June 2004.

**Panelist**, NSF proposal review panel, May 2003.

**Panelist**, NSF proposal review panel, December 2000.

**Vice-President**, Brazos Valley Chapter of IIE, 2000.

**Panelist**, NSF proposal review panel, June 1999.

### 8.3 Departmental

#### *Northwestern University*

**Member**, Nemhauser Awards Committee, 2014—2015.

**Member**, IEMS Faculty Search Committee, 2013—2014.

**Member**, IEMS Graduate Committee, 2010—current.

**Organizer**, IEMS seminar series, 2011—2012.

**Member**, IEMS Faculty Search Committee, 2010—2011.

**Chair**, Nemhauser Dissertation Committee, 2010—2011.

**Member**, IEMS Undergraduate Committee, 2003—2010.

**Honors Advisor**, IEMS Undergraduate Honors Program, 2009—2010.

**Chair**, IEMS Awards Committee, 2008—2010.

**Chair**, MaDE ABET Committee, 2005—2008.

**ABET Coordinator**, MaDE Program, 2005.

**Organizer**, IEMS seminar series, 2005 - 2006.

**Undergraduate Program Chair**, IEMS, 2007.

#### *Texas A&M University*

**Chair**, Industrial Engineering Scholarship Committee, 2002 - 2003.

**Member**, Industrial Engineering ABET Coordination Committee, 2002 - 2003.

**Member**, Industrial Engineering Faculty Search Committee, 2000 - 2002.

**Member**, Industrial Engineering Undergraduate Committee, 1999 - 2003.

**Member**, Industrial Engineering Graduate Committee, 1998 - 1999.

### 8.4 College and University

#### *Northwestern University*

**Member**, Northwestern Faculty Senate, 2012 - present.

**Member**, Benefits Committee, Northwestern Faculty Senate, 2013 - present.

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**Member**, Budget Committee, Northwestern Faculty Senate, 2012 - 2013.

**Director**, Manufacturing and Design Engineering (MaDE) program, 2004 - 2008.

**Member**, McCormick Undergraduate Council, 2006 - 2008.

**Member**, IDEA Prototyping Shop Committee, 2006 - present.

**Member**, McCormick Academic Standing Committee, 2004 - 2005.

**Volunteer Judge**, Undergraduate Research Symposium, May 24, 2004.

**Volunteer Judge**, EDC Poster Fair, March 13, 2004.

Texas A&M University

**Member**, Industrial Engineering Department Head Search Committee, 2002-2003.

## 8.5 Conference Organization

**Session Organizer and Chair**, Journal of Quality Technology Editor's Choice Session, INFORMS Annual Conference, Phoenix, AZ, October 14—17, 2012.

**Session Organizer**, Journal of Quality Technology Invited Session, Second International Conference on the Interface Between Statistics and Engineering (ICISE), Tainan, Taiwan, June 23-25, 2012.

**Program Committee**, Second International Conference on the Interface Between Statistics and Engineering (ICISE), National Cheng Kung University, Tainan, Taiwan, June 23-25, 2012.

**Session Organizer and Chair**, Journal of Quality Technology Editor's Choice Session, INFORMS Annual Conference, Charlotte, NC, November 15, 2011.

**Session Chair**, Session on Space Filling Designs, Spring Research Conference on Statistics in Industry and Technology, Evanston, June 22-24, 2011.

**Organization Committee**, Spring Research Conference on Statistics in Industry and Technology, Evanston, June 22-24, 2011.

**Session Organizer and Chair**, Journal of Quality Technology Invited Session, Spring Research Conference on Statistics in Industry and Technology, Evanston, June 22-24, 2011.

**Session Organizer and Chair**, Journal of Quality Technology Editor's Choice Session, INFORMS Annual Conference, Austin, TX, November 7, 2010.

**Session Organizer and Chair**, Journal of Quality Technology Invited Paper Session, ASQ Fall Technical Conference, Birmingham, AL, October 8, 2010.

**Organizer**, Journal of Quality Technology ERB Meeting, ASA Joint Statistical Meeting, Vancouver BC, August 2, 2010.

**Session Organizer and Chair**, Journal of Quality Technology Editor's Choice Session, INFORMS Annual Conference, San Diego., October 11, 2009.

**Session Organizer and Chair**, Journal of Quality Technology Invited Paper Session, ASQ Fall Technical Conference, Indianapolis, October 9, 2009.

**Organizer**, Journal of Quality Technology ERB Meeting, ASA Joint Statistical Meeting, Washington DC, August 3, 2009.

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**Session Organizer and Chair**, Journal of Quality Technology Editor's Choice Session, INFORMS Annual Conference, Washington D.C., October 13, 2008.

**Session Organizer and Chair**, Session on "Control Charting with Complex Data Structures", INFORMS Annual Conference, Seattle, WA, Nov. 4-7, 2007.

**Session Organizer and Chair**, Panel Discussion on "Teaching Quality Engineering in IE/OR Programs," INFORMS Annual Conference, Pittsburgh, PA., Nov. 5-8, 2006.

**Session Organizer and Chair**, Session on "Process monitoring and diagnosis," INFORMS Annual Conference, San Francisco, CA, Nov. 12-15, 2005.

**Session Organizer and Chair**, Session on Distributed Sensing III, INFORMS Annual Conference, Denver, CO, Oct. 24-27, 2004.

**Organizer and Chair**, QSR Best Student Paper Contest, INFORMS Annual Conference, Atlanta, GA, October 19-22, 2003.

**Cluster Organizer**, INFORMS Annual Conference, San Jose, CA., November 17-20, 2002 (organized cluster of 14 sessions on topics related to Quality, Statistics & Reliability).

**Session Organizer and Chair**, Session on Automatic Process Control Methods for Quality Improvement, INFORMS Annual Conference, San Jose, CA, November 17-20, 2002.

**Session Organizer and Chair**, Session on SPC for Complex-structured Data and Processes, INFORMS Fall Conference, San Antonio, TX, November 4-8, 2000.

**Session Organizer and Chair**, Session on Multivariate Statistical Quality Control, INFORMS Spring Conference, Salt Lake City, UT, May 7-10 2000.

**Session Organizer and Chair**, Session on Model-based Statistical Process Control and Diagnosis, INFORMS Spring Conference, Cincinnati, OH, May 1-4 1999.

**Session Organizer and Chair**, Session on Multivariate Statistical Process Control and Diagnosis, INFORMS Spring Conference, Cincinnati, OH, May 1-4 1999.

**Session Co-Organizer and Chair**, Session on Advanced Maintenance Technologies, ASME International Mechanical Engineering Congress and Exposition, Anaheim, CA, November 1998.

**Organization Committee**, Symposium on Advanced Maintenance Methodologies and Technologies, ASME International Mechanical Engineering Congress and Exposition, Anaheim, CA, November 1998.

**Organizer**, Quality Technology Forum, Texas A&M University, November 1998.

**Session Chair**, Session on Identification and Adaptive Control, American Control Conference, Seattle, WA, 1995.

## 9 PROFESSIONAL AFFILIATIONS

- Institute for Operations Research and the Management Sciences (INFORMS)
- Institute of Industrial Engineers (IIE)
- American Society of Mechanical Engineers (ASME)
- Institute of Electrical and Electronics Engineers (IEEE)
- Society of Manufacturing Engineers (SME)
- American Statistical Association (ASA)