Curriculum Vitae

Bruce E. Ankenman

Northwestern University, Evanston, IL USA

As a design engineer in the automotive parts industry, Bruce Ankenman found that an engineer's job depends on the ability to efficiently collect and analyze data. Since many engineers have limited access to statistical methods, his research has centered around developing simple-to-use, yet statistically powerful tools for the design and analysis of both physical and simulation-based experiments.

In 2016 at the Segal Design Institute, Bruce co-developed a course with Professor Pam Daniels called Designing Your Life for Northwestern. It was inspired by the course of the same name at Stanford. The course is now offered multiple times per year and has drawn high praise from undergraduate students from across all schools at Northwestern.

In 2022, Bruce and Professor Joe Holtgreive co-founded the Northwestern Personal Development StudioLab, which offers classes, a certificate, resources, events and materials to enhance the personal development of undergraduate students at Northwestern.

Education

Northwestern University (The Family Institute)	M.A. (exp. 2024) Counseling
University of Wisconsin-Madison	Ph.D. (1995), Industrial Engineering
University of Wisconsin-Madison	M.S. (1990), Manufacturing Systems Eng.
Case Western Reserve University	B.S. (1984), Electrical Engineering

Employment History

Academic Experience

2015-present	Professor, Northwestern University
2002-2015	Associate Professor, Northwestern University
1996-2002	Assistant Professor, Northwestern University
1990-1995	Research Assistant, UW-Madison, Ctr. for Quality and Productivity Imp.
1989-1990	Teaching Assistant, UW-Madison, Dept. of Mechanical Engineering

Industrial Experience

Apr.-Dec. 1995	Research Statistician, The Lubrizol Corporation, Wickliffe, OH
1988-1989	Project Engineer, Therm-O-Disc, Inc., Mansfield, OH
1984-1988	Design Engineer, Therm-O-Disc, Inc., Mansfield, OH
1984-1989	

Refereed Journal Publications

S. J. Freeman, B. Radonski, L. Lecka, K. Davis, G. Prince, K. Carthy, J. J. Seley, J. Song, J. Lee, S. C. Bailey, R. Khorzad, D. Gatchell, B. Ankenman, D. R. Lewis, J. Holl, A.Wallia (2023), SAT116 Utilizing User-centered Design And Usability And Skills Testing For Remote Diabetes Survival Skills Training, Journal of the Endocrine Society, Volume 7, Issue Supplement_1.

M. Plumlee, C. B. Erickson, B. E. Ankenman, E. Lawrence. (2021) "Composite grid designs for adaptive computer experiments with fast inference." *Biometrika*, **108**, 749-755.

Mayampurath, A., Parnianpour, Z., Richards, C.T., Meurer, W.J., Lee, J., Ankenman, B., Perry, O., Mendelson, S.J., Holl, J.L. and Prabhakaran, S. (2021). Improving Prehospital Stroke Diagnosis Using Natural Language Processing of Paramedic Reports. *Stroke*, **52**, 2676-2679.

Prince, G., Lewis, D. R., Pollack, T., Karam, S., Touma, E., Khorzad, R., Bailey, S., Gatchell, D., Ankenman, B., Holl, J., & Wallia, A. (2021). Employing User-Centered Design and Learning Science Theory to Enhance Remote Delivery of Diabetes Education and Survival Skills at Hospital Discharge. *Journal of the Endocrine Society*, **5**, 447.

Erickson, C.B., Ankenman, B.E., Plumlee, M., & Sanchez, S.M. (2021). Gradient-based criteria for sequential experiment design. *Quality and Reliability Engineering International*, **37**, 3084-3107.

Coyne, K., Hakimian, S., Pollack, T., Karam, S., Prince, G., Touma, E., Gatchell, D.W., Khorzad, R., Ankenman, B., Holl, J. L., Wallia, A. (2020) "631-P: Front-Line Clinician Perspectives on Immediate Self-Care Needs of Patients with Diabetes." Diabetes (New York, N.Y.) 69.Supplement_1 (2020).

Lane, J.N., Ankenman, B., Iravani, S. (2018) Insight into Gender Differences in Higher Education: Evidence from Peer Reviews in an Introductory STEM Course. *Service Science* **10**, 442-456.

Erickson, C.B., Ankenman, B.E., and Sanchez, S.M. (2018) "Comparison of Gaussian process modeling software", *European Journal of Operational Research*, **266**, 179-192.

Duan, W., Ankenman, B. E., Sanchez, S., and Sanchez, P. (2017) "Sliced Full-Factorial Latin Hyper Cube Designs as a Framework for a Batch Sequential Design Algorithm." *Technometrics*, **59**, 11-22.

Ankenman, B.E., Cheng, R.C.H., Lewis, S. M. (2014) "Screening for Dispersion Effects by Sequential Bifurcation." *ACM: Transactions on Modeling and Computer Simulation*, **25**, 2:1-2:27.

Alaeddini, A., Yang, K., Mao, H., Murat, A., and Ankenman, B. (2013) "An Adaptive Sequential Experimentation Methodology for Expensive Response Surface Optimization– Case Study in Traumatic Brain Injury Modeling," *Quality and Reliability Engineering International*, **30**, 767–793.

Dingus, C., Ankenman, B., Dean, A., and Sun, F. (2013) "Identification of dispersion effects in replicated two-level fractional factorial experiments," *Journal of Statistical Theory and Practice*, **7**, 687-702.

Alaeddini, A., Yang, K., Murat, A., and Ankenman, B. (2012) "An Efficient Adaptive Sequential Methodology for Expensive Response Surface Optimization," *Quality and Reliability Engineering International*, **29**, 799–817.

Chen, X., Ankenman, B. E. and Nelson, B. L. (2012) "Enhancing Stochastic Kriging Metamodels with Gradient Estimators," *Operations Research*, **61**, 512-528.

Chen, X., Ankenman, B. E., and Nelson, B. L. (2012) "The Effects of Common Random Numbers on Stochastic Kriging Metamodels," *ACM: Transactions on Modeling and Computer Simulation,* **22**, 7/1-7/20.

Yang, F., Liu, J., Nelson, B. L., Ankenman, B. E. and Tongarlak, M. (2011) "Metamodeling for cycle time-throughput-product mix surfaces using progressive model fitting," Production Planning and Control, 22, 50-68.

Tamhane, A. C., Qiu, D., and Ankenman, B. E. (2010) "A parametric mixture model for clustering multivariate binary data," *Statistical Analysis and Data Mining*, **3**, 3-19.

Tongarlak, M. H., Ankenman, B. E., Nelson, B. L., Borne, L. and Wolfe, K. (2010), "Using Simulation Early in the Design of a Fuel Injector Production Line," *Interfaces*, **40**, 107-117.

Wan, H., Ankenman, B. E. and Nelson, B. L. (2010). "Improving the Efficiency and the Efficacy of Controlled Sequential Bifurcation," *INFORMS Journal on Computing*, **22,** 482-492.

Ankenman, B. E., Nelson, B. L. and Staum, J. (2010) "Stochastic Kriging for Simulation Metamodeling," *Operations Research*, **58**, 371-382.

Hoyle, C., Chen, W., Ankenman, B., Wang, N. (2009), "Optimal Experimental Design of Human Appraisals for Modeling Consumer Preferences in Engineering Design", *ASME Journal of Mechanical Design*, **131**, 071002.

Ankenman B., Benjamin S., and Jacob P. (2008) "An innovative design program for engineering students," *Topics in Stroke Rehabilitation*, **15**, 145-145.

Yang, F., Ankenman, B. E., and Nelson, B. L. (2008) "Estimating Cycle Time Percentile Curves for Manufacturing Systems via Simulation," *INFORMS Journal on Computing,* **20**, 628-643.

Wan, H. and Ankenman, B. E. (2007) "Two-Stage Controlled Fractional Factorial Screening for Simulation Experiments," *Journal of Quality Technology,* **39**, 126-139.

Yang, F., Ankenman, B. E., and Nelson, B. L. (2007) "Efficient Generation of Cycle Time-Throughput Curves through Simulation and Metamodeling," *Naval Research Logistics*, **54**, 78-93.

Easter, E. P. and Ankenman B. E. (2006) "Evaluation of the care and performance of comfort-stretch knit fabrics," *AATCC Review*, **6**, 28-32.

Wan, H., Ankenman, B. E. and Nelson, B. L. (2006). "Controlled Sequential Bifurcation:A New Factor-Screening Method for Discrete-Event Simulation," *Operations Research*, **54**, 743-755.

Easter, E. P. and Ankenman B. E. (2005) "A comparison of soil repellent vs. dual action fluorocarbon finishes on cotton blends." *AATCC Review*, **5**, 27-31.

Easter, E. P. and Ankenman B. E. (2004) "Care practices for fluorocarbon treated garments: A case study." *AATCC Review*, **4**, 12-16.

Ankenman, B., Colgate J. E., and McKenna A. (2004) IDEA, Implementing design throughout the curriculum at Northwestern, *International Journal of Engineering Education*, 20,405-411.

Ankenman, B. E. (2003). "Identifying Rising Ridge Behavior in Quadratic Response Surfaces," *IIE Transactions*, **35**, 493-502.

Ankenman, B. E., Aviles, A. I. and Pinhiero, J. C. (2003). "Optimal Designs for Mixed-Effects Models with two Random Nested Factors," *Statistica Sinica*, **13**, 385-401.

Tamhane, A. C., Ankenman, B. E. and Yang, Y. (2002). "The Beta Distribution as a Latent Response Model for Ordinal Data (I): Estimation of Location and Dispersion," *Journal of Statistical Computation and Simulation*, **72**, 473-494.

Ankenman, B. E., Liu, H., Karr, A. F. and Picka, J. D. (2002). "A Class of Experimental Designs for Estimating a Response Surface and Variance Components," *Technometrics*, **44**, 45-54.

Rapoport, J., Aldea, C. M., Shah, S. P., Ankenman, B. E. and Karr, A. F. (2002). "Permeability of Cracked Steel Fiber-Reinforced Concrete," *ASCE Journal of Materials in Civil Engineering*, 14, 355-358.

Akkaya, Y., Shah, S. P. and Ankenman, B. E. (2001). "Effect of Fiber Dispersion on the Multiple Cracking of Cement Composites," *Journal of Engineering Mechanics*, **127**, 311-316.

Alberts, K. S. and Ankenman, B. E. (2001). "Simulating Pearson's and Spearman's Correlation in Q-Sorts Using Excel: A Simulation Proof of a Widely-Believed Result," *Social Science Computer Review*, **19**, 221-226.

McDaniel, W. R. and Ankenman, B. E. (2000). "Comparing Experimental Design Strategies for Quality Improvement with Minimal Changes to Factor Levels," *Quality and Reliability Engineering International*, **16**, 355-362.

McDaniel, W. R. and Ankenman, B. E. (2000). "A Response Surface Test Bed," *Quality and Reliability Engineering International*, **16**, 363-372.

Ankenman, B. E. and McDaniel, W. R. (2000). "A *p* Chart for Monitoring Capability Using Sensitivity Data," *Quality Engineering*, **12**, 462-469.

Jaiswal, S. S., Picka, J. D., Igusa, T., Karr, A. F., Shah, S. P., Ankenman, B. E. and Styer, P. (2000). "Statistical Studies of the Conductivity of Concrete Using ASTM C1202-94," *Concrete Science and Engineering*, **2**, 97-105.

Ankenman, B. E. (1999). "Design of Experiments with Two-Level and Four-Level Factors," *Journal of Quality Technology*, **31**, 363-375.

Bisgaard, S. and Ankenman, B. (1996). "Standard Errors for the Eigenvalues in Second Order Response Surface Models," *Technometrics*, **38**, 238-246.

Bisgaard, S. and Ankenman, B. (1995). "Analytic Parameter Design," *Quality Engineering*, **8**, 75-91.

Ankenman, B., Bisgaard, S. and Osswald, T. A. (1994). "Experimental Optimization of Computer Models," *Manufacturing Review*, **7**, 332-345.

Awards and Honors

1. Masahiro and Eiko Meshii Award for Excellence in Design Education 2022-2024.
2. Bette and Neison Harris Professor of Teaching Excellence 2018-2021.
3. Charles Deering McCormick Professor of Teaching Excellence 2012-2015.
4. 2013 INFORMS Simulation Society Outstanding Simulation Publication Award for "Stochastic Kriging for Simulation Metamodeling," *Operations Research*, 2010.
5. NAE Frontiers of Engineering Education Symposium Participant, Irvine, CA. October, 2012.
6. Named to Northwestern's Associated Student Government's Faculty Honor Roll. 2007
7. Visiting Fellow at the University of Southampton for 2004/2005.
8. McCormick School of Engineering Advisor of the Year - 2002
9. Morris E. Fine Junior Professor of Materials and Manufacturing, 1996-1999.

Service

At Northwestern

- Co-Director of the Northwestern Personal Development StudioLab: 2023-present.
- Co-Director of the Segal Design Institute: 2012-2023.
- Faculty Co-Advisor for Design for America: 2009-2017.
- Director of Undergraduate Programs, Segal Design Institute: 2007-2012.
- Co-Director of IDEA: 2006-2007.
- Director of Design Thinking and Communications (formerly EDC): 2003-2004 and 2005-2020.
- Director of Manufacturing and Design Engineering degree: 2002-2004 & 2007-2011.
- IDEA Faculty Committee: 2002-2006.
- Advisory Board: Center for Device Development: 2012-present.
- Coordinator for Data as Art: Joint Program with the School of the Art Institute of Chicago: 2013-2019.
- Advising Committee for Northwestern Tiny House Team: 2010-2013.
- Director of the MEM program: 2007-2012.
- IEMS Strategic Planning Committee: 2009-2017.
- IEMS Undergraduate Committee: 2000-2004, 2005-present.
- IEMS Graduate Committee:1997-2004.
- Undergraduate Manufacturing Advisory Committee: 1998-2002.
- University Faculty Reappointment, Promotion, Tenure, and Dismissal Appeal Panel (UFRPTDAP): 1998-2000.
- Program Review Committee: Northwestern Transportation Center (1 year).
- Program Review Committee: Civil and Environmental Engineering (1 year).
- McCormick Academic Standing Committee (3 years).
- McCormick Curriculum Committee (4 years).
- McCormick Promotion and Tenure Committee (2 year)

Outside Northwestern

- Advisory board for Industrial and Systems Engineering Department, University of Wisconsin-Madison, 2011-2014.
- Co-organizer of Newton Institute's Workshop: Accelerating Industrial Productivity via Deterministic Computer Experiments and Stochastic Simulation Experiments, September 5-9, 2011, Cambridge University, UK.
- Local Arrangements Chair – Spring Research Conference on Statistics in Industry and Technology, Evanston, IL, June 21-24, 2011.
- Publications Officer for the Quality and Productivity Section of the ASA: 2007-2009.
- Management Board of Spring Research Conference on Statistics in Industry and Technology, Evanston, IL, 1999-2002.
- Organizing Committee member for Design and Analysis of Experiments Conference, Chicago, IL, May, 2003.
- Organizing Committee member for Design and Analysis of Experiments Conference, Vancouver, B.C., July 2002.
- Quality Statistics and Reliability Section of INFORMS Officer: Council Member (1998-2000), Chair Elect (2001), Chair (2002), organized student paper competition 2002.
- Judge for the Youden Prize for the best paper in Technometrics in the year 2000.
- Editorial Board of Journal of Quality Technology: 2009-2012.
- Editorial Board of IIE Transactions: 2002-2005.
- Associate Editor for Naval Research Logistics: 2001-2009.
- Department Editor (Experimental Design and Optimization) for IIE Transactions: 2005-2008.

Professional Societies

American Society for Engineering Education (ASEE)
American Society of Quality (ASQ)
American Statistical Association (ASA)
Institute for Operations Research and Management Science (INFORMS)
Institute of Industrial Engineers (IIE)

Teaching and Advising

Class	***Description***
DSGN-106	Design Thinking and Communications (16)
DSGN-308	Human Centered Product Design (2)
DSGN-395	Data as Art (joint with the School of the Art Institute of Chicago) (4)
DSGN-300	Designing Your Life (17)
IEMS-201	Introduction to Probability and Statistics (15)
IEMS-303	Statistics I (15)
IEMS-305	Statistical Process Control (6)
IEMS-307	Quality Improvement by Experimental Design (15)
IEMS-401	Intermediate Statistics
IEMS-407	Decision Tools for Managers (Team taught 7 times)

IEMS-428 Quality Engineering Tools (12)
IEMS-490 Advanced Experimental Design (4)

Masters Advisees:

Gary Summers (1996), Gerald McCartan (1996), Karthik Chermakani (2000).

PhD Advisees:

William R. McDaniel (1999), Ana Ivelisse Avilés (2001), Ying Yang (2003), Hong Wan (2005), Feng Yang (2006), Dingxi Qiu (2007), Mustafa Tongarlak (2011), Xi Chen (2012), Weitao Duan (2014), Xaver Neumeyer (2014), Collin Erickson (2019).

PhD Committees:

Scott Alberts (1999), Yilmaz Akkayo (CEE 2000), Seong Hee Kim (2001), Juta Pichitlamken (2002), Julie Rapoport (CEE 2002), John Lawlor (CEE 2001), Anna Vine (2005), Ewa Sztendur (University of Victoria, 2008), Chris Hoyle (2009), Adel Alaeddini (2010, Wayne State University), Ning Zhang (2013), Wei Xie (2014), John Wetzel (2014), Zhen Jiang (2015)