

HARRIET B. NEMBHARD

CURRICULUM VITAE

Address

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Harvey Mudd College
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Present Position

Harvey Mudd College

President and Professor of the College, 2023-present

Education

- Ph.D., Industrial and Operations Engineering, University of Michigan, 1994
- M.S.E., Industrial and Operations Engineering, University of Michigan, 1993
- B.S.E., Industrial Engineering, Arizona State University, 1990
- B.A., Management, Claremont McKenna College, 1990

Professional Appointments

- University of Iowa, College of Engineering
Dean and Roy J. Carver Professor of Engineering, 2020-2023
Professor, Industrial and Systems Engineering
- Oregon State University, School of Mechanical, Industrial and Manufacturing Engineering
School Head, 2016-2020
Eric R. Smith Professor of Engineering
- Penn State University, Harold and Inge Marcus Dept. of Industrial and Manufacturing Engineering
Interim Department Head, Jan-Sept 2015; Professor, 2011-2016; Associate Professor, 2004-2011
Director, Center for Integrated Healthcare Delivery Systems (CIHDS), 2009-2016
Site Director, NSF Center for Health Organization Transformation (CHOT), 2011-2016
Tracking and Evaluation Lead, Clinical and Translational Science Institute (CTSI), 2011-2016
Program Director, Six Sigma Minor, 2008-2016
- École Central Paris, Dept. of Industrial Engineering, *Visiting Associate Professor, 2006-2007*
- University of Wisconsin-Madison, Dept. of Industrial Engineering, *Associate Professor, July-Dec 2003*
- University of Wisconsin-Madison, Dept. of Industrial Engineering, *Assistant Professor, 1998-2003*
- Auburn University, Dept. of Industrial and Systems Engineering, *Assistant Professor, 1994-1998*

Board Activities

- Claremont McKenna College Alumni Association Board of Directors: director, July 2019-June 30, 2022
- Claremont McKenna College Board of Trustees: alumna trustee, July 1, 2019-June 30, 2022
- Harvey Mudd College Board of Trustees: trustee, July 1, 2023-present
- University of Michigan, Department of Industrial and Operations Engineering Advisory Board: member-elect, July 1, 2024

National Academies Activities

- National Academies of Sciences, Engineering, and Medicine (NASEM), *Leadership and Advisory Committees of the Action Collaborative on Transforming Trajectories for Women of Color in Tech*: chair, 2024-present
- National Academies of Sciences, Engineering, and Medicine (NASEM), *Roundtable on Systemic Change in Undergraduate STEM Education*: member, 2022-present

Professional Affiliations

- Achievement Rewards for College Scientists (ARCS) Foundation: member, 2016-2020
- American Association for the Advancement of Science (AAAS): member, 2020-present
- American Society for Engineering Education (ASEE): member, 1997-2003; 2014-present
- Institute of Industrial and Systems Engineers (IISE): member 1990-2018; Fellow, 2019-present
- Institute for Operations Research and the Management Sciences (INFORMS): member, 1994-2003, 2023-present
- National Society of Black Engineers (NSBE): member 1987-1994, 2015-2019
- Society of Women Engineers (SWE): member, 2016-2019

Honors and Awards

- University of Michigan, College of Engineering, Alumni Merit Award, 2022
- American Institute for Medical and Biological Engineering (AIMBE), Fellow, 2022
- Institute of Industrial and Systems Engineers (IISE), Fellow, 2019
- International Academy of Quality (IAQ), Academician, 2009
- American Society for Quality (ASQ), Fellow, 2009
- Bashore Career Professorship, 2004-2007
- ASQ Certified Six Sigma Black Belt, 2005
- American Society for Quality (ASQ), Feigenbaum Medal, 2004
- Alfred P. Sloan New Faculty Fellow, 1997
- Rackham Merit Fellow, University of Michigan, 1992-1994
- Alpha Pi Mu (Industrial Engineering Honor Society), 1989

Recent Invited Talks and Panels

- *"The Role of ELATES Fellows in Supporting the Health and Wellbeing of Women in the Academy,"* keynote address to the graduating class of ELATES Fellows, Drexel University, March 14, 2024.
- *"A Liberal Arts STEM Education: The Next 10 Years,"* The University Club of Claremont, February 13, 2024.
- *"Meditations on Quality 4.0 for the Academy,"* Douglas C. Montgomery Distinguished Lecture, Arizona State University, April 7, 2023.
- *Workshop on Bias in Pulse Oximetry*, Panelist, Federation of American Scientists, November 1, 2022.
- *"Leading with Courage,"* Drexel University, Executive Leadership for Academics in Technology, Engineering and Sciences (ELATES), August 6, 2022.
- *"Rethinking Complaint: Organizational Structures to Support Culture Change,"* keynote address for International Women's Day, Women's Impact Network, Hewlett-Packard, March 8, 2022.

Magazine Articles

- Barabino, G. A. and Nembhard, H. B. (2022). "Suffocating from Medical Bias: A Systems Engineering Approach to Equitable Health Care Solutions," *American Scientist*, July-August, 204-207.
- Redd, K. Estrada, M., Nembhard, H. B., Ngai, C. (2024). "Eight Indicators for Measuring Equitable Student Success in STEM," *Change*, forthcoming.

RESEARCH AND PROFESSIONAL ACTIVITIES

Expertise

- Applied statistics and process control
- Systems engineering and operations research
- Applications: production/manufacturing systems; healthcare systems

Funding

A total of **\$3.6M** as PI or Co-PI:

- **NSF RAPID-2040072.** Matriculation and Well-Being Under Emergent Events (MWEE): Using Data to Empower Campus Communities in Times of Crisis. PI: Julie Ivy; Co-PIs: **H. B. Nembhard**, Lauren Davis, and Maria Mayorga. August 2020-July 2023. Total Funding: **\$140,000.**
- **NSF EED-1830836.** Reimagining Engineering Societies and Organizations to Support Participation of Women and Underrepresented Minority Students. PI: **H. B. Nembhard**; Co-PI: Shane Brown. July 2018-June 2023. Total Funding: **\$200,000.**
- **NSF EEC-1840570.** Engineering Research Center Planning Grant: Empowering People to achieve Optimal Well-being through Engineering Research (EMPOWER). PI: Julie Ivy; Co-PIs: **H. B. Nembhard**, Lauren Davis, and Julie Hagle. July 2018-June 2020. Total Funding: **\$100,000.**
- **NSF IIP-1624727.** I/UCRC Phase II: Center for Healthcare Organization Transformation (CHOT). PI: **H. B. Nembhard**; Co-PIs: Conrad Tucker and Chris DeFlitch. July 2016-June 2021. Total Funding: **\$1.2M**: NSF \$321K and Industry Cost Sharing \$850K. Transferred PI to C. Tucker.
- **NSF IIP-1067885.** I/UCRC Phase I: Center for Healthcare Organization Transformation (CHOT). PI: **H. B. Nembhard**; Co-PIs: Chris DeFlitch, Deidre McCaughey, Madhu Reddy, and Conrad Tucker. January 2011-December 2016. Total funding: **\$1M**: NSF \$290K and Industry Cost Sharing \$710K.
- **NIH UL1-TR000127.** Penn State Clinical and Translational Science Institute (CTSI). PI: Larry Sinoway; Co-PIs: Susan McHale, Urs Leurenberger; Senior Personnel: **H. B. Nembhard**. July 2011-June 2016. Total Funding: \$28.7M; CIHDS Share **\$500,000.**
- **NSF CMMI-0800122.** Integrating Experimental Design and Reliability for Multiple Stage Manufacturing of Multi-Scale Devices. PI: **H. B. Nembhard**; Co-PIs: Don Heaney and Sanjay Joshi. August 2008-July 2012. Total Funding: **\$320,000.**
- **NSF OII-0848712.** STTR Phase II: A Lithographic Gelcasting Process Using Nanoparticulates: An Enabling Technology for Mass Production of Microdevices with Nanoscale Features. PI: Don Heaney, PI; Co-PIs: **H. B. Nembhard** and James Adair. January 2009-December 2010. Total Funding: **\$500,000.**
- **NSF OII-0637850.** STTR Phase I: A Lithographic Gelcasting Process Using Nanoparticulates: An Enabling Technology for Mass Production of Microdevices with Nanoscale Features. PI: Eric Mockensturm; Co-PIs: James Adair, Mary Frecker, **H. B. Nembhard**, Don Heaney, Sanjay Joshi, and Chris Muhlstein. January 2007-December 2007. Total Funding: **\$150,000.**
- **NSF DMII-1358459.** An Evaluation Approach for Quantifying Manufacturing Flexibility. PI: **H. B. Nembhard**; Co-PI: Leyuan Shi. September 2003-August 2007. Total Funding: **\$300,000.**
- **NSF DMII-0115007.** Going Beyond Design of Experiments: Joint Monitoring and Adjustment for Process Improvement. PI: **H. B. Nembhard**. September 2001-August 2005. Total Funding: **\$139,600.**
- **NSF DMII-GOALI.** Characterizing Startup Operations in Manufacturing Operations. PI: **H. B. Nembhard**. October 1998-October 1999. Total Funding: **\$15,400.**

Editorships and Journal Service

- Editorial Board, *International Journal of Experimental Design and Process Optimisation*, 2009-2016
- Editorial Board, *Quality and Reliability Engineering International*, 2003-2016
- Editorial Board, *Quality Engineering*, 1999-2016

- Associate Editor, *INFORMS Journal on Computing*, 2001-2007
- Guest Editor with F. Tsung (2005), *Quality and Reliability Engineering International*, Special Issue: Quality, Statistics, and Reliability Cluster at INFORMS 2003.
- Guest Editor with M. Jackson (2008), *International Journal of Nanomanufacturing*, Special Issue: DOE in Nanomanufacturing
- Guest Editor (2008), *Quality Engineering*, Special Issue: SPC in Health Care
- Editor with P.A. Farrington, D. T. Sturrock, and G. Evans (1999), *Winter Simulation Conference Proceedings*
- Referee for *Computers in Industrial Engineering*, *The Engineering Economist*, *IEEE Transactions on Engineering Management*, *IIE Transactions*, *Journal of Quality Technology*, *Naval Research Logistics*, and *Technometrics*, various times 1994-2020

PUBLICATIONS

Books

1. Nembhard, H. B. and Aktan, M., Editors (2009). *Real Options in Engineering Design, Operations, and Management*, CRC Press. ISBN 142-00716-9-6.
2. Griffin, P.M., Nembhard, H. B., DeFlitch, C. J., Bastian, N., Kang, H., and Munoz, D. (2016). *Healthcare Systems Engineering*. Wiley-Blackwell: New York. ISBN: 978-1-118-97108-6.
3. Nembhard, H. B., Cudney, E., Coperich, Editors (2019). *Emerging Frontiers in Industrial and Systems Engineering: Success through Collaboration*. CRC Press. ISBN: 978-1-138-59375-6.

Patent

U.S. Patent #8,530,039 B2. Title: Polycrystalline Complex Shaped Meso-Scale Components. Inventors: James Adair, Christopher Muhlstein, Mary Frecker, Eric Mockenstrum, Harriet Nembhard, Randy Haluck, Mathew Abraham, Nickolas Antolino, Gregory Hayes, Milton Aguirre, Rebecca Kirkpatrick, and Chumpol Yuangyai. Date of Patent: September 10, 2013.

Dissertation

Nembhard, H. B. (1994). *A Transient Period Control Methodology for Continuous Mix Manufacturing*, Ph.D. Dissertation, University Microfilm, Ann Arbor, MI.
 Advisor: Dr. John R. Birge, Jerry W. and Carol Lee Levin Professor of Operations Management, University of Chicago.

Journal Articles (53)

* indicates graduate students under my supervision

1. Nembhard, H. B. (1998). "Simulation Using the State-Space Representation of Noisy Dynamic Systems to Determine Effective Integrated Process Control Designs," *IIE Transactions*, 30, 3, 247-256.
2. Nembhard, H. B. and Birge, J. R. (1998). "A Startup Procedure for Process Industries Using a Multiple Objective Nonlinear Program," *IIE Transactions*, 30, 4, 291-300.
3. Nembhard, H. B. and Mastrangelo, C. M. (1998). "Integrated Process Control for Startup Operations," *Journal of Quality Technology*, 30, 3, 201-211.
4. Nembhard, H. B., Shi, L., and Park, C. S. (2000). "Real Option Models for Managing Manufacturing System Changes in the New Economy," *The Engineering Economist*, 45, 3, 232-258.
5. Nembhard, D. A. and Nembhard, H. B. (2000). "A Demerits Control Chart for Autocorrelated Data," *Quality Engineering*, 13, 2, 179-190.
6. Nembhard, H. B. and Nembhard, D. A. (2001). "The Use of Bayesian Forecasting to Make Process Adjustments During Transitions," *European Journal of Operational Research*, 130, 2, 437-448.

7. Nembhard, H. B. and *Kao, M.-S. (2001-02). "Implementing SPC in a Simulation Model for Manufacturing Transitions," *Quality Engineering*, 14, 1, 127-136.
8. Nembhard, H. B. (2001-02). "Controlling Change: Process Monitoring and Adjustment During Transition Periods," *Quality Engineering*, 14, 2, 229-242.
9. Nembhard, H. B. and *Kao, M.-S. (2001). "A Forecast-Based Monitoring Methodology for Process Transitions," *Quality and Reliability Engineering International*, 17, 4, 307-321.
10. Nembhard, H. B., Mastrangelo, C. M., and *Kao, M.-S. (2001). "Statistical Monitoring Performance for Startup Operations in a Feedback Control System," *Quality and Reliability Engineering International*, 17, 5, 379-390.
11. Nembhard, H. B., Shi, L., and *Aktan, M. (2002). "Real Options Designs for Quality Control Charts," *The Engineering Economist*, 47, 1, 28-59.
12. Nembhard, H. B. (2003). "Individual Observation Process Monitoring Charts for Systems with Response Lags," *Quality Engineering*, 15, 3, 489-505.
13. Nembhard, H. B., Ferrier, N., Osswald, T. A., and *Sanz-Urbe, J. R. (2003). "An Integrated Model of Statistical and Vision Monitoring for Manufacturing Transitions," *Quality and Reliability Engineering International*, 19, 6, 461-476.
14. Nembhard, H. B. and *Valverde-Ventura, R. (2003). "Integrating Experimental Design and Statistical Control for Quality Improvement," *Journal of Quality Technology*, 35, 4, 406-423. (Received the Lloyd S. Nelson best paper award.)
15. Nembhard, H. B. and *Kao, M. S. (2003). "Adaptive Forecast-Based Monitoring for Dynamic Systems," *Technometrics*, 45, 3, 208-219.
16. Nembhard, H. B., Shi, L., and *Aktan, M. (2003). "A Real Options Design for Product Outsourcing," *The Engineering Economist*, 48, 3, 199-217.
17. Ivy, J. S. and Nembhard, H. B. (2005). "A Modeling Approach to Maintenance Decisions Using Statistical Quality Control and Optimization," *Quality and Reliability Engineering International*, 21, 4, 355-366.
18. Nembhard, H. B. and *Kao, M. S. (2005). "Transition Monitoring and Adjustment for Dynamic Systems in a Process Improvement Environment," *Quality and Reliability Engineering International*, 21, 6, 621-632.
19. Nembhard, H. B., Shi, L., and *Aktan, M. (2005). "A Real Options Based Analysis for Supply Chain Decisions," *IIE Transactions* (special issue on Financial Engineering), 37, 10, 945-956.
20. Nembhard, D. A., Nembhard, H. B., and Qin, R. (2005). "Real Options Modeling for Valuing Worker Cross Training," *The Engineering Economist*, 50, 2, 95-116.
21. Nembhard, H. B. and *Changpetch, P. (2007). "Directed Monitoring of Seasonal Processes Using Cuscore Statistics," *Quality and Reliability Engineering International*, 23, 2, 219-232.
22. Nembhard, H. B. and *Valverde-Ventura, R. (2007). "Cuscore Statistics to Monitor a Nonstationary System," *Quality and Reliability Engineering International*, 23, 3, 303-325.
23. Nembhard, H. B. and *Chen, S. (2007). "Cuscore Control Charts for Generalized Feedback Control Systems," *Quality and Reliability Engineering International*, 23, 4, 483-502.
24. *Valverde-Ventura, R. and Nembhard, H. B. (2008). "Robustness Properties of Cuscore Statistics for Monitoring a Nonstationary System," *Quality and Reliability Engineering International*, 24, 7, 817-841.
25. *Changpetch, P. and Nembhard, H. B. (2008). "Periodic Cuscore Charts to Detect Step Shifts in Autocorrelated Processes," *Quality and Reliability Engineering International*, 24, 8, 911-926.
26. Carrion, H., Rogosky, M., Nembhard, H. B., Joshi, S. and Catchmark, J. (2008). "Characterization of Step and Flash Imprint Lithography SilSpin Etch-back Process," *International Journal of Nanomanufacturing* special issue on Design of Experiments in Nanomanufacturing, 2, 4, 305-318.

27. *Acharya, N. and Nembhard, H. B. (2008). "Statistical Design and Analysis for a Three-Step Surface Initiated Polymerisation Process," *International Journal of Nanomanufacturing* special issue on Design of Experiments in Nanomanufacturing 2, 4, 331-345.
28. Aguirre, M., Frecker, M., and Nembhard, H. B. (2008). "A Case Study Comparison of Alternative Meta-Modeling Methods Related to Nano-enabled Surgical Instrument Design," *International Journal of Nanomanufacturing* special issue on Design of Experiments in Nanomanufacturing, 2, 4, 375-405.
29. *Acharya, N. and Nembhard, H. B. (2009). "Bayesian Algorithms for Missing Observations in Experimental Designs for a Nanolubrication Process," *IIE Transactions*, 41, 11, 969-978.
30. Ivy, J. S., Nembhard, H. B., and *Barron, K. (2009). "Quantifying the Impact of Variability and Noise on Patient Outcomes in Breast Cancer Decision Making," *Quality Engineering*, 21, 3, 319-334.
31. *Yuanyai, C., Nembhard, H. B., Hayes, G., Antolino, N., and Adair, J. H. (2009). "Yield Improvement for Lost Mould Rapid Infiltration Forming Process by a Multi-Stage Fractional Factorial Split Plot Design," *International Journal of Nanomanufacturing*, 3, 4, 351-367.
32. *Chen, S. and Nembhard, H. B. (2011). "Multivariate Cuscore Control Charts for Monitoring the Mean Vector in Autocorrelated Processes," *IIE Transactions*, 43, 4, 291-307.
33. *Kim, M.-J., Nembhard, H. B., Lambert, B., Turbelin, C., Flahault, A. and Vergu, E. (2011). "A syndromic surveillance system for clinical and non-clinical health data," *IIE Transactions on Healthcare Systems*, 1, 1, 37-48.
34. *Chen, S. and Nembhard, H. B. (2011). "A High-Dimensional Control Chart for Profile Monitoring," *Quality and Reliability Engineering International*, 27, 4, 451-464.
35. *Yuanyai, C., Nembhard, H. B., Hayes, G. and Adair, J. (2012). "Robust Parameter Design for Multiple Stage Nanomanufacturing," *IIE Transactions (Special Issue on Quality, Sensing, and Prognostics Issues in Nanomanufacturing)*, 44, 7, 580-589.
36. Kraschnewski J. L., Sciamanna, C., Stuckey, H. L., Chuang, C. H., Lehman, E. B., Hwang, K. O., Sherwood, L. L., Nembhard, H. B. (2013). "A Silent Response to the Obesity Epidemic: Decline in US Physician Weight Counseling," *Medical Care*, 51, 2, 186-92.
37. Shirwaiker, R., Wysk, R., Kariyawasam, S., Voigt, R. C., Carrion, H., and Nembhard, H. B. (2014). "Interdigitated silver-polymer-based antibacterial surface system activated by oligodynamic iontophoresis – An empirical characterization study," *Biomedical Microdevices*, 16(1), 1-10.
38. *Kang, H., Nembhard, H. B., Rafferty, C., and DeFlitch, C. (2014). "Patient Flow in the Emergency Department: A Classification and Analysis of Admission Process Policies," *Annals of Emergency Medicine*, 64, 4, 335-342.
39. *Munoz, D., Nembhard, H. B. and Kraschnewski, J. (2014). "Quantifying Complexity in Translational Research: An Integrated Quality Function Deployment – Analytical Hierarchy Process Methodology," *International Journal of Health Care Quality Assurance*, 27, 8, 760-776.
40. *Vaughn-Cooke, M., Nembhard, H. B., Ulbrecht, J., and Gabbay, R. (2015). "Informing Patient Self-Management Technology Design Using a Patient Adherence Error Classification," *Engineering Management Journal*, 27, 3, 124-130.
41. Tucker, C. S., Behoora, I., Nembhard, H. B., Lewis, M., Sterling, N., Huang, X. (2015). "Machine Learning Classification of Medical Adherence in Patients with Movement Disorders Using Non-Wearable Sensors," *Computers in Biology and Medicine*, 66, 120-134.
42. Tucker, C. S., Han, Y., Nembhard, H. B., Lee, W.-C., Lewis, M., Sterling, N., Huang, X. (2015). "A Data Mining Methodology for Predicting Early Stage Parkinson's Disease Using Non-Invasive, High Dimensional Gait Sensor Data," *IIE Transactions on Healthcare Systems Engineering*, 5, 4, 238-254.
43. *Bastian, N. D., *Kang, H., Nembhard, H. B., Bloeschichak, A., and Griffin, P. (2016). "The Impact of a Pay-for-Performance Program on Central Line-Associated Blood Stream Infections in Pennsylvania," *Hospital Topics*, 94, 1, 8-14.

44. Bharathi, G., Singh, A., Tucker, C.S., Nembhard, H. B. (2016). "Knowledge Discovery of Game Design Features by Mining User-Generated Feedback," *Computers in Human Behavior*, 60, 361-371.
45. *Bastian, N., *Swenson, E., and Nembhard, H. B. (2016). "Data Analytics in Health Promotion: Health Market Segmentation and Classification of Total Joint Replacement Surgery Patients," *Expert Systems with Applications*, 60, 118-129.
46. *Kang, H., Nembhard, H. B., Curry, W. J., Ghahramani, N., and Hwang, W. (2017). "A Systems Thinking Approach to Prospective Planning of Interventions for Chronic Kidney Disease," *Health Systems*, 6, 2, 130-147.
47. *Munoz, D., Kilinc, M., Nembhard, H. B., Tucker, C., and Huang, X. (2017). "Evaluating the Cost-Effectiveness of an Early Detection of Parkinson's Disease through Innovative Technology," *The Engineering Economist*, 62, 2, 180-196.
48. *Kang, H., Nembhard, H. B., DeFlitch, C. and Pasupathy, K. S. (2017). "Assessment of Emergency Department Efficiency Using Data Envelopment Analysis," *IIE Transactions on Healthcare Systems Engineering*, 7, 4, 236-246.
49. *Munoz, D., Nembhard, H.B., and Camargo, K. (2018). "A goal programming approach to address the proposal selection problem: A case study of a Clinical and Translational Science Institute," *International Transactions in Operational Research*, 25, 1, 405-423.
50. *Kang, H., Nembhard, H. B., Curry, W., Ghahramani, N. and Hwang, W. (2018). "A System Dynamics Approach to Planning and Evaluating Interventions for Chronic Disease Management," *Journal of the Operations Research Society*, 69, 7, 987-1005.
51. *Swenson, E., Davis, C., Bastian, N. and Nembhard, H. B. (2018). "Reducing Cost Drivers in Total Joint Arthroplasty: Understanding Patient Readmission Risk and Supply Cost," *Clinical Orthopaedics and Related Research*, 7, 2, 135-147.
52. *Swenson, E., *Bastian, N., Nembhard, H. B. (2018). "Healthcare Market Segmentation and Data Mining: A Systematic Review," *Health Marketing Quarterly*, 35, 3, 186-208.
53. *Sanchez, D., Brooks, A., Brown, S., and Nembhard, H. B. (2023). "An exploratory study on how mechanical engineering undergraduates perceive participation in professional disciplinary engineering student organizations that influence their engineering identity," OnlineFirst, *International Journal of Mechanical Engineering Education*.

Book Chapters

1. Nembhard, H. B., *Acharya, N., *Aktan, M., and Kim, S. (2006). "Design Issues and Analysis of Experiments in Nanomanufacturing," *Handbook of Industrial and Systems Engineering*, A. B. Badiru, editor. CRC Press; ISBN 0-8493-2719-9.
2. Nembhard, H. B. (2006). "Cuscore Statistics: Directed Process Monitoring for Early Problem Detection," *Springer Handbook of Engineering Statistics*, H. Pham, editor. Springer-Verlag, London; ISBN 1-85233-806-7.
3. Nembhard, H. B. and Yannou, B. (2008). "Les options réelles en ingénierie de la conception: opportunités et défis sur le problème du mix des moteurs véhicules," (translation: "Real Options in Decision Engineering: Opportunities and Challenges for Managing Engine Technologies") Chapter 15, *La Conception Industrielle de Produits Vol. 3: Ingénierie de L'évaluation et de la Décision*, Hermes Science Publishing, London. ISBN 978-2746219236.
4. *Yuangyai, C. and Nembhard, H. B. (2009). "Design of Experiments: A Key to Innovation in Nanotechnology," *Emerging Nanotechnologies for Manufacturing*, Waquar Ahmed and Mark J. Jackson, editors. Academic Press/Elsevier. ISBN-13: 978-0-08-094763-1
5. Nembhard, H. B. and Aktan, M., Editors (2009). *Real Options in Engineering Design, Operations, and Management*, CRC Press. ISBN 142-00716-9-6.

Refereed Conference Proceedings Articles

1. Nembhard, H. B. and Nembhard, D. A. (1996). "Dynamic Simulation for Time Series Modeling," *Proceedings of the 1996 Winter Simulation Conference*, (ed. J. M. Charnes, D. M. Morrice, D. T. Brunner, and J. J. Swain), 1407-1412.
2. Nembhard, H. B. and Park, C. S. (1999). "Capturing Manufacturing Transitions Using Real Options," *Proceedings of the 1999 Industrial Engineering Research Conference* (ed. D. Taylor, E. Malstrom, J. Watson, and K. Standley).
3. *Kao, M.-S. and Nembhard, H. B. (1999). "Integrating Process Monitoring and Control for Autocorrelated Data Using State-Space Models," *Proceedings of the 1999 Industrial Engineering Research Conference* (ed. D. Taylor, E. Malstrom, J. Watson, and K. Standley).
4. Nembhard, H. B., Kao, M.-S., and *Lim, G. (1999). "Integrating Discrete-Event Simulation with Statistical Process Control for Transitions in a Manufacturing Environment," *Proceedings of the 1999 Winter Simulation Conference* (ed. P. A. Farrington, H. B. Nembhard, D. T. Sturrock, and G. W. Evans), 701-708.
5. Nembhard, H. B., Shi, L. and *Aktan, M. (2000). "A Real Options Design for Quality Control Charts," *Proceedings of the 2000 Winter Simulation Conference* (ed. J. A. Joines, R. R. Barton, P. Fishwick, and K. Kang).
6. Nembhard, H. B., Shi, L., and *Aktan, M. (2001). "A Real Options Design for Product Outsourcing," *Proceedings of the 2001 Winter Simulation Conference* (ed. B. A. Peters, J. S. Smith, D. J. Medeiros, and M. W. Rohrer).
7. Nembhard, H. B., Nembhard, D. A., and *Gurses, A. (2002). "Real Options Modeling for Valuing Worker Flexibility," *Proceedings of the 2002 Industrial Engineering Research Conference*.
8. Nembhard, H. B., Shi, L. and *Aktan, M. (2002). "Valuing Operational Flexibility in Manufacturing Systems Using Real Options," *Proceedings of the 2002 Industrial Engineering Research Conference*.
9. Nembhard, H. B., Shi, L., and *Aktan, M. (2002). "Effect of Implementation Time Lag on Real Options Valuation," *Proceedings of the 2002 Winter Simulation Conference* (ed. E. Yücesan, C.-H. Chen, J. L. Snowdon, and J. M. Charnes).
10. Ivy, J. S. and Nembhard, H. B. (2003). "Strategic Maintenance Decisions Using Statistical Quality Control and Optimization," *Proceedings of the 2003 Industrial Engineering Research Conference*.
11. Carrion, H., Nembhard, H. B., Rogosky, M., and Joshi, S. (2006). "Characterization of Step and Flash Imprint Lithography SilSpin Etch-back Process," *Proceedings of 2006 Industrial Engineering Research Conference*.
12. Nembhard, H. B., and *Chen, S. (2007). "Statistical Monitoring of Dose-Response Profiles Using A Multivariate Cuscore Control Chart," *Proceedings of the Qualita 2007 Conference*, Tangier, Morocco, March 20-22, 2007.
13. Nembhard, H. B., Joshi, S., Heaney, D., *Yuangyai, C., and Hayes, G. (2009). "Minimum Aberration criteria for Multistage Fractional Factorial Split Plot Design," *Proceedings of the NSF CMMI Research and Innovation Conference*, Hawaii, June 22-25, 2009.
14. *Vaughn-Cooke, M., Nembhard, H. B., and Ulbrecht, J. (2010). "Reformulating Human Reliability in Healthcare Systems," *Proceedings of the Industrial Engineering Research Conference*, Cancun, Mexico, June 5-9, 2010.
15. *Kang, H.J., Prayadsab, P., Rafferty, C., Nembhard, H. B., and DeFlitch, C. (2012). "A Simulation Study of Patient Flow: The Admission Process from the Emergency Department to Internal Medicine," *Proceedings of the 7th INFORMS Workshop on Data Mining and Health Informatics*, Phoenix, AZ, 2012.
16. *Kang, H., Nembhard, H. B., Curry, W., Ghahramani, N. and Hwang, W. (2013). "A Systems Dynamics Approach to Support Prospective Planning of Interventions to Improve Chronic Kidney Disease Care," *Proceedings of the 2013 Winter Simulation Conference*, Washington, D.C., December 9-11, 2013.

17. *Munoz, D., Alonso, W., Nembhard, H. B. (2014). "A Social Network Analysis-based Approach to Evaluate Workflow and Quality in a Pediatric Intensive Care Unit," *Proceedings of the Industrial and Systems Engineering Research Conference*, Montreal, Canada.
18. *Kang, H., Nembhard, H. B., DeFlitch, C. (2014). "Identification of Emergency Department Efficiency Frontiers by Using Data Envelopment Analysis (DEA) for Data-driven Benchmarks," *Proceedings of the Industrial and Systems Engineering Research Conference*, Montreal, Canada.
19. Gillam, P. S., Nembhard, H. B., and *Munoz, D. (2014). "The Role of Quality Improvement Methods in Translational Research," *Proceedings of the Industrial and Systems Engineering Research Conference*, Montreal, Canada.

CURRICULAR AND SUPERVISORY ACTIVITIES

Graduate Level Courses

- **IE 568/597 Healthcare Systems Engineering.** Quantitative methods to analyze and improve healthcare delivery. Co-developed with Paul Griffin. Penn State.
- **IE 511 Experimental Design in Engineering.** Statistically based quality improvement methods useful in industrial settings; observational methods and design of experiments; experimentation to discover influential factors and to analyze sources of variation. Penn State.
- **IE 555 Statistical Process Monitoring and Analysis.** Advanced process monitoring methods; monitoring autocorrelated data, control charts for multiple stream processes, directed process monitoring using Cuscores; changepoint models. Penn State.
- **IE 575 Introduction to Quality Engineering.** Statistically based quality improvement methods useful in industrial settings; observational methods and design of experiments; experimentation to discover influential factors and to analyze sources of variation. Penn State.
- **IE 715 Advanced Methods for Quality Improvement.** Empirical model-building and regression analysis; two-level factorial and fractional factorial designs; process and product optimization; analysis of response surfaces; DOE strategies for fitting response surfaces. Penn State.
- **IE 511 Statistical Control in Industrial Systems.** Modeling process dynamics and disturbances; philosophy of process control combining monitoring and feedback methods; design of feedback schemes to minimize costs of adjustment and sampling; detection of special causes with Cuscore Statistics. UW-Madison.
- **IE 691 Financial Engineering: A View of Manufacturing Operations.** Real option modeling framework for manufacturing transitions; options for improving manufacturing systems; impact on corporate decision making. Co-developed with L. Shi. UW-Madison.
- **ISE 656 Advanced Simulation.** Discrete-event simulation modeling for complex systems; modeling probability distributions; random number generators; generating random variates; output analysis; variance-reduction techniques. Auburn University.
- **ISE 515 Stochastic Operations Research.** Sample paths; simulation and stochastic processes; arrival-counting processes, discrete-time processes, continuous-time processes, queuing processes. Auburn University.
- **ISE 612 Process Dynamics and Control.** Feedback and feed-forward control; first-order and second-order dynamic systems; process transients; state-space models; Kalman filtering; on-line statistical process monitoring and control. Auburn University.

Curriculum Design

- **Six Sigma Minor.** Six course sequence focusing on process improvement. Led development of the minor. From its inception in 2009 to 2016, there have been 289 students who graduated with this minor. It continued to be a popular option in the department.

Undergraduate Level Courses

- **MIME 497/498 Engineering Capstone Design.** Engineering seniors design and implement workable solutions to campus hunger. Oregon State.
- **IE 499 Healthcare Delivery Systems and Technologies.** Systems and data analytics approaches to integrating technology into healthcare delivery. Oregon State. Co-taught with Mehmet Kilinc.
- **IE 434 Statistical Quality Control.** Process monitoring methods and applications for quality control. Penn State.
- **IE 436 Six Sigma Methodology.** Statistical methods for systematic improvement and problem-solving. Penn State.
- **IE 423 Quality Control and Reliability.** Process monitoring methods and applications for quality improvement and reliability. Penn State.
- **IE 480W Capstone Design Project.** Industry-based senior capstone design project emphasizing manufacturing systems, service systems, and information systems in an interdisciplinary setting. Penn State.
- **ISE 475 Introduction to Simulation.** Entity creation, movement, and management; single and multiple servers; modeling probability distributions; antithetic variates; GPSS/H, ARENA, and ProModel simulation languages. Auburn University.

Post-Doctoral Scholars Supervised (4)

- Mehmet Aktan, Ph.D., 2005-2006. Topics: design of experiments, real options. Next appointment: assistant professor at Necmettin Erbakan University (Turkey)
- Marija Jankovic, Ph.D., 2009-2011. Topics: statistical process control, healthcare systems engineering. Next appointment: assistant professor at Ecole Centrale Paris, now CentraleSupélec (France)
- Eralp Dogu, Ph.D., 2009-2010. Topics: statistical process control, healthcare systems engineering. Next appointment: assistant professor at Mulga Sitki Kocman Univeristy (Turkey)
- Mehmet Serdar Kilinc, Ph.D., 2015-2018. Topics: big data, healthcare systems, engineering. Next appointment: assistant professor at Le Moyne College (NY)

PhD Student Committees, Chair/Co-Chair (14 graduated)

- Ming-Shu (Daniel) Kao, Ph.D., Industrial Engineering, UW-Madison, December 2001. Dissertation Title: *A Unified Framework for Statistical Process Control of a Dynamic-Stochastic System in Manufacturing Transitions*. (Chair and Advisor) Current Position: Senior Principal Quality Engineer, Medronic
- René Valverde-Ventura, Ph.D., Industrial Engineering, UW-Madison, December 2002. Dissertation Title: *Using Experimental Design and Statistical Control to Advance a Framework for Process Improvement in Manufacturing*. Current Position: Senior Applied Mathematician, Roche Diabetes Care
- Mehmet Aktan, Ph.D., Industrial Engineering, UW-Madison, May 2003. Dissertation Title: *Real Options Valuation of Flexibility in Manufacturing and Quality*. (Chair and Co-Advisor with L. Shi.) Current Position: Vice Rector, Antalya Bilim University, Turkey

- Navin Acharya, Ph.D., Industrial Engineering, Penn State, December 2006. Dissertation Title: *Missing Observations and Restrictions on Randomization in Nanomanufacturing Experimentation*. (Chair and Advisor) Current Position: Managing Director, Associated Chemicals
- Shuohui Chen, Ph.D., Industrial Engineering, Penn State, December 2006. Dissertation Title: *The Cuscore and High-Dimensional Control Charts for Statistical Monitoring of Autocorrelated Process Data*. (Chair and Advisor) Current Position: Quantitative Analyst, Google
- Chumpol Yuangyai, Ph.D., Industrial Engineering, Penn State, December 2009. Dissertation Title: *Experimental Design and Robust Parameter Design in Multiple Stage Manufacturing for Nano-Enabled Medical Instruments*. (Chair and Advisor) Current Position: Lecturer at King Mongkut's Institute of Technology Ladkrabang (Thailand)
- Monifa Vaughn-Cooke, Ph.D., Industrial Engineering, Penn State, May 2012. Dissertation Title: *A Multidimensional Information System for Human Reliability Assessment: Applied to Patient Adherence*. (Chair and Co-Advisor with J. Ulbrect) Current Position: Assistant Research Professor, University of Maryland
- Min-Jung Kim, Ph.D., Industrial Engineering, Penn State, August 2012. Industrial Engineering, Penn State. *Statistical Quality Methods to Monitor and Transform Healthcare Data*. (Chair and Advisor)
- Hyo-Jung Kang, Ph.D., Industrial Engineering, Penn State, May 2015. Dissertation Title: *Redesigning a Healthcare Delivery System: Integrated Analysis from Service Processes to System Structures*. (Chair and Advisor) Current Position: Assistant Professor, University of Illinois at Urbana-Champaign
- David Muñoz, Ph.D., Industrial Engineering, Penn State, August 2015. Dissertation Title: *Quality Improvement to Assess and Audit Complexity in Research Translation*. (Chair and Advisor) Current Position: CEO, Creditu
- Nathan Bastian, Ph.D., Industrial Engineering, Penn State, May 2016. Dissertation Title: *Multiple Criteria Decision Engineering to Support Management in Military Healthcare and Logistics Operations*. (Chair and Co-Advisor with P. Griffin)
- Eric Swenson, Ph.D., Industrial Engineering, Penn State, May 2017. Dissertation Title: *Value-based Payments in Total Joint Arthroplasty in Healthcare: Market Segmentation Methodology to Improve Value*. (Chair and Advisor) Current Position: St. Paul District Commander, US Army Corps of Engineers
- Yifeng Yu, Ph.D., Industrial Engineering, Penn State, Aug 2017. Dissertation Title: *Risk-Adjusted Monitoring, Cost-Effectiveness, and Meta-Analysis for Data-Driven Healthcare for Total Hip Arthroplasty*. (Chair and Advisor) Current Position: Lead Data Scientist at Plymouth Rock
- Dominga Sanchez, Ph.D., Fall 2023. Civil Engineering, Oregon State. Dissertation Title: *The Power of Participation: Inspiring Stories of Engineering Undergraduates Navigating Professional Engineering Student Organizations and Challenging Structural Norms*. (Co-Advisor with S. Brown)

Masters Student Committees, Chaired (11 graduated)

- Pannapa Changpetch, M.S.I.E., Penn State, May 2006. "Periodic Cuscore Charts to Detect Step Shifts in Autocorrelated Processes."
- Kim Barron, M.S.E., Penn State, May 2006. *Modeling and Uncertainty in Breast Cancer Decision Making*.
- Wenny Chandra, M.S.I.E., Penn State, May 2008. "An Analogues-Changeoint Methodology for Influenza-Like-Illness and Drug Sales Surveillance."
- Sajal Chavan, M.S.I.E., Penn State, December 2008. "A Six Sigma Methodology for Global System Forecasting."
- Avinash Desai, M.S.I.E. May 2010. Industrial Engineering, Penn State. "A Review of Customer Interactions and a Comparative Analysis of Sourcing Strategies – A Case Study at Labsupplies LLC."
- Aurore-Laetitia Mata, M.S. May 2010. Industrial Engineering, Penn State. *Paying Healthcare Providers: An Agency-Theoretic Approach For Chronic Disease Management*.

- Nishanth Ramkuttu. M.S.E. August 2010. Industrial Engineering, Penn State. *Risk Assessment of Medical Devices*
- Yonmi Jung. M.S. December 2010. Industrial Engineering, Penn State. *Hypertension Risk Utility Index*.
- Yining Chen, M.S.I.E., Penn State, August 2013. "Data Visualization in Healthcare Workflow."
- Dominic Amirtharaj, M.S.I.E., Penn State, August 2014. "Financial Incentives in Healthcare Delivery."
- Linlin Ma, M.S.I.E., Penn State, December 2016. "Predictive Modeling of Telehealth Heart Failure Interventions."

SELECTED PROFESSIONAL SERVICE

Governmental/Academy Committees

- National Academy of Engineering (NAE), Member, Steering Committee on Engineering Societies and Facilitating Measures of Faculty Impact, 2017-2018
- National Academy of Engineering (NAE), Engineering Societies and Undergraduate Education, Workshop Planning Committee, 2017
- National Science Foundation, Member, Committee of Visitors (COV) to review the Division of Civil Mechanical and Manufacturing Innovation (CMMI), 2012
- Federal Drug Administration, Member, Advisory Committee for Pharmaceutical Science and Clinical Pharmacology, 2008-2013
- National Science Foundation, Member, Proposal Review Panel, various years 1996-2020

Professional Societies

- American Society of Mechanical Engineering (ASME)
 - Department Heads Executive Committee, 2016-2020
- American Society for Quality (ASQ)
 - National Chapter: Feigenbaum Medal awards committee, member 2006-2007, co-chair-2008; Grant Medal committee, 2008-2012; conference session chair, 2007; Future Study committee, 2008; advisor to the society president on quality in nanotechnology, 2010.
 - Local Chapter (501): Education chair, 2009-2016
 - PSU Student Chapter: Faculty advisor, 2005-2016
- Institute of Industrial Engineers (IIE)
 - Annual Conference, General Co-Chair, 2018
 - Annual Conference, Program Co-Chair, 2017
 - Annual Conference, Track Co-Chair, Engineering Education, 2016
 - PSU Student Chapter: Faculty Advisor, Spring 2015
 - Quality and Reliability Engineering Division Board, 2011
 - Engineering Economy Division: President, 2003; Program Chair, 2002; and Newsletter Editor, 2001
- Institute for Operations Research and the Management Sciences (INFORMS)
 - Annual Conference, Session Chair, 2005, 2006, 2008
 - Quality, Reliability, and Statistics Division, Council Member, 1998-2002

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