Qiang Huang

Professor
Daniel J. Epstein Department of Industrial and Systems Engineering
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Research Interests

Engineering-informed AI and Machine Learning for Advanced Manufacturing:
- Machine Learning for Additive Manufacturing (ML4AM)

- Computation-Driven Quality-Control-As-a-Service

- Control-Theoretic Machine Learning for Engineering Systems

- Integrated Nanomanufacturing & Nanoinformatics (INN)

- Data Science for Engineering Applications

Education

Ph.D.	Industrial and Operations Engineering, University of Michigan, August 2003
M.A.	Statistics, University of Michigan, April 2002
Ph.D.	Mechanical Engineering, Shanghai JiaoTong University, December 1998
M.S.	Mechanical Engineering, Shanghai JiaoTong University, February 1996
B.S.	Mechanical Engineering, Shanghai JiaoTong University, July 1993

Professional Experience

Professor, Daniel J. Epstein Department of Industrial and Systems Engineering, University of Southern California, Los Angeles, CA, May 2020 ∼ present.

Invited Professor, LURP (Automated Production Research Laboratory), Ecole Normale Superieure (ENS) Paris-Saclay, June 15, 2022 ∼ July 15, 2022.

Associate Professor, Daniel J. Epstein Department of Industrial and Systems Engineering, University of Southern California, Los Angeles, CA, March 2012 ∼ May 2020.

Invited Professor, LURP (Automated Production Research Laboratory), Ecole Normale Superieure (ENS) Paris-Saclay, May 22, 2017 ∼ July 20, 2017.

Gordon S. Marshall Early Career Chair in Engineering, University of Southern California, Los Angeles, CA, January 2012 ∼ August 2016.

Visiting Professor, Department of Electrical Engineering Katholieke Universiteit (KU) Leuven, Belgium, Feb 21 to Mar 5, July 2016 (sponsored by European ERC and US NSF collaboration program)

Visiting Senior Professor, Department of Mechanical Engineering, Politecnico Di Milano (Polimi), Milan, Italy, March 2016 ∼ June 2016.

Visiting Associate Professor, Dept. of Industrial Engineering and Logistics Management, Hong Kong University of Science and Technology, June 10 ∼ July 10, 2013

Assistant Professor, Daniel J. Epstein Department of Industrial and Systems Engineering, University of Southern California, Los Angeles, CA, August 2009 ∼ March 2012.

Associate Professor, Department of Industrial and Management Systems Engineering, University of South Florida, Tampa, FL, June 2008 ∼ August 2009.

Member of Scientific Committee, Center for Quality Science at Academy of Mathematics & System Sciences, Chinese Academy of Sciences, 2008 ~ 2011.

Assistant Professor, Department of Industrial and Management Systems Engineering, University of South Florida, Tampa, FL, August 2003 ~ June 2008.

Honors and Awards

1. IISE Fellow Award from Institute of Industrial and Systems Engineers, May 2022

2. The 2022 IISE Quality Control and Reliability Engineering (QCRE) Track Best Paper Award, 2022 Institute of Industrial and Systems Engineers (IISE) Conference, May 21-24, 2022, Seattle, WA.

3. The 2021 IEEE CASE Best Conference Paper Award, 2021 IEEE International Conference on Automation Science and Engineering (CASE 2021), August 23-27, 2021, Lyon, France.

4. Christopher Henson*, Nathan Decker* (PhD students under my supervision), Honorable Mention, NAMRC Student Research Presentation Award, Christopher Henson*, Nathan Decker

5. Christopher Henson* and Nathan Decker* , Finalist of the Student Manufacturing Design Competition, NAMRC & MSEC Manufacturing Research Virtual Conference 2021, June 21-25, 2021, Cincinnati, OH.

6. Nathan Decker*, Winner of the RAMP (Reusable Abstractions of Manufacturing Processes) 2019 Competition (`https://event.asme.org/MSEC/Program/RAMP-2019-Competition`), the 2019 ASME 14th International Manufacturing Science and Engineering Conference, Erie, PA, June 10-June 14, 2019.

7. Featured Research on ISE Magazine (June 2020)
Jin*, Y., Qin, S., and Huang, Q., 2020, "Modeling Inter-layer Interactions for Out-of-Plane Shape Deviation Reduction in Additive Manufacturing" *IISE Transactions on Design and Manufacturing*, Vol. 52 (7), pp. 721-731.

8. Featured Research on ISE Magazine (September 2018)
Duanmu*, Y., Riche, C., Gupta, M., Malmsdat, N., and **Huang**, Q., 2018, "Scale-up Modeling for Droplet Formation in Coated Microfluidic T-junction Across Multiple Domains," *IISE Transactions on Quality and Reliability*, Vol. 50(10), pp. 892-899.

9. Keynote speaker, "Geometric Shape Accuracy Control for Additive Manufacturing Through Machine Learning, "European Forum on Additive Manufacturing, June 27-29, 2017, Paris, France (`http://www.afpr.asso.fr/les-assises/`).

10. Finalist, 2016 INFORMS QSR (Quality, Statistics, and Reliability) Best Referred Paper Finalist, "Model Transfer via Equivalent Effects of Lurking Variables, "co-authored with Prof. A. Sabbaghi.

11. 2013 IEEE Transactions on Automation Science and Engineering Best Paper Award, IEEE Robotics and Automation Society. Received during IEEE CASE 2014, August 18-22, 2014, Taipei, Taiwan.

12. Best Application Paper Award Finalist, the tenth IEEE International Conference on Automation Science and Engineering (CASE 2014), August 18-22, 2014, Taipei, Taiwan.

13. NSF Faculty Early Career Development (CAREER) Award, 2011.
Supplement award for conducting research collaborations through EU-funded European Research Council (ERC) grant at Katholieke Universiteit (KU) Leuven, Belgium, 2016.

14. Gordon S. Marshall Early Career Chair in Engineering, USC, January 2012 – August 2016.

15. Featured research on ISE Magazine (April 2015), INFORMS 2014, and The Third International Conference on the Interface between Statistics and Engineering, Hong Kong, 2014 – IIE Transactions Invited Session Paper: "Optimal Offline Compensation of Shape Shrinkage for 3D Printing Processes", IIE Transactions on Quality and Reliability, Vol. 47, No. 5, pp. 431–441.

16. One of the 12 Invited Speakers for "Nanoinformatics 2013: Informatics for Nanomanufacturing,"National Nanomanufacturing Network, October 15-17, 2013, University of Pennsylvania, Philadelphia.

17. Phi Tau Phi Scholastic Honor Society of America, April 2013 – Present

18. Finalists for 2012 INFORMS-QSR Best Student Paper Competition: Li Wang, "Cross-Domain Model Building and Validation (CDMV): A New Modeling Strategy to Reinforce Understanding of Nanomanufacturing Processes,"Advisor: Prof. Qiang Huang.

19. Featured research on ISE Magazine (December 2010)
Huang, Q., 2011, "Physics-Driven Bayesian Hierarchical Modeling of Nanowire Growth Process At Each Scale,"*IIE Transactions on Quality and Reliability*, Vol. 43, pp. 1-11.

20. Featured research on ISE Magazine (April 2006)
Wang, H., and Huang, Q., 2006, "Error Cancellation Modeling and Its Application in Machining Process Control," *IIE Transactions on Quality and Reliability*, Vol.38, pp.379–388.

Research
Research Grants

1. PI, *3D Terahertz Imaging System with FPGA Accelerator for Robust Defect Detection*, Pratt & Whitney Institute for Collaborative Engineering Board, $120K of total $240K (PI in S. Korea: Gyungsu Byun), 08/2022∼ 8/2024.

2. PI, *Smart Multi-Nozzle, Multi-Material 3D Printing System for Fabrication of High-Temperature Plastic Composites Parts*, Pratt & Whitney Institute for Collaborative Engineering Board, $120K of total $240K (PI in S. Korea: Joo-Hyung Kim), 07/01/2020∼ 06/30/2022.

3. PI, *On-Site Non-Intrusive Inspection and Maintenance System Using Terahertz Imaging and Artificial Intelligent Accelerating*, Pratt & Whitney Institute for Collaborative Engineering Board, $120K of total $240K (PI in S. Korea: Gyungsu Byun), 07/01/2020∼ 06/30/2022.

4. PI, *Shape Deviation Generator and Learner- An Engineering-Informed Convolution Modeling and Learning Framework for Additive Manufacturing Accuracy Control*, NSF CMMI-1901514, $366K, 08/15/2019∼ 08/14/2022. (REU supplement: $16K in 2020)

5. Senior Personnel/Co-PI, *ECR: PEER: Development of Modular, Scalable, and Extensible Advanced Manufacturing Curriculum*, NSF DUE-1935712, $156K of total $1,999,846, (PI: SK Gupta, Co-PIs: Gisele Ragusa, Sven Koenig, Azad Madni, Yong Chen, Qiang Huang), 08/2019-08/2022.

6. Co-PI, *AM Data Modeling for Machine Learning and Data-Centric Analytics for Smart Aerospace Additive Manufacturing*, DOE Clean Energy Smart Manufacturing Innovation Institute (CESMII), $60K of total $750K, 12/2019∼ 12/2020 (PI: Honeywell Aerospace, Co-PIs: Raytheon, USC, UCLA, Missouri S&T, KAM, Identify3D, Sentient Science).

7. PI, *Data-Centric Modeling, Prediction, and Control of CNT Dispersion in Composite Materials*, $5K, Airbus Institute for Engineering Research (AIER) at USC, 2018.

8. Lead PI, *Collaborative Research: EAGER: Explore the Theoretical Framework of Engineering Knowledge Transfer in Cybermanufacturing Systems*, NSF CMMI-1744121, $50K of total $160K, 08/15/2017∼ 08/14/2018 (PIs: A. Sabbaghi at Purdue U; M. Plumlee at U of Michigan; H. Wang at FSU).

9. Lead PI, *CPS:Synergy:Collaborative Research: Smart Calibration Through Deep Learning for High-Confidence and Interoperable Cyber-Physical Additive Manufacturing Systems*, NSF CMMI-1544917, $350K of total $650K, 09/01/2015∼08/31/2020 (PI at Purdue U: A. Sabbaghi, $300K).

10. Lead PI, *Collaborative Research: Geometric Shape Error Control for High-Precision Additive Manufacturing*, NSF CMMI-1333550, $285K of total $400K, 08/2013∼07/2018 (Co-PI at USC: Y. Chen; PI at Harvard University: T. Dasgupta, $115K).

11. PI, *CAREER: Nanomanufacturing Process Modeling and Control – A Foundation for Large-Scale Production*, NSF CMMI-1055394, $406,329, 08/2011∼07/2017 (including NSF supplement award for NSF CAREER grant awardee to conduct research collaborations through EU-funded European Research Council (ERC) grant "Advanced Data-Driven Black-Box Modeling", Katholieke Universiteit (KU) Leuven, Belgium; $6,329.00, 07/2015∼07/2017.)

12. PI, *RAMP-UP: Robust and Smart Control of Additive Manufacturing Processes for High Geometric Accuracy*, Oak Ridge National Laboratory (ORNL), US Department of Energy; ORNL grant #: 4000145653, $100K, 03/15/2016∼03/14/2017, under ORNL "Research for Additive Manufacturing Program – University Partnerships (RAMP-UP)".

13. Co-PI (50% effort), *Cyber-Enabled Manufacturing Systems (CeMS): Real-Time Shape Compensation for Accurate Direct Digital Manufacturing*, Office of Naval Research, ONR Grant# N000141110671, $439,645, 2011∼2015 (PI: Y. Chen at USC).

14. Lead PI, *Collaborative Research: Nanostructure Growth Process Modeling and Optimal Experimental Strategies for Repeatable Fabrication of Nanostructures for Application in Photovoltaics*, NSF CMMI-1000972, $300K of total $460K, 2010∼2013 (Co-PI at USC: C. Zhou; PI at Harvard University: T. Dasgupta, $160K).

15. PI, *In Situ Nanomanufacturing Process Control Through Multiscale Nanostructure Growth Modeling*, NSF CMMI-0728100 & CMMI-1002580, $350K, 2007∼2011 (Co-PI: A. Kumar).

16. PI, *Analysis of Correlated Functional Process Variables for Manufacturing Process Diagnosis*, NSF CMMI-0600066 & CMMI-1002433, $280K, 2006∼2010 (Co-PI: A. Kumar), including supplement request of $15K for Cyberinfrastructure Experiences for Graduate Students (CIEG).

17. Co-PI, *Nanoengineered, Manufacturable, Ion-Implantation Seeded Silica Nanowires for Sensitive BioScreening*, NSF CMMI-0700659, $289,980, 2007∼2010 (PI: S. Bhansali).

18. Co-PI, *Strategic Partnership on the Next Generation Manufacturing Research between HKUST and USC*, Sponsorship Scheme for Targeted Strategic Partnerships at Hong Kong University of Science and Technology, HK$160,000, 2013–2016 (PI: Prof. F. Tsung, HKUST).

19. Co-PI *Hybrid BioFlex System for Personalized Restoration of Electromechanical Coupling of Injured and Regenerating Tissues*, USC VSoE Research Innovation Fund, $9,000, 2012 (PI: T. Hsiai, BME; Co-PI: J. Yoon, CHE).

20. Co-PI, *Bayesian process control for nanomanufacturing with mixed resolution information*, Hong Kong RGC (Research Grant Council) #620508, 2008∼2010, HK$279,610 (PI: F. Tsung, Co-PI: J. Shi).

21. PI, *Multiscale Nanostructure Growth Modeling for Control of Nanomanufacturing*, Functional Multiscale Materials by Design Initiative, University of South Florida, $7000, Summer 2007.

22. PI, *Part-Path-Oriented Measurement Strategy for Serial-Parallel Reconfigurable Manufacturing Systems with Real-Time RF-Tag Information*, $7600, sponsored by NSF ERC-RMS at University of Michigan (Co-PI: R. Katz, Chief Engineer at ERC-RMS), 2004.

23. PI, *Process Control based on Multivariate Functional Data*, University of South Florida Internal Research Awards, $2700, 05/04∼04/05.

Publications

Refereed Journals and Transactions

Note: (* indicates a coauthor who is/was a PhD student under my supervision

Published or Accepted

1. Cesar Ruiz*, Davoud Jafari, Vignesh V. Subramanian, Tom H.J. Vaneker, Wei Ya, and Qiang Huang, 2022, "Prediction and Control of Product Shape Quality in Wire and Arc Additive Manufacturing Using Generalized Additive Models, "*ASME Transactions, Journal of Manufacturing Science and Engineering*, DOI: 10.1115/1.4054721.

2. Yuanxiang Wang*, Cesar Ruiz*, and Q. Huang, 2022, "Learning and Predicting Shape Deviations of Smooth and Non-Smooth 3D Geometries through Mathematical Decomposition of Additive Manufacturing, "*IEEE Transactions on Automation Science and Engineering*, DOI: 10.1109/TASE.2022.3174228, in press.

3. Nathan Decker* and Qiang Huang, 2021, "Optimizing the Expected Utility of Shape Distortion Compensation Strategies for Additive Manufacturing, "*Procedia Manufacturing*, Vol. 53, pp. 348-358.

4. Christopher Henson*, Nathan Decker* and Qiang Huang, 2021, "A Digital Twin Strategy for Major Failure Detection in Fused Deposition Modeling Processes, "*Procedia Manufacturing*, Vol. 53, pp. 359-367.

5. Obaton, A-F; Wang*, Y.; Butsch, B.; and Huang, Q., 2021, "A Non-destructive Resonant Acoustic Testing and Defect Classification of Additively Manufactured Lattice Structures," *Welding in the World, The International Journal of Materials Joining*, Vol. 65, pp. 361-371.

6. Decker*, N., Lyu*, M., Wang*, Y., and Huang, Q., 2021, "Geometric Accuracy Prediction and Improvement for Additive Manufacturing Using Triangular Mesh Shape Data," *ASME Transactions, Journal of Manufacturing Science and Engineering*, Vol. 143(6), pp. 061006.

7. Decker*, N. and Huang, Q., 2020, "Intelligent Accuracy Control Service System for Small-Scale Additive Manufacturing," *Manufacturing Letters*, Vol. 26, pp. 48-52.

8. Decker*, N., Wang*, Y., Huang, Q., 2020, "Efficiently Registering Scan Point Clouds of 3D Printed Parts for Shape Accuracy Assessment and Modeling, "*Journal of Manufacturing Systems*,Vol. 56, pp. 587-597.

9. Huang, Q., Wang*, Y, Lyu*, M., Lin*, W., 2020, "Shape Deviation Generator (SDG) – A Convolution Framework for Learning and Predicting 3D Printing Shape Accuracy, "*IEEE Transactions on Automation Science and Engineering*, Vol. 17(3), pp. 1486 -1500.

10. Jin*, Y., Qin, S., and Huang, Q., 2020, "Modeling Inter-layer Interactions for Out-of-Plane Shape Deviation Reduction in Additive Manufacturing "*IISE Transactions on Design and Manufacturing*, Vol. 52 (7), pp. 721-731.

11. Ferreira, R., Sabbaghi, A., Huang, Q., 2020, "Automated Geometric Shape Deviation Modeling for Additive Manufacturing Systems via Bayesian Neural Networks," *IEEE Transactions on Automation Science and Engineering*, Vol. 17(2), pp. 584-598.

12. Jin*, Y., Qin, S., Huang, Q., Saucedo, V., Li, Z., Meier, A., Kunda, S., Lehr, B., and Charaniya, S., 2019, "Classification and Diagnosis of Bioprocess Cell Growth Productions Using Early-Stage Data "*Industrial & Engineering Chemistry Research*, Vol. 58 (30), pp. 13469-13480.

13. Luan*, H, Grasso, M., Colosimo, B., Huang, Q., 2019, "Prescriptive Data-Analytical Modeling of Selective Laser Fusion Processes for Accuracy Improvement "*ASME Transactions, Journal of Manufacturing Science and Engineering*, Vol. 141(1), 011008 (13 pages).

14. Sabbaghi, A. and Huang, Q., 2018, "Model Transfer Across Additive Manufacturing Processes via Mean Effect Equivalence of Lurking Variables," *Annals of Applied Statistics*, Vol. 12(4), pp. 2409 -2429.

15. Zhang*, X., Wang*, H., Chen*, S., and Huang, Q., 2018, "A Novel Two-stage Optimization Approach to Machining Process Selection Using Error Equivalence Method "*Journal of Manufacturing Systems*, Vol. 49, pp. 36-45.

16. Duanmu*, Y., Riche, C., Gupta, M., Malmsdat, N., and Huang, Q., 2018, "Scale-up Modeling for Droplet Formation in Coated Microfluidic T-junction Across Multiple Domains," *IISE Transactions on Quality and Reliability*, Vol. 50(10), pp. 892-899.

17. Colosimo, B., Huang, Q., Dasgupta, T., Tsung, F., 2018, "Opportunities and Challenges of Quality Engineering for Additive Manufacturing "Invited position paper, Journal of Quality Technology, Vol. 50(3), pp. 233-252.

18. Zhu, Z., Anwer, N., Huang, Q., and Mathieu, L., 2018, "Machine Learning in Tolerancing for Additive Manufacturing," *CIRP Annals – Manufacturing Technology*, Vol. 67(1), pp.157-160.

19. Sabbaghi, A., Huang, Q., and Dasgupta, T., 2018, "Bayesian Model Building From Small Samples of Disparate Data for Capturing In-Plane Deviation in Additive Manufacturing," *Technometrics*, Vol. 60(4), pp. 532 -544.

20. Song, S., Wang, A., Huang, Q., Tsung, F., 2017, "In-Plane Shape-Deviation Modeling and Compensation for Fused Deposition Modeling Processes," *IEEE Transactions on Automation Science and Engineering*, Vol. 14(2), pp. 968-976.

21. Aghdam, F.F, Liao, H., and Huang, Q., 2017, "Modeling Interaction in Nanowire Growth Processes Toward Improved Yield," *IEEE Transactions on Automation Science and Engineering*, Vol. 14(2), pp. 1139-1149.

22. Luan*, H., and Huang, Q., 2017, "Prescriptive Modeling and Compensation of In-Plane Shape Deformation for 3-D Printed Freeform Products, "*IEEE Transactions on Automation Science and Engineering*, Vol. 14(1), pp. 73–82.

23. Jin*, Y., Qin, S., and Huang, Q., 2016, "Offline Predictive Control of Out-of-Plane Shape Deformation for Additive Manufacturing, "*ASME Transactions on Manufacturing Science and Engineering*, Vol. 138(12), pp.121005 (7 pages).

24. Sosina, S., Dasgupta, T., and Huang, Q., 2016, "A Stochastic Graphene Growth Kinetics Model, "*Journal of the Royal Statistical Society, Series C*, Vol. 65(5), pp. 705–729.

25. Bao, L., Huang, Q., and Wang, K., 2016 "Robust Parameter Design for Profile Quality Control," *Quality and Reliability Engineering International*, Vol. 32(3), pp.1059-1070.

26. Wang*, L. and Huang, Q., 2016, "A Strategy to Characterize Nanofabrication Processes with Large RPM (Experimental Run, Physics, and Measurement) Uncertainties," *IEEE Transactions on Semiconductor Manufacturing*, Vol. 29(1), pp. 50-56.

27. Huang, Q., 2016, "An Analytical Foundation for Optimal Compensation of Three-Dimensional Shape Deformation in Additive Manufacturing, "*ASME Transactions, Journal of Manufacturing Science and Engineering*, Vol. 138(6), 061010 (8 pages).

28. Duanmu*, Y. and Huang, Q., 2015 "Analysis and Optimization of Skirt-Area Effect for III-V Nanowire Synthesis via Selective Area Metal-Organic Chemical Vapor Deposition, "*IIE Transactions on Design and Manufacturing*, Vol. 47(12), pp.1424–1431.

29. Huang, Q., Zhang*, J., Sabbaghi, A., and Dasgupta, T., 2015, "Optimal Offline Compensation of Shape Shrinkage for Three-Dimensional Printing Processes, "*IIE Transactions on Quality and Reliability*, Vol. 47(5), pp. 431–441. (INFORMS 2014, IIE Transactions Invited Session paper and IIE Magazine Featured Article, May 2015).

30. Xu*, L., Wang*, L., and Huang, Q., 2015, "Semiconductor Nanowires Growth Process Modeling for Scale-up Nanomanufacturing: A Review," *IIE Transactions on Quality and Reliability*, Vol. 47(3), pp. 274-284.

31. Huang, Q., Nouri*, H., Xu, K., Chen, Y., Sosina, S., and Dasgupta, T., 2014, "Statistical Predictive Modeling and Compensation of Geometric Deviations of 3D Printed Products, "*ASME Transactions, Journal of Manufacturing Science and Engineering*, Special Issue on Additive Manufacturing (AM) and 3D Printing, Vol. 136(6), 061008 (10 pages).

32. Sabbaghi, A., Dasgupta, T., Huang, Q., Zhang*, J., 2014, "Inference for deformation and interference in 3D printing, "*Annals of Applied Statistics*, Vol. 8(3), pp. 1395-1415.

33. Xu*, L. and Huang, Q., 2014, "Growth Process Modeling of III-V Nanowire Synthesis via Selective Area Metal Organic Chemical Vapor Deposition, "*IEEE Transactions on Nanotechnology*, Vol. 13(6), pp. 1093 - 1101.

34. Wu*, J., and Huang, Q., 2014 "Graphene Growth Process Modeling: A Physical-Statistical Approach, "*Applied Physics A, Materials Science & Processing*, Vol. 116(4), pp. 1747-1756.

35. Zhu, L., Dasgupta, T., and Huang, Q.,2014, "A D-Optimal Design for Estimation of Parameters of an Exponential-Linear Growth Curve of Nanostructures," *Technometrics*, Vol. 56(4), pp. 432-442. (ASQ Fall Technical Conference 2014, Technometrics Invited Session paper).

36. Wang*, L., and Huang, Q., 2013, "Cross-Domain Model Building and Validation (CDMV): A New Modeling Strategy to Reinforce Understanding of Nanomanufacturing Processes, "*IEEE Transactions on Automation Science and Engineering*, Vol. 10(3), pp. 571–578.

37. Xu*, L., and Huang, Q., 2013, "EM Estimation of Nanostructure Interactions with Incomplete Feature Measurement and Its Tailored Space Filling Designs, "*IEEE Transactions on Automation Science and Engineering*, Vol. 10(3), pp. 579–587. (2013 IEEE Transactions on Automation Science and Engineering Best Paper Award)

38. Xu*, L., and Huang, Q., 2012, "Modeling the Interactions among Neighboring Nanostructures for Local Feature Characterization and Defects Detection, "*IEEE Transactions on Automation Science and Engineering*, Vol. 9(4), pp. 745-754.

39. Chang, C.J., Xu*, L., Huang, Q., and Shi, J.,2012, "Quantitative Characterization and Modeling Strategy of Nanoparticle Dispersion in Polymer Composites, "*IIE Transactions, Special Issue on Quality and Design Issues in Nanomanufacturing Systems*, Vol. 44(7), pp. 523-533.

40. Huang, Q., Wang*, L., Dasgupta, T., Zhu, L., Sekhar, P.K., and, Bhansali, S., An*, Y., 2011, "Statistical Weight Kinetics Modeling for Silica Nanowires Growth Catalyzed by Pd Thin Film,"*IEEE Transactions on Automation Science and Engineering*, Vol. 8(2), pp. 303-310.

41. Huang, Q., 2011, "Physics-Driven Bayesian Hierarchical Modeling of Nanowire Growth Process At Each Scale,"*IIE Transactions on Quality and Reliability*, Vol. 43(1), pp. 1-11. (Selected for Research Highlight in IIE Industrial Engineer).

42. Alvi, F., Joshi, R., Huang, Q., and Kumar, A., 2011, "Coarse-grained Kinetic Scheme-based Simulation Framework for Solution Growth of ZnO Nanowires,"*Journal of Nanoparticle Research*, Vol.13(6), pp. 2451-2459.

43. Zhang*, X., Huang, Q., 2010, "Analysis of Interaction Structure Among Multiple Functional Process Variables for Process Monitoring in Semiconductor Manufacturing, "*IEEE Transactions on Semiconductor Manufacturing*, Vol.23(2), pp.263-272.

44. Chen*, S., Wang*, H., and Huang, Q., 2010, "Diagnosis of Multiple Error Sources Under Variation Equivalence ", *NAMRI/SME Transactions*, Vol. 38, pp. 395-402.

45. Zhang*, X., Wang*, H., Huang, Q., Kumar, A., and Zhai,J., 2009, "Statistical and Experimental Analysis of Correlated Time-varying Process Variables for Condition Diagnosis in Chemical-Mechanical Planarization."*IEEE Transactions on Semiconductor Manufacturing*, Vol.22 (3), pp. 512-521.

46. Wang*, H., Zhang*, X., Kumar, A., Huang, Q., 2009, "Nonlinear Dynamics Modeling of Correlated Functional Process Variables for Condition Monitoring in Chemical-Mechanical Planarization ", *IEEE Transactions on Semiconductor Manufacturing*, Vol. 22(1), pp. 188-195.

47. Wang*, H., Kababji*, H., and Huang, Q., 2009, "Monitoring Global and Local Variations in Multichannel Functional Data For Manufacturing Processes,"*SME Transactions Journal of Manufacturing Systems*, Vol. 28 (1), pp. 11–16.

48. Wang*, H., and Huang, Q., 2007, "Using Error Equivalence Concept to Automatically Adjust Discrete Manufacturing Processes for Dimensional Variation Reduction," *ASME Transactions, Journal of Manufacturing Science and Engineering*, Vol. 129(3), pp. 644–652.

49. Kim, J., Huang, Q., Shi, J., 2007, "Latent Variable-based Key Process Variable Identification and Process Monitoring for Forging," *SME Transactions Journal of Manufacturing Systems*, Vol. 26(1), pp. 53-61.

50. Wang*, H., and Huang, Q., 2006, "Error Cancellation Modeling and Its Application in Machining Process Control," *IIE Transactions on Quality and Reliability*, Vol.38(4), pp.379–388. (Work highlighted by IIE Industrial Engineer)

51. Wang*, H., and Huang, Q., Yang, H., 2006, "In-Line Statistical Monitoring of Machine Tool Thermal Error Through Latent Variable Modeling," *SME Transactions Journal of Manufacturing Systems*, Vol. 25(4), pp. 279-292.

52. Kim, J., Huang, Q., Shi, J., and Chang, T.-S., 2006, "Online Multichannel Forging Tonnage Monitoring and Fault Pattern Discrimination Using Principal Curve," *ASME Transactions, Journal of Manufacturing Science and Engineering*, Vol. 128(4), pp. 944–950.

53. Wang*, H., Huang, Q., Katz, R., 2005, "Multi-Operational Machining Processes Modeling for Sequential Root Cause Identification and Measurement Reduction," *ASME Transactions, Journal of Manufacturing Science and Engineering*, Vol. 127(3), pp. 512–521.

54. Huang, Q., and Shi, J., 2004, "Stream of Variation Modeling of Serial-Parallel Multistage Manufacturing Systems with Coupled Process Routes," *ASME Transactions, Journal of Manufacturing Science and Engineering*, Vol. 126(3), pp.611–618.

55. Huang, Q., and Shi, J., 2004, "Variation Transmission Analysis and Diagnosis of Multi-Operational Machining Processes," *IIE Transactions on Quality and Reliability Engineering*, Vol. 36(9), pp. 807–815.

56. Huang, Q., Shi, J., and Yuan, J., 2003, "Part Dimensional Error and its Propagation Modeling in Multi-Operational Machining Processes," *ASME Transactions, Journal of Manufacturing Science and Engineering*, Vol. 125(2), pp. 255–262.

57. Zhou, S., Huang, Q., and Shi, J., 2003,"State Space Modeling for Dimensional Monitoring of Multistage Machining Process Using Differential Motion Vector," *IEEE Transactions on Robotics and Automation*, Vol. 19(2), pp. 296–309.

58. Huang, Q., Shi, J., 2003, "Simultaneous Tolerance Synthesis through Variation Propagation Modeling of Multistage Manufacturing Processes," *NAMRI/SME Transactions*, Vol. 31, pp. 515–522.

59. Huang, Q., Zhou, S., and Shi, J., 2002, "Diagnosis of Multi-Operational Machining Processes through Process Analysis," *Robotics and Computer-Integrated Manufacturing*, Vol. 18(3), pp. 233–239.

Patents, Provisional Patents & Software Disclosure

1. Patent US9827717B2 *Statistical Predictive Modeling and Compensation of Geometric Deviations of 3D Printed Products*, granted on November 28, 2017 (Q. Huang, T. Dasgupta, and S. Sosina).

2. Patent US9886526B2 *3D Printing Shrinkage Compensation Using Radial and Angular Layer Perimeter Point Information*, granted on February 6, 2018 (Q. Huang).

3. Patent US10310922B2 *Systems and Methods for Predicting and Improving Scanning Geometric Accuracy for 3D Scanners*, granted on June 4, 2019 (Q. Huang).

4. Patent US20160320771A1 *Systems and Methods for Compensating for 3D Shape Deviations in Additive Manufacturing*, granted on November 12, 2019 (Q. Huang, H. Luan, and Y. Jin).

5. Patent US20190346830A1 *System and Method for Automated Geometric Shape Deviation Modeling for Additive Manufacturing*, pending (R. Ferreira, A. Sabbaghi, Q. Huang, K. Amstutz).

6. U.S. Provisional Patent Application No. 63/190,213 *System and Methods for Control Systems and Modeling for Predicting and Controlling Additive Manufacturing Quality*, filed on May 18, 2021.

7. Software disclosure D2020-0055, *Software to Learn and Calibrate 3D Printers for Shape Distortion Control*, August 23, 2019.

8. Provisional patent (71523-37950), *Convolution Modeling and Learning System for Predicting Geometric Shape Accuracy of 3D Printed Products*, filed on September 28, 2020.

9. Invention disclosure D2021-0209, *Control-theoretic formulation and modeling approaches for predicting and controlling 3D printing quality*, March 11, 2021.

10. Invention disclosure D2021-0281, *Extending the Cookie-Cutter Modeling Framework for 3D Shapes*, Jun 3, 2021.

11. Invention disclosure D2022-0052 *Prediction and Control of Product Shape Quality in Wire and Arc Additive Manufacturing Through Machine Learning*, October 12, 2021.

12. Invention disclosure D2022-0055 *Optimal Test Build Design for Machine Learning of 3D Printed Part Deformation*, October 16, 2021.

Books and Book Chapters

1. *Machine Learning for Quality Control in Additive Manufacturing*, Chapter in Edited book of *Recent Advances in Additive Manufacturing*, 2020, World Scientific Series in Advanced Manufacturing (Editor-in-Chief Dr. Satyandra K. Gupta).

Software Tools

1. Printfixer(`printfixer3d.com`), cloud-based 3D printing quality-control-as-a-service platform

Editorial Articles and Highlights

1. Colosimo, B., Huang, Q., Dasgupta, T., Tsung, F., 2018, "Editors' note for special issue: Quality Engineering in Advanced Manufacturing ", Journal of Quality Technology, Vol. 50(3), pp. 231-232.

2. Bukkapatnam, S., Kamarthi, S., Huang, Q., and Zeid, A., Komanduri, R., 2012, "Nanomanufacturing systems: opportunities for industrial engineers, " *Quality, Sensing and Prognostics Issues in Nanomanufacturing, Special Issue of the IIE Transactions on Quality and Reliability Engineering/Manufacturing and Design*, Vol. 44, pp. 492-495.

3. Huang, Q., 2012, "Integrated Nanomanufacturing and Nanoinformatics for Scale-up Research" *National Nanomanufacturing Network Newsletter*, May 2012 Issue, DOI: 10.4053/hi685-120530.

Refereed Conference Proceedings

1. Yuanxiang Wang*, and Q. Huang, 2022, "Small-Sample Learning of 3D Printed Thin-Wall Structures Using Printing Primitives, "*2022 IEEE International Conference on Automation Science and Engineering (CASE 2022)*, August 20-24, 2022, Mexico City, Mexico.

2. Yuanxiang Wang*, Cesar Ruiz*, Sanglok Park, Kyung-Ho Shin, Joo-Hyung Kim, and Qiang Huang, 2021, "A Shape Registration Methodology for Geometric Deviation Correction in Additive Manufacturing, "*ASME Manufacturing Science and Engineering Conference (MSEC), Purdue University, West Lafayette, Indiana, June 27, 2022 - July 1, 2022.*

3. Cesar Ruiz*, Davoud Jafari, Vignesh V. Subramanian, Tom H.J. Vaneker, Wei Ya, and Qiang Huang, 2021, "Improving Geometric Accuracy in Wire and Arc Additive Manufacturing With Machine Learning, "*ASME Manufacturing Science and Engineering Conference (MSEC), Purdue University, West Lafayette, Indiana, June 27, 2022 - July 1, 2022.*

4. Andi Wang, Davoud Jafari, Tom H.J. Vaneker, and Qiang Huang, 2021, "Surface Roughness Characterization for Additive Manufactured Products via Double Kernel Smoothing Spatial Variogram Estimation, textquotedblright *ASME Manufacturing Science and Engineering Conference (MSEC), Purdue University, West Lafayette, Indiana, June 27, 2022 - July 1, 2022.*

5. Yuanxiang Wang*, Cesar Ruiz*, and Q. Huang, 2021, "Extended Fabrication-Aware Convolution Learning Framework for Predicting 3D Shape Deformation in Additive Manufacturing, "*2021 IEEE International Conference on Automation Science and Engineering (CASE 2021)*, August 23-27, 2021, Lyon, France. (2021 IEEE CASE Best Conference Paper Award)

6. Lin*, W., Dai, P., and **Huang**, Q., 2020, "Automatic Feature Selection for Shape Registration in Additive Manufacturing "*IISE Annual Conference & Expo 2020*, May 30 – June 2, 2020, New Orleans, USA.

7. Decker*, N. and **Huang**, Q., 2019, "Geometric Accuracy Prediction for Additive Manufacturing Through Machine Learning of Triangular Mesh Data, "*2019 ASME 14th International Manufacturing Science & Engineering (MSEC) Conference*, Erie, PA, USA.

8. Luan*, H., Post, B., and **Huang**, Q., 2017, "Statistical Process Control of In-Plane Shape Deformation for Additive Manufacturing, "*2017 13th IEEE International Conference on Automation Science and Engineering (CASE 2017)*, Special Session on Predictive Modeling and Control of Additive Manufacturing, pp. 1274-1279, August 20-23, 2017, Xi'an, China.

9. Sabbaghi, A., and Huang, Q., 2016, "Predictive Model Building Across Different Process Conditions and Shapes in 3D Printing, "*2016 12th IEEE International Conference on Automation Science and Engineering (CASE 2016, ISAM 2016)*, pp. 774–779, August 21-24, 2016. Dallas, TX, USA.

10. Jin*, Y., Qin, S., and **Huang**, Q., 2016, "Prescriptive Analytics for Understanding of Out-of-Plane Deformation in Additive Manufacturing, "*2016 12th IEEE International Conference on Automation Science and Engineering (CASE 2016, ISAM 2016)*, pp. 786–791, August 21-24, 2016. Dallas, TX, USA.

11. Wang, J., Duanmu, Y.*, and **Huang**, Q., 2016, "Generalized Linear Grade-Efficiency Modeling for Gas-Solids Cyclone Separators, "*2016 12th IEEE International Conference on Automation Science and Engineering (CASE 2016, ISAM 2016)*, pp. 1020–1025, August 21-24, 2016. Dallas, TX, USA.

12. Luan*, H. and **Huang**, Q., 2015, "Predictive Modeling of In-plane Geometric Deviation for 3D Printed Freeform Products, "*2015 IEEE International Conference on Automation Science and Engineering (CASE 2015)*, Special Session on Predictive Modeling and Control of Additive Manufacturing, pp. 912–917, August 24-28, 2015, Gothenberg, Sweden.

13. Jin*, Y., Qin, S., and **Huang**, Q., 2015, "Out-of-Plane Geometric Error Prediction for Additive Manufacturing, "*2015 IEEE International Conference on Automation Science and Engineering (CASE 2015)*, Special Session on Predictive Modeling and Control of Additive Manufacturing, pp. 918 –923, August 24-28, 2015, Gothenberg, Sweden.

14. Sabbaghi, A., Huang, Q., and Dasgupta, T., 2015, "Bayesian Additive Modeling for Quality Control of 3D Printed Products, "*2015 IEEE International Conference on Automation Science and Engineering (CASE 2015)*, Special Session on Predictive Modeling and Control of Additive Manufacturing, pp.906–911, August 24-28, 2015, Gothenberg, Sweden.

15. Song, S., Wang, A., Huang, Q., Tsung, F., 2014, "Shape Deviation Modeling for Fused Deposition Modeling Processes, "*the tenth IEEE International Conference on Automation Science and Engineering (CASE 2014)* , Special Session on Predictive Modeling and Control of Additive Manufacturing, August 18-22, 2014, Taipei, Taiwan.

16. **Huang**, Q., Nouri*, H., Xu, K., Chen, Y., Sosina, S., and Dasgupta, T., 2014, "Predictive Modeling of Geometric Deviations of 3D Printed Products – A Unified Modeling Approach for Cylindrical and Polygon Shapes, "*the tenth IEEE International Conference on Automation Science and Engineering (CASE 2014)* , Special Session on Predictive Modeling and Control of Additive Manufacturing, August 18-22, 2014, Taipei, Taiwan. (Best Application Paper Award Finalist).

17. Sabbaghi, A., Dasgupta, T., Huang, Q., and Zhang* J., 2013, "Posterior Predictive Checks for Interference in a 3D Printing Experiment, "*Conference on Statistical Practice 2014* .

18. Wang*, L. and **Huang**, Q., 2014, "Characterizing and Identifying Variations Among Nano Experimental Runs, "*ISCIE/ASME 2014 International Symposium on Flexible Automation (ISFA2014)*, July 14-16, 2014, Awaji-Island, Hyogo, Japan.

19. Xu*, L., **Huang**, Q., Sabbaghi, A., and Dasgupta, T., 2013 "Shape Deviation Modeling for Dimensional Quality Control in Additive Manufacturing, "*Proceedings of the ASME 2013 International Mechanical Engineering Congress & Exposition*, November 15-21, 2013, San Diego, USA.

20. Sabbaghi, A., Dasgupta, T., Zhang*, J., Huang, Q. "Inference with Interference and Interference for Inference: Modeling Potential Outcomes and the Structure of Interference in a 3D Printing Experiment, "*2013 Joint Statistical Meetings*, August 2013.

21. Wang*, L., **Huang**, Q., Krishanan, S., Huey, E, and Bhansali, S., 2012, "Physical knowledge integration in nano-manufacturing using approximate Bayesian computation, "22nd International Conference on Flexible Automation and Intelligent Manufacturing (FAIM 2012).

22. **Huang**, Q., 2011, "Integrated Nanomanufacturing and Nanoinformatics for Quality Improvement ", *44th CIRP International Conference on Manufacturing Systems*, June 1-3, 2011, Madison, Wisconsin (Invited).

23. Wang*, H., Chen*, S., and **Huang**, Q., 2009, "Multistage Machining Process Design and Optimization Using Error Equivalence Method ", *2009 ASME International Manufacturing Science and Engineering Conference (MSEC)*, October 4-7, 2009, West Lafayette, IN.

24. **Huang**, Q., Wang*, H., 2008, "Error Equivalence Methodology for Dimensional Variation Control in Manufacturing." *2008 IEEE International Conferences on Robotics, Automation & Mechatronics (RAM)*, RAM2008-1013, June 3-6, Chengdu, China.

25. Wang*, H., **Huang**, Q., 2005, "Automatic Process Adjustment for Reducing Dimensional Variation in Discrete Part Machining Processes." *Proceedings of 2005 International Mechanical Engineering Congress & Exposition,* MED-10A, IMECE2005-80406, Nov. 5-11, Orlando, FL.

26. Wang*, H., **Huang**, Q., Katz, R., 2004, "Multi-Operational Machining Processes Modeling for Sequential Root Cause Identification and Measurement Reduction," *Proceedings of 2004 International Mechanical Engineering Congress & Exposition,* MED-19, IMECE2004-59330, Nov. 13-19, Anaheim, CA.

27. Kim, J., Huang, Q., Shi, J., and Chang, T.-S., 2003, "Online Multi-Channel Forging Tonnage Monitoring and Fault Pattern Discrimination Using Principal Curve," *Proceedings of 2004 International Mechanical Engineering Congress and Exposition*, MED-17B, IMECE2004-59191, Nov. 13-19, Anaheim, CA.

28. Huang, Q., and Shi, J., 2002, "Stream of Variation Analysis and Root Cause Diagnosis for Multi-Operational Machining Processes," *2002 Japan-USA Symposium on Flexible Automation,* July 15-17, Hiroshima, Japan.

29. Huang, Q., Zhou, S., and Shi, J., 2001, "Diagnosis of Multi-Operational Machining Processes By Using Virtual Machining," *Int. Conf. on Flexible Automation & Intelligent Manufacturing,* pp. 804-813, July 16-18, Dublin, IRELAND.

30. Huang, Q., Zhou, N., and Shi, J., 2000, "Stream of Variation Modeling and Diagnosis of Multi-Station Machining Processes," *Proc. 2000 ASME Int. Mech. Eng. Congress & Exposition*, MED-Vol. 11, pp.81-88, November 5-10, Orlando, FL.

Invited Talks

1. "Engineering-Informed Machine Learning for Manufacturing, " Department of Industrial & Manufacturing Systems Engineering, Iowa State University, April 20, 2022.

2. "Machine Learning for Manufacturing, " Honor College of Viterbi School of Engineering, USC, April 8, 2022.

3. "Quality Control as a Computational Service for Smart Manufacturing, " Panelist for Manufacturing Day, USC Center of Advanced Manufacturing, October 1, 2021.

4. "Control-Theoretic Machine Learning for Intelligent 3D Printing Accuracy Control," Panel of Artificial Intelligence in Healthcare 3D Printing, 3DHEALS2021, March 25, 2021.

5. "Engineering-Informed Machine Learning for Intelligent 3D Printing Accuracy Control ", Panel of Artificial Intelligence and Healthcare 3D Printing, 3DHEALS2020 conference, June 5-6, 2020.

6. "Engineering-Informed Machine Learning for Shape Distortion Control in Additive Manufacturing " Department of Mechanical and Aerospace Engineering, University of Central Florida, Orlando, FL. October 4, 2019.

7. "An Engineering-Informed Convolution Learning Framework for Shape Distortion Control in Additive Manufacturing " Department of Mechanical Engineering, University of Alberta, Edmonton, AB, Canada, August 30, 2019.

8. One of the nine invited symposium speakers, "A Convolution Framework for Learning and Predicting 3D Printing Shape Accuracy ", the 9th International Symposium on Quality Science and Reliability Technology, Peking University, July 5 and 6, 2019, Beijing China.

9. "Machine Learning for 3D Printing Distortion Control ", Webinar to INFORMS Quality, Statistics, and Reliability community and IISE Quality Control & Reliability Engineering community, April 24, 2019.

10. "Automated Machine Learning of 3D Printing Accuracy Models Under Cybermanufacturing Environments," University of Michigan-SJTU Joint Institute, Shanghai Jiao Tong University (SJTU), May 17, 2018.

11. "Automated Machine Learning of 3D Printing Accuracy Models Under Cybermanufacturing Environments," Chinese University of Hong Kong - Shenzhen, March 16, 2018.

12. "Data Analytics for Scalable Nanomanufacturing: Stochastic Modeling of Graphene Fabrications Processes ", USC-MFD Distinguished Lecture Series, Mork Family Department of Chemical Engineering and Materials Science, USC, September 7, 2017.

13. "Shape Accuracy Control for Additive Manufacturing", 3D Print R&D Center, HP Inc., Barcelona, Spain, July 10, 2017.

14. Keynote speaker, "Geometric Shape Accuracy Control for Additive Manufacturing Through Machine Learning," European Forum on Additive Manufacturing, June 27-29, 2017, Paris, France (http://www.afpr.asso.fr/les-assises/).

15. "Geometric Shape Accuracy Control for Additive Manufacturing Through Machine Learning," LURPA, ENS (Ecole Normale Superieure) Paris-Sacaly, June 15, 2017.

16. "Geometric Shape Accuracy Control for Cyber-Physical Additive Manufacturing Systems," Chinese University of Hong Kong - Shenzhen, March 16, 2017.

17. "Geometric Shape Deformation Control for Additive Manufacturing", Advanced Manufacturing Research Group, Faculty of Engineering, University of Nottingham, Nottingham, UK, January 25, 2017.

18. "Geometric Shape Accuracy Control for Additive Manufacturing", Special Interest Group Meeting of European Society of Precision Engineering and Nanotechnology: Quality Control for Additive Manufacturing, Manufacturing Technology Center, Coventry, UK, January 23, 2017.

19. "Geometric Shape Accuracy Control for Additive Manufacturing", International Manufacturing Centre, University of Warwick, Warwick, UK, January 20, 2017.

20. "Smart Calibration For Efficient Quality Control of Cyber-Physical Additive Manufacturing Systems ", Decision Systems Engineering Spring'17 Seminar Talk Series, School of Computing, Informatics, & Decision Systems Engineering, Arizona State University, January 13, 2017.

21. "Smart Calibration For Efficient Quality Control of Cyber-Physical Additive Manufacturing Systems ", 2016 Shenzhen International Smart Energy Forum, Chinese University of Hong Kong - Shenzhen, December 20, 2016.

22. "Smart Calibration Through Deep Learning for High-Confidence and Interoperable Cyber-Physical Additive Manufacturing Systems ", 2016 NSF Cyber-Physical Systems Principal Investigators' Meeting, Washington DC, October 31 - November 1, 2016.

23. "Accuracy Control for Additive Manufacturing", School of Industrial and Systems Engineering, Georgia Tech, October 28, 2016.

24. "Accuracy Control for Additive Manufacturing", Department of Industrial and Operations Engineering, University of Michigan, Ann Arbor, October 12, 2016.

25. "Smart Calibration for Cyber-Physical Additive Manufacturing Systems ", LURPA (Automated Production Research Laboratory), ENS Cachan (Ecole Normale Superieure de Cachan), France, July 21, 2016.

26. "Model Transfer Through Engineering Effect Equivalence", Department of Electrical Engineering, KU Leuven, Belgium, July 12, 2016.

27. "Smart Calibration of 3D Printing Processes Through Optimal Compensation of Shape Deformation ", Grado Department of Industrial and Systems Engineering, Virginia Tech, February 17, 2016.

28. "Smart Calibration of 3D Printing Processes Through Optimal Compensation of Shape Deformation ", HP Labs Palo Alto, February 9, 2016.

29. "An Analytical Foundation for Optimal Compensation of Three-Dimensional Shape Deformation in Additive Manufacturing ", Department of Industrial & Systems Engineering, University of Washington, Seattle, January 5, 2016.

30. "Predictive Modeling and Compensation of In-plane Geometric Deviation for Additive Manufacturing — A Quantum Leap from Simple Shapes to Freeform ", Department of Mechanical Engineering, Politecnico Di Milano, Milan, Italy, April 17, 2015.

31. "Quality Control For Additive Manufacturing ", Department of Industrial Engineering, Tsinghua University, June 10th, 2015.

32. "Quality Control For Additive Manufacturing ", Department of Industrial and Management Systems Engineering, Peking University, June 26, 2015.

33. "Quality Control For Additive Manufacturing – A Paradigm Shift, " Panelist, 2nd HKUST-USC forum on 3D Printing – Research and Practice, Hong Kong University of Science and Technology, December 18, 2014.

34. "Stochastic Modeling of Graphene Growth Processes," Kimbler Lecture, the Department of Industrial and Management Systems Engineering, University of South Florida, November 25, 2014.

35. "Predictive Quality Control for Additive Manufacturing," High-Performance Materials Institute, Florida State University, November 24, 2014.

36. "Improving Printing Quality of 3D Printers, " Panelist, 1st HKUST-USC forum on 3D Printing – Research and Practice, Hong Kong University of Science and Technology, January 18, 2014.

37. "Improving Quality of 3D Printing, " Antai School of Bussiness, Shanghai Jiao Tong University, January 10, 2014.

38. "Nanoinformatics for Scale-up Nanomanufacturing: Some Studies," Informatics for Nanomanufacturing Workshop, October 15, 2013, the University of Pennsylvania.

39. "Engineering Design of Scale-up Experiments," Department of Systems Engineering & Engineering Management, City University of Hong Kong, June 26, 2013.

40. "Compensation of Shape Shrinkage for High-Precision Direct Additive Manufacturing, " Department of Industrial Engineering & Logistics Management, Hong Kong University of Science & Technology, June 19, 2013.

41. "Nanomanufacturing Process Modeling and Design Issues," Workshop on Design and Analysis of Experiments in Modern-day Science and Technology, Department of Statistics, Harvard University, April 8-9, 2011.

42. "Integrated Nanomanufacturing and Nanoinformatics for Quality Improvement," Department of Industrial Engineering, University of Houston, October 1, 2010.

43. "Integrated Nanomanufacturing and Nanoinformatics for Quality Improvement," Department of Industrial and Systems Engineering, Texas A&M University, September 30, 2010.

44. "Nanomanufacturing Process Modeling for Quality Improvement," Department of Industrial and Systems Engineering, University of Wisconsin-Madison, April 9th, 2010.

45. "Nanomanufacturing Process Modeling for Quality Improvement," Department of Industrial Engineering and Management Sciences, Northwestern University, April 8th, 2010.

46. "Statistical Weight Kinetics Modeling for Silica Nanowires Growth Catalysed by Pd Thin Film," 2009 Workshop on Statistical Methods for Nano Research, Georgia Tech, December 9, 2009.

47. "Engineering-Driven Statistical Analysis for In-Process Improvement," Biostatistical Forum, College of Public Health at University of South Florida, September 26, 2008.

48. "*In Situ* Quality Control for Nanomanufacturing, " National Center for Nanoscience and Technology, Beijing, China, June 13, 2008.

49. "Bayesian Multiscale *In Situ* Process Control for Nanomanufacturing," Daniel J. Epstein Department of ISE, University of Southern California, April 28, 2008.

50. "Bayesian Multiscale *In Situ* Process Control for Nanomanufacturing," Statistics Colloquium Lecture at University of South Florida, April 18, 2008.

51. "Multiscale *In Situ* Nanomanufacturing Process Control: Challenges and Research Issues," Academy of Mathematics and Systems Science, Chinese Academy of Sciences, Beijing, China, August 3, 2007.

52. "Multiscale *In Situ* Nanomanufacturing Process Control: Challenges and Research Issues," School of Materials Science and Engineering, Jilin University, China, July 2, 2007.

53. "Modeling and Analysis of Fundamental Phenomena in Complex Manufacturing Systems for Quality and Productivity Improvement," Mechanical Engineering Department University of Texas, Austin, March 29, 2007.

54. "Modeling and Analysis of Fundamental Phenomena in Complex Systems for Quality and Productivity Improvement," ISyE Statistics Seminar, Industrial and Systems Engineering Department at Georgia Institute of Technology, March 9, 2007.

55. "Measurement Strategy through Sequential Root Cause Identification," NSF Site Visit, Engineering Research Center for Reconfigurable Manufacturing Systems at University of Michigan, May 6, 2004.

56. "Stream of Variation Methodology for Serial-Parallel Reconfigurable Manufacturing Systems: Part-Path-Oriented Strategy," Technical Advisory Committee Meeting, Engineering Research Center for Reconfigurable Manufacturing Systems at University of Michigan, October 15, 2003.

Teaching
Courses Taught
Undergraduate level
ISE 426: Statistical Quality Control (F10, F11, F12, F13, F14, F16, S18, F18, S19, F19, S20,F20,S21,S22)
Graduate level
ISE 610: Advanced Design of Experiments and Quality Engineering (F16, F17,F18,F19, F20,F21)
ISE 599 (new): Advanced Topics on System Monitoring and Causal Inference with Complex Engineering Data (S22)
ISE 525: Design of Experiments (F09, F10, F11, F12, F13, F14, F15)
ISE 529 (new): Engineering Data Analytics (S15)
ISE 599 (new): Foundation of Applied Mathematic for Engineered System Analytics (S13)
ISE 651: Research Seminar (F09, S11, F11, F17,F19,S22)

Student Mentoring
Current Ph.D. students

1. Weizhi Lin, "3D Shape Modeling and Analysis in 3D Printing Through Manifold Learning ", 2019 ∼ present.

2. Chris Henson, "In-Situ Process Monitoring and Control for Additive Manufacturing Processes", 2019 ∼ present.

3. Minghao Gu, "Engineering-informed Dimension Reduction," fall 2021 ∼ present.

4. Han Kyul Kim, "Causal Inference for Diversity-Enhanced Education," spring 2021∼ present (Co-advising).

Post-doc Research Fellow

1. Dr. Cesar Ruiz, Conducting research on predictive maintenance and machine learning for additive manufacturing, September 16, 2020 ∼ June 15, 2022. Current position: Assistant

Professor at School of Industrial and Systems Engineering, University of Oklahoma, starting in fall 2022 ∼ Present.

Visiting Scholars

1. Ivanna Baturynska, Visiting PhD fellow in Additive Manufacturing, Department of Manufacturing and Civil Engineering, Norwegian University of Science and Technology (NTNU), Norway; October to December, 2019. Current position: *Associate Professor at NTNU*.

2. Dr. Sang Hun Lee, a General manager of KCC Corp, South Korea, February 2020 to January 2022, conducting Machine Learning and Big Data research for manufacturing, and his visit is funded by KCC Corp.

3. Mengqi Fan, Visiting PhD student, Department of Industrial Engineering, Tsinghua University, China; April to October, 2019.

Undergraduate Researchers

– Yilin Zhu (ISE senior), Rachel Xu (ISE freshman), Chengxi Xu (CS junior), Mitchell Lin (CS junior), summer 2022.

– Kevin Sun (Viterbi CURVE fellow); fall 2020 ∼ spring 2022.

– Catherine Tsai, spring 2021 (Viterbi CURVE fellow)

– Mandy Hartman (Viterbi fellow); fall 2020

– Austin J. Barrow, Purdue University; Kevin Sun and Jiyoon Park, USC; summer 2020, 2021.

– Austin J. Barrow, Honors Aerospace Engineering, Purdue University, summer 2019.

– Donggyun Kim and Byungjoon Park, School of Aeronautical and Mechanical Engineering, Korea Aerospace University, summer 2019.

Ph.D. Graduates

1. Hui Wang, Ph.D., Fall 2007, USF, "Error Equivalence Theory for Manufacturing Process Control."(USF)   Current position: Associate Professor (with tenure) at the Department of Industrial and Manufacturing Engineering, Florida State University, spring 2014 ∼ Present.

2. Xi Zhang, Ph.D., Fall 2009, USF, "Physical and Statistical Analysis of Functional Process Variables for Process Control in Semiconductor Manufacturing."(USF)   Current position: Associate Professor with tenure, Industrial Engineering & Management Dept., Peking University, 2010 ∼ Present.

3. Lijuan Xu, Ph.D., December 2013, USC, "Nanostructure Interaction Modeling and Estimation for Scalable Nanomanufacturing. "   Current position: Staff Data Scientist at Google, CA.

4. Li Wang, Ph.D., December 2013, USC, "Modeling and Analysis of Nanostructure Growth Process Kinetics and Variations for Scalable Nanomanufacturing. " Current position: Director II of Data Science at Liberty Mutual Insurance.

5. Yanqing Duanmu, Ph.D., August 2017, USC, "Some Scale-up Methodologies for Advanced Manufacturing."   Current position: Data Scientist, Apple Inc.

6. He Luan, Ph.D., May 2018, USC, "Statistical Modeling and Machine Learning for Shape Accuracy Control in Additive Manufacturing." Current position: Data Scientist at Google, CA.

7. Yuan Jin, December 2018, USC, "Statistical Modeling and Process Data Analytics for Smart Manufacturing" (Co-advising with Prof. Joe Qin).   Current position: Data Scientist at Facebook, CA.

8. Nathan Decker, March 2022, USC, "Machine Learning-Driven Deformation Prediction and Compensation for Additive Manufacturing ".   Current position: System Engineer, ExoAnalytic Solutions.

9. Yuanxiang Wang, May 2022 "Fabrication-Aware Machine Learning for Accuracy Control in Additive Manufacturing ". Current position: Assistant Professor, School of Mechanical Engineering, Tongji University, Shanghai, China, fall 2022 (expected).

<u>M.S. Graduates</u>

1. Hani Kababji, M.S., 2005, "Online Change Detection for Multichannel Functional Data."(USF) Current position: senior consultant at Ernst & Young.

2. Shaoqiang Chen, M.S., Summer 2008, "Manufacturing Process Design and Control based on Error Equivalence Methodology."(USF). Current position: Chico's FAS.

3. Gang Liu, M.S., Fall 2009, "Nanostructure Morphology Variation Modeling and Estimation for Nanomanufacturing Process Yield Improvement."(USF)

<u>REU students mentored</u>
<u>USC</u>: Cynthia Larocque, Preethi Kasireddy, William Sheng, Michelle Leclair, Drew Nollsch. <u>USF</u>: Clayton Bristal, Kristin L. Carattini, Estrella Jackson, Tsai Wu, <u>UM</u>: Shenale E. Glenn, Lina Kim, and Krystle D. Lemon.

Service

Editorial Service

Lead Editor, *IISE Transactions on Design and Manufacturing*, Special Issue: AI and Machine Learning for Manufacturing, 10/2021 – 07/2023.

Department Editor, *IISE Transactions on Design and Manufacturing*, 09/01/2017 – 08/31/2023 (extended for the second term).

Associate Editor, *ASME Transaction, Journal of Manufacturing Science and Engineering*, 08/01/2017 – 08/01/2023 (extended for the second term).

Associate Editor, *IISE Transactions on Design and Manufacturing*, 02/01/2017 – 01/31/2020.

Member of Scientific Committee, the 32nd DESIGN Conference of the International Academy for Production Engineering (CIRP).

Committee Member, International Scientific Committee for CIRP Conference on Computer Aided Tolerancing, 2018, 2020.

Guest Editor, *IISE Transactions on Design and Manufacturing*, Special issue on Additive Manufacturing, 03/2017 – 03/2018.

Member of Editorial Review Board, *Journal of Quality Technology*, 09/2016 –08/2018.

Guest Editor, *Journal of Quality Technology*, Special Issue on "Quality Engineering in Advanced Manufacturing", 2015 –2017.

Associate Editor, *IEEE Transactions on Automation Science & Engineering*, 2012-2016

Founding Associate Editor, *IEEE Robotics and Automation Letters*, July 2015-July 2016.

Chair-Elect (2011) & Chair (2012), INFORMS Section on Quality, Statistics, and Reliability.

Associate Editor (Quality, Micro and Nano Manufacturing Systems), *SME Journal of Manufacturing Systems*, 2008-2011.

Special Issue Editor, "Quality, Sensing and Prognostics Issues in Nanomanufacturing ", *Special Issue of the IIE Transactions*, 2010-2011.

Contributing Editor, InterNano (www.internano.org), online resource of the National Nanomanufacturing Network (NNN), 04/2012-04/2015.

Program Committee (PC), International Symposium on Flexible Automation (ISFA), 2014, 2016

Associate Editor of Conference Editorial Board, *IEEE Conference on Automation Science and Engineering (CASE), 2016, 2015, 2014, 2010, 2009.*

Member of scientific committee (Editorial Board) for the *North American Manufacturing Research Institution (NAMRI) of SME*, 2009-2011, 2013-2015.

Executive Board member, The International Society for Manipulation, Manufacturing and Measurement on the Nanoscale - 3M-NANO International Society, since October 2014.

Associate Editor for the Conference Editorial Board (CEB) of the IEEE Robotics and Automation Society for ICRA 2015

Program Committee, 2014 Workshop on Nanoinformatics for Environmental Health and Biomedicine (http://nanoinfo2014.weebly.com/), held in conjunction with 2014 IEEE International Conference on Bioinformatics and Biomedicine, Belfast, UK, November, 2014.

Editorial Board Member, 2014, *Automation of Technological and Business Processes* Journal, Odessa National Academy of Food Technologies, Ukraine.

Program Committee Member, 2014, "Annual scientific and practical conference on Information Technology and Automation, "Odessa National Academy of Food Technologies, Odessa, Ukraine.

Co-organizer, 1st HKUST-USC forum on 3D Printing – Research and Practice, Hong Kong University of Science and Technology, January 18, 2014.

Program Committee, 1st International Conference on Manipulation, Manufacturing and Measurement on the Nanoscale (3M-NANO), 29 Aug - 2 Sept 2011 in Changchun, China.

Conference, Workshop, Research Forum Organization

General chair, *IEEE Conference on Automation Science and Engineering (CASE)*, August 2025, Anaheim, CA.

Lead organizer, *Machine Learning for Additive Manufacturing (ML4AM) Workshop*, 2022 IEEE 18th International Conference on Automation Science and Engineering (CASE), August 20-24, 2022, Mexico City, Mexico.

Founder and organizer,*International Workshop on the Foundations of Accuracy Control for Additive Manufacturing (FACAM)*, 2016 (USC), 2018 (USC), 2019 (ENS Paris-Saclay), 2020 (USC) (https://facam-online.blogspot.com/).

Organizer, 2nd USC-HKUST-Purdue-NUS-Harvard Workshop on Predicative Modeling and Control of Additive Manufacturing, November 13, 2014.

Organizer, 1st USC-HKUST Workshop on Additive Manufacturing, October 9, 2013.

Government and Professional Institutions

Member of Steering Committee, IEEE Conference on Automation Science and Engineering (CASE), 2021 - present.

Co-chair of Manufacturing and Design Track, 2022 & 2021 IISE Annual Conference & Expo.

Panelist, NSF Proposal Review Panel, 2004, 2006 - 2009, 2011-2016, 2018, 2019.

Reviewer for Ralph E. Powe Junior Faculty Award, ORNL, spring 2016.

Contributed session chair, "Predictive Modeling and Control for Additive Manufacturing", *IEEE Conference on Automation Science and Engineering (CASE)*, 2016, 2015, 2014.

Member of steering committee, "Nanoinformatics 2013: Informatics for Nanomanufacturing,"National Nanomanufacturing Network, October 15-17, 2013, University of Pennsylvania, Philadelphia.

Council member of QSR (Quality, Statistics, and Reliability) section at INFORMS, 2010-2012.

Panel Organizer, "Quality Control for Nanomanufacturing," INFORMS 2007, 2009.

Session Organizer, "Quality Control for Nanomanufacturing," IERC 2007, INFORMS 2007-2011.

Symposium Co-organizer, "Advances in Quality Control in Multistage Manufacturing Systems," 2006 ASME IMECE, Chicago, IL.

Session Chair of INFORMS Annual Meeting, 2003, 2005-2017; Session Chair of IERC 2004, 2006, 2007; Session Chair of NAMRI/SME Conference, 2003

Departmental, college, and university

ISE PhD Admission Committee and Graduate Committee, fall 2020, 2021

ISE Department Research Restart Task Force: 08/2020 ∼ 2021

ISE Space Committee, 09/2020 ∼ present

Member of ISE Faculty Search Committee, fall 2018 ∼ March 2019; fall 2019 ∼ spring 2020

Member of ISE Promotion Committee, summer 2019 ∼ December 2019

Viterbi Research Committee, Viterbi School of Engineering, fall 2015 ∼ 2020

Chair of ISE PhD Admission Committee, December 2017 ∼ March 2018

Viterbi Space Review Committee, Viterbi School of Engineering, spring 2017

Chair of Departmental Space Committee, December 2016 ∼ spring 2017

Viterbi Appointment Promotion and Tenure (APT) Committee, fall 2014 ∼ fall 2015

USC Graduate School's Task Forces for Advanced PhD Fellowships, April 2015

ISE PhD Graduate Committee, December 2014∼ 2015

ISE Chair Evaluation Committee, December 2014 - February 2015

ISE Predictive Analytics Program Committee, 2013, 2014

ISE Department Tenure Promotion Committee, 2013

ISE Department Faculty Search Committee, 2013

ISE Organizer and initiator: Epstein PhD Students' Seminar on Focused Topics, fall 2013

ISE Merit Review Committee, Feb 2013

ISE Chair of PhD Admission Committee, Nov 2012 to Feb 2013

ISE 220 Course Review Committee, 2013

Advisory Committee on East Asia and China Academic Initiative, Vertibi School, 2012–2014

Proposer and organizer of Epstein Institute Seminar Series, spring & fall 2011

Member of Engineering Faculty Council (EFC), 2010 – 2012

Chair of ISE Ph.D. Admission Committee, Dec 2012 – Jan 2013

Member of ISE Ph.D. Admission Committee, Dec 2010 – Jan 2011

ISE 220 Course Review Committee Chair, spring 2013

ISE 310 Course Review Committee, spring 2012

Chair of EFC Best Practices Subcommittee on Timing of Election of ERC Officers, spring 2011

Chair of ISE 225 Course Review Committee, spring 2011

ISE screening exam organizer, spring & fall 2010

Department merit review procedure committee, Fall 2009

Department ABET ISE 426 SQC review committee, Fall 2009

Viterbi school fellowship student conversion ad hoc committee, Fall 2009.

Professional Affiliation

IISE Fellow, Senior Member of IEEE (2016), Member of INFORMS & ASME