

Qiang Huang

Associate Professor and Gordon S. Marshall Early Career Chair in Engineering
Daniel J. Epstein Department of Industrial and Systems Engineering
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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

Associate Professor and and Gordon S. Marshall Early Career Chair in Engineering, Daniel J. Epstein Department of Industrial and Systems Engineering, University of Southern California, Los Angeles, CA, March 2012 ~ Present.

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.

Honors and Awards

1. Gordon S. Marshall Early Career Chair in Engineering, USC, 2012–Present
2. NSF Faculty Early Career Development (CAREER) Award, 2011.
3. 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.
4. Best Application Paper Award Finalist, the tenth IEEE International Conference on Automation Science and Engineering (CASE 2014), August 18-22, 2014, Taipei, Taiwan.
5. Invited Key Speaker for “Nanoinformatics 2013: Informatics for Nanomanufacturing,” National Nanomanufacturing Network, October 15-17, 2013, University of Pennsylvania, Philadelphia.
6. 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.
7. *Featured articles on IIE Transactions*
“Optimal Offline Compensation of Shape Shrinkage for 3D Printing Processes”, *IIE Transactions on Quality and Reliability*, Vol. 47, No. 5, pp. 431–441.
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.
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. Graduate Student Research Assistantship at ERC-RMS of University of Michigan, 1999~2003.

Research

Research Interests

- Integrated Nanomanufacturing & Nanoinformatics (INN)
- Quality Control Paradigm for Personalized Manufacturing
- Prescriptive Modeling and Control for Additive Manufacturing
- Quality and Applied Statistics

Publications

Refereed Journals and Transactions

Note: (* indicates a coauthor who was a student under my supervision, **Huang** indicates me being the corresponding author)

Published or Accepted

1. 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*, DOI: 10.1080/0740817X.2015.1033038, in press.
2. Bao, L., Huang, Q., and Wang, K., 2015 “Robust Parameter Design for Profile Quality Control,” *Quality and Reliability Engineering International*, in press.
3. **Huang**, Q., Zhang*, J., Sabbaghi, A., and Dasgupta, T., 2015, “Optimal Offline Compensation of Shape Shrinkage for 3D Printing Processes,” *IIE Transactions on Quality and Reliability*, Vol. 47, No. 5, pp. 431–441. (INFORMS 2014, IIE Transactions Invited Session paper and IIE Magazine Featured Article, May 2015).
4. 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, Issue 3, pp. 274-284.
5. **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, pp. 061008 - 061018.
6. Sabbaghi, A., Dasgupta, T., Huang, Q., Zhang*, J., 2014, “Inference for deformation and interference in 3D printing,” *Annals of Applied Statistics*, Vol. 8, No. 3, pp. 1395-1415.
7. 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, No. 6, pp. 1093 - 1101.
8. Wu*, J., and **Huang**, Q., 2014 “Graphene Growth Process Modeling: A Physical-Statistical Approach,” *Applied Physics A, Materials Science & Processing*, Vol. 116, No. 4, pp. 1747-1756.
9. Zhu, L., Dasgupta, T., and Huang, Q., 2014, “A Locally D-Optimal Design for Estimation of Parameters of an Exponential-Linear Growth Curve of Nanostructures,” *Technometrics*, Volume 56, Issue 4, pp. 432-442. (ASQ Fall Technical Conference 2014, Technometrics Invited Session paper).
10. 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.
11. 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)
12. 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, pp. 745-754.

13. 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, pp. 523-533.
14. **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, pp. 303-310.
15. **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. (Selected for Research Highlight in IIE Industrial Engineer).
16. 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.
17. Chen*, S., Wang*, H., and **Huang**, Q., 2010, "Diagnosis of Multiple Error Sources Under Variation Equivalence", *NAMRI/SME Transactions*, Vol. 38.
18. 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.
19. 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, pp. 188-195.
20. 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. 1116.
21. 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, pp. 644-652.
22. 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, pp. 53-61.
23. 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. (Work highlighted by IIE Industrial Engineer)
24. 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, No.4, pp. 279-292.
25. 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, pp. 944-950.
26. 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, pp. 512-521.
27. 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, pp.611-618.
28. 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, pp. 807-815.

29. 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, pp. 255–262.
30. 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, pp. 296–309.
31. Huang, Q., Shi, J., 2003, "Simultaneous Tolerance Synthesis through Variation Propagation Modeling of Multistage Manufacturing Processes," *NAMRI/SME Transactions*, Vol. 31, pp. 515–522.
32. Huang, Q., Zhou, S., and Shi, J., 2002, "Diagnosis of Multi-Operational Machining Processes through Process Analysis," *Robotics and Computer-Integrated Manufacturing*, Vol. 18, pp. 233–239.

Patents and Provisional Patents

1. US Provisional Application 62/146,649, (USC 2015-231-01), April 10, 2015, *Enable 3D Scanners as Inspection Tool through Novel Prediction of Scanning Geometric Accuracy*, invention disclosed on March 26, 2015 with No. D2015-0186.
2. Provisional patent application, No. 2015-225, April 22, 2015, *Optimal Compensation algorithm for Three-Dimensional Shape Deviations in Additive Manufacturing*, invention disclosed on March 23, 2015 with No. D2015-0182.
3. Provisional patent application, No. 2015-210, April 22, 2015 *Three-Dimensional Geometric Error Prediction for Additive Manufacturing*, invention disclosed on March 16, 2015 with No. D2015-0175.
4. U.S. Patent Publication No. US-2014-0107823-A1, *3D Printing Shrinkage Compensation Using Radial and Angular Layer Perimeter Point Information*, April 17, 2014.
5. US Provisional Patent Application No. 62/037,937 *Algorithm for predicting quality of 3D Printed Products: from cylindrical shapes to polygons*, filed on February 6th, 2014.
6. U.S. Patent Application No. 14/052,418, *3D Printing Shrinkage Compensation Using Radial and Angular Layer Perimeter Point Information*, filed on October 11, 2013.
7. US Provisional Patent Application No. 61/712,723: *Algorithm of compensating shape shrinkage for 3D printing processes*, filed on October 11, 2012.

Editorial Articles and Highlights

1. 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.
2. 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. 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, August 24-28, 2015, Gothenberg, Sweden.
2. 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, August 24-28, 2015, Gothenberg, Sweden.

3. 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, August 24-28, 2015, Gothenberg, Sweden.
4. 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.
5. **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).
6. 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*.
7. 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.
8. 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.
9. 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.
10. 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)*.
11. **Huang**, Q., 2011, "Integrated Nanomanufacturing and Nanoinformatics for Quality Improvement", *44th CIRP International Conference on Manufacturing Systems*, June 1-3, 2011, Madison, Wisconsin (Invited).
12. 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.
13. **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.
14. 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.
15. 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.
16. 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.

17. 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.
18. 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.
19. 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. "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.
2. "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.
3. "Stochastic Modeling of Graphene Growth Processes," Kimbler Lecture, the Department of Industrial and Management Systems Engineering, University of South Florida, November 25, 2014.
4. "Predictive Quality Control for Additive Manufacturing," High-Performance Materials Institute, Florida State University, November 24, 2014.
5. "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.
6. "Improving Quality of 3D Printing, " Antai School of Bussiness, Shanghai Jiao Tong University, January 10, 2014.
7. "Nanoinformatics for Scale-up Nanomanufacturing: Some Studies," Informatics for Nanomanufacturing Workshop, October 15, 2013, the University of Pennsylvania.
8. "Engineering Design of Scale-up Experiments," Department of Systems Engineering & Engineering Management, City University of Hong Kong, June 26, 2013.
9. "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.
10. "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.
11. "Integrated Nanomanufacturing and Nanoinformatics for Quality Improvement," Department of Industrial Engineering, University of Houston, October 1, 2010.
12. "Integrated Nanomanufacturing and Nanoinformatics for Quality Improvement," Department of Industrial and Systems Engineering, Texas A&M University, September 30, 2010.
13. "Nanomanufacturing Process Modeling for Quality Improvement," Department of Industrial and Systems Engineering, University of Wisconsin-Madison, April 9th, 2010.
14. "Nanomanufacturing Process Modeling for Quality Improvement," Department of Industrial Engineering and Management Sciences, Northwestern University, April 8th, 2010.
15. "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.
16. "Engineering-Driven Statistical Analysis for In-Process Improvement," Biostatistical Forum, College of Public Health at University of South Florida, September 26, 2008.

17. “*In Situ* Quality Control for Nanomanufacturing, ” National Center for Nanoscience and Technology, Beijing, China, June 13, 2008.
18. “Bayesian Multiscale *In Situ* Process Control for Nanomanufacturing,” Daniel J. Epstein Department of ISE, University of Southern California, April 28, 2008.
19. “Bayesian Multiscale *In Situ* Process Control for Nanomanufacturing,” Statistics Colloquium Lecture at University of South Florida, April 18, 2008.
20. “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.
21. “Multiscale *In Situ* Nanomanufacturing Process Control: Challenges and Research Issues,” School of Materials Science and Engineering, Jilin University, China, July 2, 2007.
22. “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.
23. “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.
24. “Measurement Strategy through Sequential Root Cause Identification,” NSF Site Visit, Engineering Research Center for Reconfigurable Manufacturing Systems at University of Michigan, May 6, 2004.
25. “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.

Grants

1. Leading PI, *Collaborative Research: Geometric Shape Error Control for High-Precision Additive Manufacturing*, NSF CMMI-1333550, \$285K, 08/2013~07/2016 (Co-PI at USC: Y. Chen; PI at Harvard University: T. Dasgupta, \$115K).
2. 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).
3. 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).
4. PI, *CAREER: Nanomanufacturing Process Modeling and Control – A Foundation for Large-Scale Production*, NSF CMMI-1055394, \$400,000, 2011~2016.
5. 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, 2011~2014 (PI: Y. Chen at USC).
6. Leading PI, *Collaborative Research: Nanostructure Growth Process Modeling and Optimal Experimental Strategies for Repeatable Fabrication of Nanostructures for Application in Photovoltaics*, NSF CMMI-1000972, \$300K, 2010~2013 (Co-PI at USC: C. Zhou; PI at Harvard University: T. Dasgupta, \$160K).
7. PI, *In Situ Nanomanufacturing Process Control Through Multiscale Nanostructure Growth Modeling*, NSF CMMI-0728100 & CMMI-1002580, \$350K, 2007~2011 (Co-PI: A. Kumar).
8. 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).

9. Co-PI, *Nanoengineered, Manufacturable, Ion-Implantation Seeded Silica Nanowires for Sensitive BioScreening*, NSF CMMI-0700659, \$289,980, 2007~2010 (PI: S. Bhansali).
10. Co-PI, *Bayesian process control for nanomanufacturing with mixed resolution information*, Hong Kong RGC (Research Grant Council), 2009~2011 (PI: F. Tsung, Co-PI: J. Shi)
11. PI, *Multiscale Nanostructure Growth Modeling for Control of Nanomanufacturing*, Functional Multiscale Materials by Design Initiative, University of South Florida, \$7000, Summer 2007.
12. 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.
13. PI, *Process Control based on Multivariate Functional Data*, University of South Florida Internal Research Awards, \$2700, 05/04~04/05.

Teaching

Courses Taught

Undergraduate level

ISE 426: Statistical Quality Control

Graduate level

ISE525: Design of Experiment

*ISE 599 Foundation of Applied Mathematics for Engineered System Analytics (*new*)

ISE 650 Research Seminar

ISE 529: Engineering Data Analytics (*new*)

Student Mentoring

Current Ph.D. students

1. Yanqing Dumanmu, Yuan Jin (co-advising), He Luan

Ph.D. Graduates

1. Hui Wang, Ph.D., Fall 2007, "Error Equivalence Theory for Manufacturing Process Control." (USF) Current position: Assistant Professor at Florida State University since spring 2014.
2. Xi Zhang, Ph.D., Fall 2009, "Physical and Statistical Analysis of Functional Process Variables for Process Control in Semiconductor Manufacturing." (USF) Current position: Assistant Professor, 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: Senior Analyst at Climate Corp, 2014 ~ Present.
4. Li Wang, Ph.D., December 2013, USC, "Modeling and Analysis of Nanostructure Growth Process Kinetics and Variations for Scalable Nanomanufacturing. " Current position: Senior Analyst at Liberty Mutual Insurance, 2013 ~ Present.

M.S. Graduates

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)

REU students mentored

USC: Cynthia Larocque, Preethi Kasireddy, William Sheng, Michelle Leclair, Drew Nollsch. USF: Clayton Bristol, Kristin L. Carattini, Estrella Jackson, Tsai Wu, UM: Shenale E. Glenn, Lina Kim, and Krystle D. Lemon.

Service

Editorial Service

Associate Editor, IEEE Transactions on Automation Science and Engineering, 2012-2015

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 on Quality and Reliability Engineering/Manufacturing and Design*, 2010-2011.

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

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

Member of scientific committee (Editorial Board) for the *North American Manufacturing Research Institution (NAMRI) of SME*, 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 (PC) for the 2014 International Symposium on Flexible Automation (ISFA 2014), 2013-1014

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

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

Government and Professional Institutions

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

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.

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.

Professional Affiliation

INFORMS, IIE, IEEE, ASME, SME