ZHAOHUI GENG

Address: 4628 Bayard Street Apt 115, Pittsburgh, PA 15213
EMAIL: zhg17@pitt.edu **Phone:** (412) 944-7917

RESEARCH INTERESTS

- **Advanced Manufacturing**: *Reverse engineering; Additive manufacturing; Quality control and optimal process planning; Tolerance modeling, analysis and synthesis.*
- **Engineering Statistics**: *High-dimensional statistical shape analysis and inference; Probabilistic/Bayesian machine learning; Experimental design; Statistical quality control; Statistical learning and inference.*

ACADEMIC EXPERIENCES

Assistant Professor 2021-now
Department of Manufacturing and Industrial Engineering
The University of Texas Rio Grande Valley

Research Associate 2021-now
Department of Neurological Surgery, and Neurology at the University of Pittsburgh Medical Center
Department of Biomedical Informatics of the School of Medicine

Graduate Student Researcher / Lecturer 2016-2021
Department of Industrial Engineering
University of Pittsburgh

EDUCATION

Ph.D. in Industrial Engineering 2021
University of Pittsburgh

- *Dissertation Topic*: Volumetric data analysis for reverse engineering and solid additive manufacturing: A framework for geometric metrological analysis
- *Advisor*: Dr. Bopaya Bidanda
- *Committee Members*: Drs. Arman Sabbaghi, Jayant Rajgopal, Xiayun Zhao, Mostafa Bedewy

Master of Arts in Statistics 2018
University of Pittsburgh

Master of Science in Industrial Engineering 2016
University of Pittsburgh

Bachelor of Engineering in Electronic Science and Technology 2014
Nankai University

PUBLICATIONS

Journal Publications (Published)

5. **Z. Geng**, B. Bidanda (2021). Tolerance Estimation and Metrology for Reverse Engineering based Remanufacturing Systems. *International Journal of Production Research*, 1-14.
4. **Z. Geng**, B. Bidanda (2021). Geometric Precision Analysis for Additive Manufacturing Processes: A Comparative Study. *Precision Engineering* (**Invited**), 69, 68-76.
3. **Z. Geng**, B. Bidanda (2017). Review of Reverse Engineering Systems - Current State of the Art, *Virtual and Physical Prototyping* 12(2), 161-172.
2. Z. Zhang, **Z. Geng**, D. Cai, T. Pan, Y. Chen, L. Dong, and T. Zhou (2015). Structure, Electronic and Magnetic Properties of Hexagonal Boron Nitride Sheets Doped by 5d Transition Metal Atoms: First-Principles Calculations and Molecular Orbital Analysis, *Physica E: Low-dimensional Systems and Nanostructures* 65, 24-29.
1. Z. Zhang, **Z. Geng**, P. Wang, Y. Hu, Y. Zheng, and T. Zhou (2013). Properties of 5d Atoms Doped Boron Nitride Nanotubes: A First-Principles Calculation and Molecular Orbital Analysis, (in Chinese) *Acta Physica Sinica*, 62(24), 246301.

Journal Publications (Under Revision/Under Review)

4. **Z. Geng**, A. Sabbaghi, B. Bidanda (2021). Automated Variance Modeling for Three-Dimensional Point Cloud Data via Bayesian Neural Networks. Revision at *IISE Transactions*.
3. **Z. Geng**, B. Bidanda (2021). Utilizing Dual Functionalities of Reverse Engineering in Additive Manufacturing: Metrology and Quality Implications. Submitted to *Manufacturing Letters*.
2. **Z. Geng**, A. Sabbaghi, B. Bidanda (2021). A Framework of Tolerance Specification for Freeform Point Clouds and Capability Analysis for Reverse Engineering Processes. Submitted to *International Journal of Production Research*.
1. **Z. Geng**, A. Sabbaghi, B. Bidanda (2021). Reconstructing Original Design: Process Planning for Reverse Engineering. Submitted to *IISE Transactions*.

Manuscripts in Preparation

2. **Z. Geng**, B. Zeng, A. Sabbaghi, B. Bidanda. Minimax Registration for Point Clouds Alignment.
1. **Z. Geng**, B. Zeng, B. Bidanda.Automated Metrology Planning for 3D Scanning of a Freeform Design using Bayesian Optimization.

Refereed Book Chapters

2. **Z. Geng**, B. Bidanda (2020). Medical applications of additive manufacturing. In *Bio-Materials and Prototyping Applications in Medicine*. Springer, Cham.
1. **Z. Geng**, B. Bidanda. Current Status and Applications of Additive Manufacturing for Dental Applications. Submitted to *The ASM Handbook, Vol. 24A, Additive Manufacturing in Biomedical Applications*.

Refereed Conference Proceedings

6. **Z. Geng**, B. Bidanda (2021). Metrological Analysis for Reverse Engineering System via Volumetric Data Analysis, *FAIM 2020 - 30th International Conference on Flexible Automation and Intelligent Manufacturing*, Athens, Greece.

5. **Z. Geng**, B. Bidanda (2019). Volumetric Data Analysis: Inspection and Experimental Design for Additive Manufacturing, *ASPE 34th Annual Meeting*, Pittsburgh, PA.
4. B. Bidanda, **Z. Geng** (2017). Modeling Techniques in Reverse Engineering, *24th International Conference on Production Research*, Poznan, Poland.
3. R. Bidanda, J. Winakor, **Z. Geng**, N. Vidic (2017). A Review of Optimization Models for Boarding a Commercial Airplane, *24th International Conference on Production Research*, Poznan, Poland.
2. B. Bidanda, **Z. Geng** (2016). Emerging Trends in Reverse Engineering, *Proceedings of the 2nd Conference on Progress in Additive Manufacturing*, Singapore, Singapore.
1. **Z. Geng**, J. Haight, W. Schwaderer (2016) Current Research - Safety & Health management System Performance Measurement, *The ASSE Safety 2016 Professional Development Conference & Exposition 2016*, Atlanta, GA.

CONFERENCE PRESENTATIONS

Invited Talks

3. **Z. Geng**, B. Bidanda. Automated Metrology Planning For 3d Scanning Of A Freeform Design Using Bayesian Optimization. In *2021 INFORMS Annual Meeting*, Anaheim, CA, October 2021.
2. **Z. Geng**. Volumetric Data Analysis for Reverse Engineering and Additive Manufacturing: A Framework for Geometric Metrological Analysis. *The University of Texas Rio Grande Valley*, Edinburg (Virtual), TX, Februrary 2021.
1. **Z. Geng**. Volumetric Data Analysis for Reverse Engineering and Additive Manufacturing: A Framework for Geometric Metrological Analysis. *University of Michigan-Dearborn*, Dearborn, MI, Februrary 2020.

Contributed Talks

10. **Z. Geng**, B. Bidanda. Geometric Metrology for Additive Manufacturing. In *STM International Conference on Additive Manufacturing (ASTM ICAM 2021)*, Anaheim, CA, November 2021.
9. **Z. Geng**, B. Bidanda. The Dual Functionality of Reverse Engineering for Additive Manufacturing. In *STM International Conference on Additive Manufacturing (ASTM ICAM 2021)*, Anaheim, CA, November 2021.
8. **Z. Geng**, B. Bidanda. Metrological Analysis for Reverse Engineering System via Volumetric Data Analysis. In *FAIM 2021 - 30th International Conference on Flexible Automation and Intelligent Manufacturing*, Athens, Greece, June 2021.
7. **Z. Geng**, B. Bidanda. Designed Experiments on Geometric Accuracy of Additive Manufacturing Processes. In *Institute of Industrial & Systems Engineers (IISE) Annual Conference & Expo 2020*, Virtual, May 2020.
6. **Z. Geng**, B. Bidanda. Freeform Tolerance Specification and Metrological Analysis of Reverse Engineered Models. In *FACAM 2020 Workshop*, Los Angeles, CA, February 2020.
5. **Z. Geng**, B. Bidanda. Reverse Engineering System: Tolerance Estimation and Analysis for Remanufacturing. In *2019 INFORMS Annual Meeting*, Seattle, WA, October 2019.
4. **Z. Geng**, B. Bidanda. Volumetric Data Analysis for Inspection of 3D Printed Parts. In *25th*

International Conference on Production Research, Chicago, IL, August 2019.

3. **Z. Geng**, B. Bidanda. Reverse Engineering for Small Batch Remanufacturing. In *Institute of Industrial & Systems Engineers (IISE) Annual Conference & Expo 2019*, Orlando, FL, May 2019.
2. B. Bidanda, **Z. Geng**. Modeling Techniques in Reverse Engineering. In *24th International Conference on Production Research, Poznan, Poland*, August 2017.
1. R. Bidanda, **Z. Geng**. Emerging Trends in Reverse Engineering. In *24th International Conference on Production Research*, Poznan, Poland, August 2017.

Contributed Posters

2. **Z. Geng**, B. Bidanda. Volumetric Data Analysis for Inspection of 3D Printed Parts. In *25th International Conference on Production Research*, Chicago, IL, August 2019.
1. **Z. Geng**, B. Bidanda. Modeling Techniques in Reverse Engineering. In *24th International Conference on Production Research, Poznan, Poland*, August 2017.

TEACHING EXPERIENCE

University of Pittsburgh

ENGR 0020, Probability and Statistics for Engineers I Spring 2021
Instructor
- Undergrad level. Online. Class size: 50.

ENGR 0020, Probability and Statistics for Engineers I Fall 2020
Instructor
- Undergrad level. Online. Class size: 58.

ENGR 0020, Probability and Statistics for Engineers I Fall 2018
Instructor
- Undergrad level. Class size: 84.

ENGR 0020, Probability and Statistics for Engineers I Spring 2018
Instructor
- Undergrad level. Class size: 70.

IE 1082, Probabilistic Methods in Operations Research Summer 2020
Teaching Assistant
- Undergrad level. Class size: 25. Led by Dr. Lisa Maillart.

IE 2007, Statistics and Data Analysis Spring 2020
Teaching Assistant
- Graduate level. Class size: 30. Led by Dr. Hoda Bidkhori.

IE 2062, Data Mining Spring 2020
Teaching Assistant
- Graduate level. Class size: 30. Led by Dr. Hoda Bidkhori.

IE 1089, Additive Manufacturing Summer 2018
Teaching Assistant

- Graduate level. Class size:20. Led by Dr. Howard Kuhn.

ENGR 0020, Probability and Statistics for Engineers I Spring 2016
Teaching Assistant

- Undergrad level. Class size: 70. Led by Dr. Natasa Vidic. Responsibility: held recitations.

AWARDS AND HONORS

Outstanding Teaching Assistant Award (Swanson School of Engineering), 2019.

Invitee, IFPR Doctoral Workshop, Poznan, Poland, August 2017.

ACADEMIC SERVICES

Led and prepared a proposal to National Science Foundation (NSF) on reverse engineering.

Invited reviewer for *Virtual and Physical Prototyping*, *International Journal of Production Research*, *International Conference on Production Research* (2017, 2019), *SME NAMRC 48*.

Chair, Auctions and Remanufacturing session, 2019 INFORMS Annual Meeting, Seattle, WA, October 2019.

Undergraduate Student Research Mentor (2017 Summer) of Ashley Dacosta (Pitt EXCEL, Undergrad Diversity Program), co-advised with Dr. Joel M. Haight on data analysis of safety management program

Course Mentor, ENGR 0020, 2019 Fall.

Secretary, INFORMS Student Chapter, 2017.

Student Member of *IISE, INFORMS, ASA, ASQ*.