BO SHEN

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EDUCATION

Ph.D. Candidate in Industrial and Systems Engineering 2017 – Expected 2022
Virginia Polytechnic Institute and State University Advisor: Prof. Zhenyu (James) Kong

Bachelor of Statistics 2013 – 2017
University of Science and Technology of China (USTC)

RESEARCH INTERESTS

- **Application:** *Smart manufacturing; Additive manufacturing; Healthcare.*
- **Methodology:** *Adversarial robustness; Bayesian optimization; Federated learning; Physics-informed machine learning; Reinforcement learning; Tensor data analytics.*

PUBLICATIONS

Journal Publications (Referred)

1. **Shen, B.**, Xie, W., & Kong, Z. J. (2020). Clustered Discriminant Regression for High-Dimensional Data Feature Extraction and Its Applications in Healthcare and Additive Manufacturing. *IEEE Transactions on Automation Science and Engineering.*
   - Available at https://ieeexplore.ieee.org/document/9237105
2. **Shen, B.**, Wang, R., Law, A. C. C., Kamath, R., Choo, H., & Kong, Z. J. (2021). Super Resolution for Multi-Sources Image Stream Data using Smooth and Sparse Tensor Completion and its Applications in Data Acquisition of Additive Manufacturing. *Technometrics*, 1-16.
   - Available at https://doi.org/10.1080/00401706.2021.1905074
   - Finalists for INFORMS QSR Best Refereed Paper Competition
   - Second place of poster competition in INFORMS & HFES Student Poster Competition, ISE, Virginia Tech, 2019
3. **Shen, B.**, Kamath, R., Choo, H., & Kong, Z. J. (2021). Robust Tensor Decomposition based Background/Foreground Separation in Noisy Videos and Its Applications in Additive Manufacturing. Revision at *IEEE Transactions on Automation Science and Engineering.*
   - Available at Available at http://dx.doi.org/10.36227/techrxiv.14561775.v2
4. **Shen, B.**, Gnanasambandam, R., Wang, R., & Kong, Z. J. (2021). Multi-Task Gaussian Process Upper Confidence Bound for Hyperparameter Tuning. Revision at *IISE Transactions.*

Journal Publications in Preparation

1. **Shen, B.**, Xie, W., & Kong, Z. J. (2021). Robust Tensor Principal Component Analysis: Formulation, Algorithm, and Applications. To be submitted to *IEEE Transactions on Pattern Analysis and Machine Intelligence.*

2. **Shen, B.**, Chen, Y., & Kong, Z. J. (2021). A Novel Anomaly Discovery Method and its Applications in Minimizing Measurement Cost in Advanced Manufacturing. To be submitted to *IEEE Transactions on Pattern Analysis and Machine Intelligence.*

3. Chung, J., **Shen, B.**, Law, A. C. C., & Kong, Z. J. (2021). Reinforcement Learning based Process Knowledge Transfer for Quality Assurance of Additive Manufacturing. To be submitted to *IEEE Transactions on Automation Science and Engineering.*

4. Chung, J., **Shen, B.**, & Kong, Z. J. (2021). Sparse Bayesian Learning with Prior Knowledge and Temporally Correlated Solution Vectors with Application to Fault Diagnosis in Multi station Assembly Systems. To be submitted to *Journal of Manufacturing Systems.*

5. Maftouni, M., **Shen, B.**, Law, A. C. C., & Kong, Z. J. (2021). A Mask-guided Attention Deep Learning Model for COVID-19 Diagnosis based on an Integrated CT Scan Images Database. To be submitted to *IISE Transactions on Healthcare Systems Engineering.*

6. Maftouni, M., **Shen, B.**, Law, A. C. C., & Kong, Z. J. (2021). Attention-based Video Object Segmentation of Melting Pool. To be submitted to *IISE Transactions.*

7. Gnanasambandam, R., **Shen, B.**, & Kong, Z. J. (2021). Bayesian Optimization Using Deep Gaussian Process with its Application in Process Optimization for Additive Manufacturing. To be submitted to *ASME Trans. Journal of Manufacturing Science and Engineering.*

8. Wang, R., Garcia, D., **Shen, B.**, Ma, X., Kamath, R., Choo, H., Fezzaa, K., & Kong, Z. J. (2021). In-process Multi-physical Melt Pool Characteristics Sensing and Data Correlation in Laser Powder Bed Fusion.

9. **Shen, B.**, & Kong, Z. J. (2022). Federated Learning in Additive Manufacturing. Ongoing

Conference Papers (Published)

1. Maftouni, M., Law, A. C. C., **Shen, B.**, Zhou, Y., Yazdi, N., & Kong, Z. J. (2021). A Robust Ensemble-Deep Learning Model for COVID-19 Diagnosis based on an Integrated CT Scan Images Database. *Proceedings of the 2021 IISE Annual Conference.*
   - Available at ResearchGate (Link)
   - Runner-up for INFORMS QSR Industry Data Challenge
   - Second place of poster competition in INFORMS & HFES Student Poster Competition, ISE, Virginia Tech, 2020

INVITED TALK

1. **Multi-Task Gaussian Process Upper Confidence Bound for Hyperparameter Tuning**
   - INFORMS Annual Meeting, Anaheim, CA, 2021
   - IISE Annual Conference 2020 (Virtual)
2. **Robust Tensor Decomposition based Background/Foreground Separation in Noisy Videos and Its Applications in Additive Manufacturing**
   - INFORMS Annual Meeting, Anaheim, CA, 2021
3. **Super Resolution for Multi-Sources Image Stream Data using Smooth and Sparse Tensor Completion and its Applications in Data Acquisition of Additive Manufacturing**

– INFORMS Annual Conference 2020 (Virtual)

– IISE Annual Conference 2020 (Virtual)

4. **Robust Tensor Principal Component Analysis: Formulation, Algorithm, and Applications**

   – INFORMS Annual Conference 2020 (Virtual)

   – INFORMS Annual Conference, Seattle, WA, 2019

5. **Clustered Discriminant Regression for High-Dimensional Data Feature Extraction and Its Applications in Healthcare and Additive Manufacturing**

   – IISE Annual Conference, Orlando, FL, 2019

HONORS AND AWARDS

- **Runner-up for INFORMS QSR Industry Data Challenge (2020)**
- **Finalists for INFORMS QSR Best Refereed Paper Competition (4 finalists in total, 2020)**
- **Second place of poster competition in INFORMS & HFES Student Poster Competition, ISE, Virginia Tech (2019, 2020)**
- **ISE Graduate Student Travel Awards, Virginia Tech (2018 – 2021)**
- **Grado Department of Industrial & Systems Engineering Department Fellowship, Virginia Tech (2017)**
- **Undergraduate Fellowship, USTC (2014 – 2017)**

TEACHING EXPERIENCE

Virginia Tech, Blacksburg, VA

ISE 2214 Manufacturing Processes Lab (2017 Fall, 2019 Spring & Fall): *Lab Instructor*

ISE 2014 Engineering Economy (2018 Fall): *Graduate Teaching Assistant*

ISE 4404 Statistical Quality Control (2018 Spring): *Graduate Teaching Assistant*

MENTORING EXPERIENCE

Ph.D. Mentor at Virginia Tech: Raghav Gnanasambandam

– Bayesian Optimization Using Deep Gaussian Process with its Application in Process Optimization for Additive Manufacturing

SERVICE AND LEADERSHIP

Session Chair: Data Mining and Machine Learning in Smart Manufacturing, INFORMS Annual Conference 2021

Journal Referee: IISE Transactions, IEEE Transactions on Automation Science and Engineering

VP Finance: The INFORMS Student Chapter at Virginia Tech (2021 – 2022)

Professional Society Memberships: Institute of Industrial and Systems Engineers (IISE), Institute for Operation Research and the Management Sciences (INFORMS), Institute of Electrical and Electronics Engineers (IEEE)