

# Bo Shen

## Educations

- 2017–present **Virginia Polytechnic Institute and State University, Blacksburg, VA.**  
Ph.D. Candidate in Industrial and Systems Engineering      Advisor: Prof. Zhenyu (James) Kong  
Expected graduation date: May 2022
- 2013–2017 **University of Science and Technology of China (USTC), Anhui, China.**  
B.S. in Statistics      Graduated June 2017

## Honors and Awards

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

### Journal Papers Published or Accepted

- 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

### Journal Papers under Review

- 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. Under review at *IEEE Transactions on Automation Science and Engineering*. 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 Papers in Preparation](#)
- 5 **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*.
- 6 **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*.
- 7 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*.
- 8 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*.
- 9 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*.
- 10 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*.
- 11 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*.
- 12 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.
- 13 **Shen, B.**, & Kong, Z. J. (2022). Federated Learning in Additive Manufacturing. Ongoing  
[Conference Papers Published or Accepted](#)
- 14 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
  - Runner-up for INFORMS QSR Industry Data Challenge
  - Second place of poster competition in INFORMS & HFES Student Poster Competition, ISE, Virginia Tech, 2020

## Teaching & Mentoring Experience

ISE 2214	<b>Manufacturing Processes Lab (2017 Fall, 2019 Spring, and 2019 Fall):</b>	<i>Lab Instructor</i>
ISE 2014	<b>Engineering Economy (2018 Fall):</b>	<i>Graduate Teaching Assistant</i>
ISE 4404	<b>Statistical Quality Control (2018 Spring):</b>	<i>Graduate Teaching Assistant</i>
	<b>Graduate Student Mentor (2021 Summer–present):</b>	<i>Mentor 1 Ph.D. student for research 11</i>

## Invited Talk

### Multi-Task Gaussian Process Upper Confidence Bound for Hyperparameter Tuning

- INFORMS Annual Meeting, Anaheim, CA, 2021
- IISE Annual Conference 2020 (Virtual)

### Robust Tensor Decompositionbased Background/Foreground Separation in Noisy Videos and Its Applications in Additive Manufacturing

- INFORMS Annual Meeting, Anaheim, CA, 2021

**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)

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

- INFORMS Annual Conference 2020 (Virtual)

- INFORMS Annual Conference, Seattle, WA, 2019

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

- IISE Annual Conference, Orlando, FL, 2019

## Leadership and Service

**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.

## Professional Society Memberships

2018–present Member of Institute of Industrial and Systems Engineers (IISE)

2018–present Member of Institute for Operation Research and the Management Sciences (INFORMS)

2018–present Member of Institute of Electrical and Electronics Engineers (IEEE)