

# Dongmin LI

H. Milton Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology

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## EDUCATION

**Ph.D.** Industrial Engineering, Georgia Institute of Technology, Aug 2024 – Expected May 2026

- **Advisor:** Dr. Xiaochen Xian
- **Minor:** Machine Learning
- **Dissertation Title:** Data-Driven Prediction and Adaptive Decision-Making for Sequential Monitoring of Complex Systems

Industrial and Systems Engineering, University of Florida, May 2021 – Aug 2024

**M.S.** Statistics, University of Chinese Academy of Sciences, Sep 2017 – Jun 2020

**B.S.** Mathematics and Applied Mathematics, Dalian University of Technology, Sep 2013 – Jun 2017

- Hua Loo-Keng Talent Program (joint program with Chinese Academy of Sciences)

## RESEARCH INTERESTS

Data analytics and system informatics; Spatiotemporal modeling and online monitoring; Adaptive sampling; Machine learning for complex system modeling and decision-making; Moving vehicle-based sensors; Smart manufacturing

## PUBLICATIONS

1. **Li, D.**, Bai, M., & Xian, X. (2024). Data-driven Pathwise Sampling Approaches for Online Anomaly Detection. *Technometrics*, 66(4), 600-613.
  - *Best Refereed Paper Finalist* in Quality, Statistics, and Reliability Section of INFORMS, 2021
  - *Feature Article* in Advances in Engineering
2. **Li, D.**, Bai, M., Wang, D., & Xian, X. A Bayesian Jump Model-based Pathwise Sampling Approach for Online Anomaly Detection. *IIE Transactions*, accepted.
  - *Best Student Paper Finalist* in Data Mining Society of INFORMS, 2024
3. Du, S., Li, Z., Yu, D., **Li, D.**, & Hu, Q. (2020). Exact Confidence Limit for Complex System Reliability Based on Component Test Data. *Quality Technology & Quantitative Management*, 17(1), 75-88.
4. **Li, D.**, Hu, Q., Wang, L., & Yu, D. (2019). Statistical Inference for M/G/Infinity Queueing Systems Under Incomplete Observations. *European Journal of Operational Research*, 279(3), 882-901.
  - *Best Paper Award* in Asia-Pacific International Symposium on Advanced Reliability and Maintenance Modeling & International Conference on Quality, Reliability, Risk, Maintenance, and Safety Engineering, 2018
5. **Li, D.**, Kang, M., Singer, G., Liu, H., Hasan, M., & Xian, X., On-Demand Machine Learning for Resource-Constrained Classification. *INFORMS Journal on Data Science*, major revision submitted.
6. Zan, X., **Li, D.**, & Xian, X. Within-layer In-situ Quality Monitoring of Additive Manufacturing Processes Along Tool Paths. *Journal of Quality Technology*, under review.
  - *Data Challenge Competition Finalist* in Statistics and Reliability Section, INFORMS, 2021

7. Li, D., & Xian, X. Theoretical Analysis and Design of an Online Monitoring and Sampling Scheme Under Partial Observations, to be submitted to *Technometrics*.
  - *Best Student Paper Finalist* in Quality, Statistics, and Reliability Section of INFORMS, 2025
8. Li, D., & Xian, X. Physics-informed Machine Learning for Droplet Evolution Prediction in Inkjet Printing, under preparation.

## **MAJOR HONORS & AWARDS**

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- **Best Student Paper Award Finalist**, Quality, Statistics and Reliability Section, 2025 INFORMS Annual Meeting, for the paper “Theoretical Analysis and Design of an Online Monitoring and Sampling Scheme Under Partial Observations”, 2025
- **Best Student Paper Award Finalist**, Data Mining Society, 2024 INFORMS Annual Meeting, for the paper “A Bayesian Jump Model-based Pathwise Sampling Approach for Online Anomaly Detection”, 2024
- **Best Referred Paper Award Finalist**, Quality, Statistics and Reliability Section, 2021 INFORMS Annual Meeting, for the paper “Data-driven Pathwise Sampling Approaches for Online Anomaly Detection”, 2021
- **Data Challenge Competition Award Finalist**, Quality, Statistics and Reliability Section, 2021 INFORMS, for the competition “In-Situ Quality Process Monitoring in Additive Manufacturing”, 2021
- **Feature Article** in Advances in Engineering, “Data-driven Pathwise Sampling Approaches for Online Anomaly Detection”, 2024
- **Future Faculty Fellow**, Institute for Industrial and Systems Engineers (IISE), 2024
- **Best Paper Award**, Asia-Pacific International Symposium on Advanced Reliability and Maintenance Modeling & International Conference on Quality, Reliability, Risk, Maintenance, and Safety Engineering, for the paper “Statistical Inference for M<sub>r</sub>/G/Infinity Queueing Systems Under Incomplete Observations”, 2018
- **National Scholarship**, Ministry of Education of China, 2019
- **Excellent Graduate**, Dalian University of Technology, 2017
- **Learning Excellence Award**, Dalian University of Technology, 2014, 2015, 2016
- **Hua Loo-Keng Scholarship**, Chinese Academy of Sciences, 2015
- **Technological Innovation Award**, Dalian University of Technology, 2015

## **RESEARCH EXPERIENCE**

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### **Modeling, monitoring, and adaptive routing of moving vehicle-based sensors**

- Bayesian model incorporating spatial correlations for real-time status update and uncertainty quantification
- Online monitoring of a large area for quick anomaly detection and localization
- Adaptive route adjustment of moving sensors to suspicious locations based on real-time observations
- Determination of number of sensors for optimal statistical and economic performance through theoretical analysis of detection delay

### **Modeling and monitoring in additive manufacturing**

- Physics-informed neural network to predict droplet evolution based on the Navier–Stokes equation and sequential droplet images

- Mixed effect model incorporating neural network to estimate global spatial profiles and spatial correlations
- Residual-based spatial exponentially weighted moving average statistics to quickly detect localized anomaly within layer before the full layer is produced

### **Machine learning for resource-constrained decision-making**

- Classification problem that limits the number of samples assigned to certain classes due to resource constraints
- On-demand learning framework integrating prediction and optimization to adapt class assignments to constraints for minimal misclassification cost
- Adaptive weight adjustment in loss function based on prediction results and constraints for flexible and efficient resource allocation

### **Statistical inference for M<sub>t</sub>/G/infinity queueing systems under incomplete observations**

- Likelihood-based model parameter estimation under incomplete data
- Integration of Delta method and bootstrap method for interval estimation and prediction of vital performance measures in the queueing system

## **TEACHING EXPERIENCE**

**Instructor, ESI 6325 “Applied Probability Methods in Engineering”, ISE Department, University of Florida, Fall 2022**

- Graduate level, Master's core course (both on-campus and Electronic Delivery of Gator Engineering Program)
- My duties: Prepared and delivered lectures, designed and graded homework and exams, held office hours, mentored and evaluated term projects, and managed overall course instruction and logistics

**Teaching Assistant, ESI 3327, “Matrix and Numerical Methods in Systems Engineering”, ISE Department, University of Florida, Fall 2023**

- Undergraduate level
- My duties: Graded homework and exams, held office hours, and led interactive homework sessions and MATLAB lab sessions

**Teaching Assistant, EIN 6176, “Advanced Quality Management and Engineering for Business Processes”, ISE Department, University of Florida, Fall 2023**

- Graduate level, Outreach Engineering Management Master's Program
- My duties: Designed and graded homework and exams, and held office hours

**Guest Lecture, ISYE 3039, “Methods for Quality Improvement”, ISyE Department, Georgia Institute of Technology, Spring 2025**

- Undergraduate level
- My duties: Prepared and delivered a lecture introducing statistical process control and demonstrating its applications

## **PRESENTATIONS**

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- 1. Theoretical Analysis for Optimal Design of an Online Monitoring and Sampling Scheme Under Partial Observations**
  - Best Student Paper Award Session of Quality, Statistics, and Reliability Section in INFORMS Annual Meeting, October 2025, Atlanta, GA.
  - INFORMS Annual Meeting, October 2025, Atlanta, GA.
  - IISE Annual Conference and Expo, June 2025, Atlanta, GA.
- 2. On-Demand Machine Learning for Resource-Constrained Classification**
  - 20<sup>th</sup> INFORMS Data Mining and Decision Analytics Workshop, October 2025, Atlanta, GA.
  - INFORMS Annual Meeting, October 2025, Atlanta, GA.
- 3. Within-layer In-situ Quality Monitoring of Additive Manufacturing Processes Along Tool Paths**
  - IISE Annual Conference and Expo, June 2025, Atlanta, GA.
- 4. A Bayesian Jump Model-based Pathwise Sampling Approach for Online Anomaly Detection**
  - Best Student Paper Award Session of Data Mining Society in INFORMS Annual Meeting, October 2024, Seattle, WA.
  - INFORMS Annual Meeting, October 2024, Seattle, WA.
- 5. Data-driven Pathwise Sampling Approaches for Online Anomaly Detection**
  - Best Referred Paper Award Session of Quality, Statistics, and Reliability Section in INFORMS Annual Meeting, October 2021, online.
  - INFORMS Annual Meeting, October 2022, Indianapolis, IN.
- 6. Residual-based Control Chart for Additive Manufacturing Process Monitoring**
  - Data Challenge Competition Award Session in the 1<sup>st</sup> INFORMS Workshop on Quality, Statistics, and Reliability, October 2021, online.
- 7. Statistical Inference for M/G/Infinity Queueing Systems Under Incomplete Observations**
  - The Fifth International Conference on the Interface between Statistics and Engineering, June 2019, Seoul, South Korea.
  - Asia-Pacific International Symposium on Advanced Reliability and Maintenance Modeling & International Conference on Quality, Reliability, Risk, Maintenance, and Safety Engineering, August 2018, Qingdao, China.

### **Poster Presentations**

- 1. Theoretical Analysis for Optimal Design of an Online Monitoring and Sampling Scheme Under Partial Observations**
  - INFORMS Annual Meeting, October 2025, Atlanta, GA.
- 2. A Bayesian Jump Model-based Pathwise Sampling Approach for Online Anomaly Detection**
  - IISE Annual Conference and Expo, June 2025, Atlanta, GA.
  - Georgia Statistics Day, Emory University, October 2024, Atlanta, GA.
  - INFORMS Annual Meeting, October 2024, Seattle, WA.
- 3. Data-driven Pathwise Sampling Approaches for Online Anomaly Detection**
  - INFORMS Annual Meeting, October 2022, Indianapolis, IN.

- Nelms Institute 5th Anniversary, University of Florida, January 2022, Gainesville, FL.

## **PROFESSIONAL SERVICES & ACTIVITIES**

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### **Referee Services**

- IEEE Transactions on Automation Science and Engineering
- International Conference on Automation Science and Engineering (CASE, 2022,2023)
- SN Operations Research Forum

### **Professional Membership**

- Member of INFORMS, IISE, SME

### **Conference Organizing Activities**

- Session Chair, “Data-Driven Modeling and Decision-Making for System Prediction and Monitoring”, 2025 INFORMS Annual Meeting, October 2025, Atlanta, GA
- Session Chair, “Data Driven Analysis under Data Constraints”, 2025 IISE Annual Conference and Expo, June 2025, Atlanta, GA
- Session Chair, “Complex System Modeling, Monitoring, and Decision-making”, 2024 INFORMS Annual Meeting, October 2024, Seattle, WA

### **Outreach Activities**

- Judge, High School Students Research Poster Competition, Florida Regional Junior Science, Engineering, and Humanities Symposium (JSEHS), University of Florida, January 2023, Gainesville, FL.
- Judge, Poster Competition, The Society of Hispanic Professional Engineers (SHPE) x Herbert Wertheim College of Engineering (HWCOE) Engineering Research Symposium, April 2024, Gainesville, FL.
- Judge, InVenture Prize Preliminary Round, Georgia Institute of Technology, January 2025, Atlanta, GA.

## **REFERENCES**

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- **Dr. Xiaochen Xian** (Advisor)  
Assistant Professor  
H. Milton Stewart School of Industrial and Systems Engineering  
Georgia Institute of Technology, Atlanta, GA, USA  
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- **Dr. Jianjun (Jan) Shi**  
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- **Dr. Hongcheng Liu**  
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