

# Yinan Wang, Ph.D.

Assistant Professor

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## EDUCATION

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<b>Virginia Tech</b> Ph.D. in Industrial and Systems Engineering	<b>Blacksburg, VA</b> 05/2022
<b>Columbia University</b> M.S. in Electrical Engineering.	<b>New York, NY</b> 01/2019
<b>Xi'an Jiaotong University</b> B.S. in Electrical Engineering and Automation.	<b>Xi'an, CN</b> 06/2017

## EMPLOYMENT

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<b>Rensselaer Polytechnic Institute</b> <i>Assistant Professor, Department of Industrial and Systems Engineering</i>	08/2022 - Present
<b>Virginia Tech</b> <i>Graduate Teaching/Research Assistant</i> Advisor: Dr. Xiaowei Yue	01/2019 - 05/2022
<b>Lawrence Livermore National Laboratory</b> <i>Research Intern and Official External Collaborator</i> Mentors: Dr. M. Giselle Fernandez-Godino, Dr. Nipun Gunawardena, Dr. Donald M. Lucas	05/2021 - 08/2022
<b>Los Alamos National Laboratory</b> <i>Research Intern and Awardee of Applied Machine Learning Summer Research Fellowship</i> Mentor: Dr. Diane Oyen	06/2019 - 08/2019

## RESEARCH INTERESTS

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- Develop systematic engineering-driven surrogates to achieve accurate prediction, uncertainty quantification, system automation, and intelligent decision-making.
  - Propose physics-informed machine learning methodologies to realize real-time monitoring of complex system, accurate detection of system faults, and quick diagnosis of root causes.

## HONORS, AWARDS, RECOGNITIONS

### Research Related Awards

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- DAIS Mobile App Competition (Winner), IISE	2023
- Pritsker Doctoral Dissertation Award (2nd Place), IISE	2023
- Trustee Celebration of Faculty Achievement Award, Rensselaer Polytechnic Institute	2022
- Panel Fellow, NSF CMMI Game Changer Academies for Advancing Research Innovation	2022-2023
- FTC Early Career Grant Award, American Society for Quality (ASQ)	2022
- Computers & Information in Engineering (CIE) Best Ph.D. Dissertation Award, ASME	2022
- Paul E. Torgersen Graduate Student Research Excellence Award (Finalist), Virginia Tech	2022
- Mary G. and Joseph Natrella Scholarship, American Statistical Association (ASA)	2022
- Selected to join the IISE Future Faculty Fellows (3F) program	2021
- Educational Foundation Scholarship, International Society of Automation (ISA)	2021
- Analysis Division Scholarship, International Society of Automation (ISA)	2021
- 2021 IISE Manufacturing and Design Student Sponsorship Award	2021
- Gilbreth Memorial Fellowship, IISE	2021

- SDSS Student Award, American Statistical Association (ASA) 2020
- FTC Student Scholarship, American Society for Quality (ASQ) 2019
- Applied Machine Learning Summer Research Fellowship, Los Alamos National Laboratory 2019
- Tesla Scholarship, Columbia University 2017
- Cyrus Tang Scholarship, Xi'an Jiaotong University 2017
- Yuan Dong Scholarship, Xi'an Jiaotong University 2016
- Meritorious winner of Interdisciplinary Contest in Modeling, INFORMS, SIAM, ASA 2016
- First Prize of Shaanxi Division, China Undergraduate Mathematical Contest in Modeling 2015
- National Inspirational Scholarship 2014

#### **Paper Related Awards (10 best paper/poster/featured article awards as the leading author)**

- IISE Transactions Best Paper Award (Focus Issue on Data Science, Quality and Reliability) 2023
- IISE Transactions Best Paper Award (Focus Issue on Design and Manufacturing) 2023
- Robert J. Lyman Award, PCI 2022
- Data Analytics and Information System (DAIS) Best Track Paper, IISE 2022
- Featured article in ISE Magazine, IISE 2022
- 2022 SPES + Q&P Best Student Paper Award (Winner), American Statistical Association (ASA) 2022
- INFORMS Data Mining & Decision Analytics (DMDA) Best Theoretical Paper Award (Winner) 2021
- INFORMS QSR Best Student Paper Award (Finalist) 2021
- MSEC 2021 Best Poster Award, ASME and SME 2021
- 3rd place of INFORMS & HFES Student Poster Competition, ISE, Virginia Tech 2019

#### **Travel Awards**

- Graduate School Student Travel Awards, Virginia Tech, 2022
- Department Travel Award, ISE, Virginia Tech 2021, 2022
- NSF Student Travel Award to NAMRC 49 / MSEC 2021, National Science Foundation (NSF) 2021
- NSF Student Travel Award to QPRC, National Science Foundation (NSF) 2021, 2022

## **PUBLICATIONS**

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*Current or former advisee is indicated by name, corresponding author is indicated in †, equal contribution as first author is indicated in \**

#### **Journal Publications (accepted and published)**

- [J1] **Yinan Wang**, Diane Oyen, Weihong “Grace” Guo, Anish Mehta, Cory Scott, Nishant Panda, Giselle Fernandez-Godino, Gowri Srinivasan, Xiaowei Yue, 2021, “StressNet: Deep Learning to Predict Stress With Fracture Propagation in Brittle Materials”, *NPJ Materials Degradation* (in press) [[open-sourced software package available](#)].
- [J2] Rongxuan Wang\*, **Yinan Wang\***, Sonam Devadiga, Isaac Perkins, Zhenyu (James) Kong, Xiaowei Yue, 2021, “Structured Light Scanning Based 3D Scanning for Process Monitoring and Quality Control in Pre-cast/Prestressed Concrete Production”, *PCI Journal* (accepted).
  - Supported under the PCI Daniel P. Jenny Fellowship program.
  - Robert J. Lyman Award in 2022.
  - Winner of DAIS Mobile App Competition in 2023.
- [J3] Kaiwen Wang, **Yinan Wang**, Xiaowei Yue, Wenjun Cai, 2021, “Multiphysics Modeling and Uncertainty Quantification of Tribocorrosion in Aluminum Alloys”, *Corrosion Science* (in press).
- [J4] **Yinan Wang**, Kaiwen Wang, Wenjun Cai, Xiaowei Yue, 2022, “NP-ODE: Neural Process Aided Ordinary Differential Equations for Uncertainty Quantification of Finite Element Analysis”, *IISE Transactions* (in press) [[open-sourced software package available](#)].
  - 2021 INFORMS Quality, Statistics and Reliability (QSR) Best Student Paper Award Finalist.
  - MSEC Best Poster Award in 2021.
  - Best Paper Award in the 2022 IISE Transactions Focus Issue on Design and Manufacturing.

- [J5] **Yinan Wang**, Weihong “Grace” Guo, Xiaowei Yue, 2022, “Tensor Decomposition to Compress Convolutional Layers in Deep Learning”, *IISE Transactions* (accepted) [open-sourced software package available].
  - *Featured article in ISE Magazine.*
  - *Editor’s choice to the IISE Transactions Session at INFORMS 2021.*
  - *Best Paper Award in the 2022 IISE Transactions Focus Issue on Data Science, Quality and Reliability.*
- [J6] Yihua Liu, Wenzheng Zhao, Hongpeng Liu, **Yinan Wang**, Xiaowei Yue, 2022, “Coverage Path Planning for Robotic Free-form Surface Inspection with Control on the Measurement Uncertainty”, *IEEE/ASME Transactions on Mechatronics* (accepted).
- [J7] **Yinan Wang**, Wenbo Sun, Jionghua “Judy” Jin, Zhenyu “James” Kong, Xiaowei Yue, 2023, “MVGCN: Multi-view Graph Convolutional Neural Network for Surface Defect Identification using 3D Point Cloud”, *ASME Transactions Journal of Manufacturing Science and Engineering* (accepted).
- [J8] Yanzheng Li\*, **Yinan Wang\***, Yinhua Liu, 2023+, “3D Point Cloud Segmentation Based on Context Feature for Sheet Metal Part Boundary Recognition”, *IEEE Transactions on Instrumentation and Measurement* (accepted).
- [J9] Wenzheng Zhao, Yinhua Liu<sup>†</sup>, **Yinan Wang<sup>†</sup>**, Xiaowei Yue, 2023+, “Distributed Spot Welding Task Allocation and Sequence Optimization for Multi-robot Multi-station Collaborative Assembly Processes”, *International Journal on Advanced Manufacturing Technology* (accepted).

## INVITED TALKS, CONFERENCE PRESENTATIONS, POSTER PRESENTATIONS

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### Invited Talks and Seminars

1. Engineering-driven Machine Learning for System Intelligence
  - *ISE Departmental Seminar, Rensselaer Polytechnic Institute, March 2022.*
  - *InspirASIAN Seminar Series - Graduate Student Panel, Asian Cultural Engagement Center, Virginia Tech, March 2022.*
2. Engineering-driven Statistical Learning Methods with Applications to Quality Improvement in Smart Manufacturing
  - *Invited talk as a recipient of the Mary G. and Joseph Natrella Scholarship Award in QPRC 2022.*
3. Engineering-driven Machine Learning for System Intelligence in Advanced Manufacturing
  - *ME Departmental Seminar, Worcester Polytechnic Institute, Aug. 2022.*
  - *MANE Departmental Seminar, Rensselaer Polytechnic Institute, Nov. 2022.*
  - *MSE Departmental Seminar, Rensselaer Polytechnic Institute, Jan. 2023.*
4. Rise of Robots as Quality Control Specialists Post-Covid
  - *Connect Live Session, ISA Automation and Robotics Division, Mar. 2023.*

### Conference Presentations (either invited or abstract reviewed)

5. StressNet: Deep Learning to Predict Stress With Fracture Propagation in Brittle Materials
  - *Applied Machine Learning Summer Students Seminar Series, Los Alamos National Laboratory, Aug. 2019.*
  - *INFORMS Conference, Virtual, Nov. 2020.*
  - *INFORMS Conference, Anaheim, CA / Virtual, Oct. 2021.*
6. Tensor Decomposition to Compress Convolutional Layers in Deep Learning
  - *IISE Transactions Featured Article Session, INFORMS Conference, Anaheim, CA / Virtual, Oct. 2021.*
  - *IISE Transactions Best Paper Session, IISE Annual Conference & Expo, New Orleans, LA, May 2023*
7. NP-ODE: Neural Process Aided Ordinary Differential Equations for Uncertainty Quantification of Finite Element Analysis
  - *IISE Annual Conference & Expo 2021, Virtual, May 2021.*
  - *ASME MSEC 2021, Virtual, June 2021.*
  - *ASA Quality and Productivity Research Conference (QPRC), Virtual, July 2021.*

- 1st QSR Workshop, INFORMS Conference, Anaheim, CA / Virtual, Oct. 2021.
  - Best Student Paper Award Session, INFORMS Conference, Anaheim, CA / Virtual, Oct. 2021.
  - IISE Transactions Best Paper Session, IISE Annual Conference & Expo, New Orleans, LA, May 2023
8. Spatial-temporal Prediction of Evolving “Cloud” in the Air
- Summer Students Poster Symposium, Lawrence Livermore National Laboratory (Virtual), Aug. 2021.
  - AGU Fall Meeting, New Orleans, LA, Dec. 2021.
  - INFORMS Annual Meeting, Phoenix, AZ, Oct. 2023 (Scheduled).
9. WOOD: Wasserstein-based Out-of-Distribution Detection
- Best Theoretical Paper Award Session, 16th DMDA Workshop, INFORMS Conference, Anaheim, CA / Virtual, Oct. 2021.
  - INFORMS Conference, Anaheim, CA / Virtual, Oct. 2021.
  - IISE Annual Conference & Expo, Seattle, WA, May 2022.
  - Q&P and SPES Student Paper Award Session, Joint Statistical Meeting (JSM), Washington, DC, Aug. 2022.
10. MVGCN: Multi-view Graph Convolutional Neural Network for Surface Defect Identification using 3D Point Cloud
- 1st QSR Workshop, INFORMS Conference, Anaheim, CA / Virtual, Oct. 2021.
  - ASA Quality and Productivity Research Conference (QPRC), San Francisco, CA, June 2022.
  - ASME MSEC 2022, West Lafayette, Indiana, June 2022.
  - INFORMS Conference, Indianapolis, Indiana, Oct. 2022.
  - INFORMS Quality Statistics and Reliability Conference, Raleigh, NC, June 2023
11. 3D Point Cloud Segmentation Based on Context Feature for Sheet Metal Part Boundary Recognition
- SIAM International Conference on Data Mining DS2-MH Workshop, Minneapolis, MN, April 2023
12. SmartFixture: A Physics-guided Reinforcement Learning Framework for Automatic Fixture Design in Manufacturing Process
- IISE Annual Conference & Expo, New Orleans, LA, May 2023

## TEACHING, ADVISING, MENTORING

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### Course Teaching

- **Instructor, Rensselaer Polytechnic Institute**
  - o ISYE 4230 Quality Control 2022, 2023 Fall
  - o ENGR 2600 Modeling and Uncertainty 2023 Spring
- **Guest Lecturer, Rensselaer Polytechnic Institute**
  - o “Engineering-driven Artificial Intelligence for Complex Physical Systems” - ISYE 1100 2023 Spring
- **Graduate Teaching Assistant, Virginia Tech**
  - o ISE 3414 Probabilistic Operation Research 2019 Fall
  - o ISE 2034 Data Management for ISE 2020 Spring
  - o ISE 5024 ISE Seminar 2021 Fall
  - o ISE/STAT 5474 Statistical Quality Control 2021 Fall
- **Guest Lecturer, Virginia Tech**
  - o “Data Cleaning” - ISE 2034 2020 Spring
  - o “Introduction to Statistical Quality Control Software” - ISE/STAT 5474 2021 Fall
  - o “Introduction to Deep Learning” - ISE 4984/5984 2022 Spring
  - o “Introduction to Machine Learning Platforms” - ISE 4984/5984 2022 Spring

### Student Advising (Ph.D., M.S. Thesis, and Undergraduate)

- **Ph.D. Students (3 in process)**

- Yue Zhao (Thesis: TBD)
- Jiayu Liu (Thesis: TBD)
- Junfeng Wu (Thesis: TBD)

- **Senior Design Team**

- Fiber-reinforced Inclined Additive Manufacturing, University of Texas at Rio Grande Valley 2020 Fall
- Manufacturing Lab Session, Virginia Tech 2020 Spring
- Digital Manufacturing Project With AMT, Virginia Tech 2021 Fall
- Connected Robot in Intelligent Factory, Virginia Tech 2021 Fall
- Machine Learning for Advanced Manufacturing, Virginia Tech 2022 Spring

## PROFESSIONAL ACTIVITIES

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### External Service

- Panelist or Award Judge for:

- INFORMS QSR Best Student Paper Competition, Reviewer 2023
- INFORMS Data Mining Best Paper Competiton (Student Track), Reviewer 2023
- IISE DAIS Best Student Paper Competition, Reviewer 2023
- IISE Undergraduate Student Symposium, Panelist 2023
- IISE Dissertation Pitch Competition, Judge 2023
- National Science Foundation, Ad-hoc Reviewer 2023
- National Science Foundation, Panelist 2023
- National Science Foundation, Panelist 2022
- INFORMS DMDA Workshop Best Applied Paper Competition, Judge 2022

- Board Member for:

- Board Member of IISE/DAIS Division 2023-2025
- Student Board Member of IISE/QCRE Division 2021-2022

- Session Chair for:

- General Session “Data Science for Quality and Reliability (1)”, IISE Annual Conference & Expo 2022, Seattle, WA, May 2022
- General Session “Anomaly Detection and Diagnosis”, IISE Annual Conference & Expo 2022, Seattle, WA, May 2022
- General Session “Machine Learning for Quality Assurance and Decision-making in Advanced Manufacturing”, INFORMS 2022, Indianapolis, IN, Oct. 2022
- General Session “Smart Manufacturing and Beyond I”, IISE Annual Conference & Expo 2023, New Orleans, LA, May 2023
- General Session “Advanced Machine Learning for Complex Physical Systems”, INFORMS 2023, Phoenix, AZ, Oct. 2023
- Technical Session “Quality and Reliability”, MSEC 2023, New Brunswick, NY, June 2023

- Symposium/Workshop/Data Challenge (Co-)Organizer for

- NAMRC/MSEC/LEM&P Symposium “Advances in statistical learning for quality and reliability in smart manufacturing”, New Brunswick, New Jersey, 2023
- SIAM International Conference on Data Mining (SDM) Workshop “Data Science for Smart Manufacturing and Healthcare”, Minneapolis, Minnesota, 2023
- Data Challenge in 1st CVPR workshop on Vision-based Industrial InspectiON (VISION), Vancouver, Canada, 2023

- Journal Reviewer for:

- *Additive Manufacturing*
- *Advances in Computational Science and Engineering (ACSE)*
- *ASME Transactions, Journal of Computing and Information Science in Engineering*
- *ASME Transactions, Journal of Manufacturing Science and Engineering*
- *IEEE/ASME Transactions on Mechatronics*
- *IEEE Transactions on Automation Science and Engineering*
- *IEEE Transactions on Neural Networks and Learning Systems*
- *IIEE Transactions*
- *Journal of Intelligent Manufacturing*
- *Mathematical Biosciences and Engineering*
- *Nature Partner Journal on Material Degradation*
- *Scientific Reports*
- Conference Reviewer for:
  - *Conference of IEEE Industrial Electronics Society (IECON)*
  - *IEEE International Conference on Automation Science and Engineering (CASE)*
  - *IEEE International Conference on on Industrial Technology (ICIT)*
  - *IEEE Industrial Electronics Society Annual On-Line Conference (ONCON)*
  - *INFORMS Data Mining and Decision Analytics Workshop* 2022, 2023
  - *IIEE Annual Conference*
  - *North American Manufacturing Research Conference (NAMRC)*
  - *Manufacturing Science and Engineering Conference*
  - *1st Workshop on Vision-based InduStrial InspectiON, CVPR* 2023

#### Internal Service

- Academic Advisor, Rensselaer Polytechnic Institute 2023-2024
- Chair of the Award Committee for ISE department, Rensselaer Polytechnic Institute 2022-2023
- Member of the Hiring Committee for ISE faculty, Rensselaer Polytechnic Institute 2022-2023
- President-Elect of INFORMS Student Chapter, Virginia Tech 2021-2022
  - *INFORMS 2022 Student Chapter Annual Award as a Maga Cum Laude*
- Event VP of INFORMS Student Chapter, Virginia Tech 2019-2020
  - *INFORMS 2020 Student Chapter Annual Award as a Cum Laude*

#### MEDIA COVERAGE

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- Award recipient spotlight in ISE Magazine, Issues Nov. 2022 and Jan. 2023 2022, 2023
  - Alumni spotlight by Virginia Tech Asian Cultural Engagement Center, Oct. 2022 Newsletter 2022
  - Featured article in ISE Magazine, Issue April 2022 2022

#### PROFESSIONAL MEMBERSHIPS

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Member of American Statistical Association (ASA), American Society of Quality (ASQ), American Society of Mechanical Engineers (ASME), Institute of Electrical and Electronics Engineers (IEEE), Institute of Industrial and Systems Engineers (IIEE), Institute for Operations Research and the Management Sciences (INFORMS), International Society of Automation (ISA), Society for Industrial and Applied Mathematics (SIAM), Society of Manufacturing Engineers (SME). Associate member of Sigma Xi.