Yinan Wang, Ph.D.

Incoming Assistant Professor
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EDUCATION

Virginia Tech   **Blacksburg, VA**
Ph.D. in Industrial and Systems Engineering   05/2022

Columbia University   **New York, NY**
M.S. in Electrical Engineering.   01/2019

Xi'an Jiaotong University   **Xi'an, CN**
B.S. in Electrical Engineering and Automation.   06/2017

EMPLOYMENT

Rensselaer Polytechnic Institute   From 08/2022
Assistant Professor, Department of Industrial and Systems Engineering

Virginia Tech   01/2019 - 05/2022
Graduate Teaching/Research Assistant
Advisor: Dr. Xiaowei Yue

Lawrence Livermore National Laboratory   05/2021 - 08/2022
Research Intern and *Official External Collaborator*
Mentors: Dr. M. Giselle Fernandez-Godino, Dr. Nipun Gunawardena, Dr. Donald M. Lucas

Los Alamos National Laboratory   06/2019 - 08/2019
Research Intern and *Awardee of Applied Machine Learning Summer Research Fellowship*
Mentor: Dr. Diane Oyen

RESEARCH INTERESTS

- 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

- 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 (6 best paper/poster/featured article awards/finalists)

- 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 2021
- NSF Student Travel Award to QPRC 2021, American Statistical Association (ASA) 2021

PUBLICATIONS

Journal Publications (accepted and published)

[1] **Yinan Wang**, Kaiwen Wang, Wenjun Cai, Xiaowei Yue, 2021, "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.*

[2] **Yinan Wang**, Weihong "Grace" Guo, Xiaowei Yue, 2021, "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.*

[3] **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].

[4] 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 Precast/Prestressed Concrete Production", *PCI Journal* (accepted).

  - *Supported under the PCI Daniel P. Jenny Fellowship program.*
    (* denotes equal contribution)

[5] Kaiwen Wang, **Yinan Wang**, Xiaowei Yue, Wenjun Cai, 2021, "Multiphysics Modeling and Uncertainty Quantification of Tribocorrosion in Aluminum Alloys", *Corrosion Science* (in press).

[6] 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).

Journal Publications (submitted and under review)

[7] **Yinan Wang**, Wenbo Sun, Jionghua (Judy) Jin, Zhenyu (James) Kong, Xiaowei Yue, 2022+, "WOOD: Wasserstein-based Out-of-Distribution Detection", submitted to *IEEE Transactions on Pattern Analysis and Machine Intelligence* (under review)[open-sourced software package available].

  - *Best Theoretical Paper Award in the Data Mining and Decision Analytics Workshop at INFORMS 2021.*
  - *2022 ASA SPES + Q&P Best Student Paper Award.*

[8] **Yinan Wang**, Wenbo Sun, Jionghua (Judy) Jin, Zhenyu (James) Kong, Xiaowei Yue, 2022+, "MVGCN: Multi-view Graph Convolutional Neural Network for Surface Defect Identification using 3D Point Cloud", submitted to *ASME Transactions Journal of Manufacturing Science and Engineering* (revision submitted).

[9] **Yinan Wang**, M. Giselle Fernandez-Godino, Nipun Gunawardena, Donald D. Lucas, Xiaowei Yue, 2022+, "ST-GasNet: Spatial-temporal Prediction of Atmospheric Dispersion Clouds using Deep Learning", *IEEE Transactions on Neural Networks and Learning Systems* (under review).

INVITED TALKS, CONFERENCE PRESENTATIONS, POSTER PRESENTATIONS

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 (Scheduled).*

Conference Presentations (either invited or abstract reviewed)

3. 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.*

4. 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.*

5. 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.*

6. 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 (Scheduled).*
   - *Q&P and SPES Student Paper Award Session, Joint Statistical Meeting (JSM), Washington, DC, Aug. 2022 (Scheduled).*

7. 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.*
   - *ASME MSEC 2022, West Lafayette, Indiana, June 2022. (Scheduled)*
   - *INFORMS Conference, Seattle, WA, Oct. 2022 (Scheduled).*

TEACHING, ADVISING, MENTORING

Graduate Teaching Assistant, Virginia Tech

- ISE 3414 Probabilistic Operation Research   2019 Fall

- ISE 2034 Data Management for ISE	2020 Spring
- ISE 5024 ISE Seminar	2021 Fall
- ISE/STAT 5474 Statistical Quality Control	2021 Fall

Guest Lecturer, Virginia Tech

- "Data Cleaning" - ISE 2034	2020 Spring
- "Introduction to Statistical Quality Control Software" - ISE/STAT 5474	2021 Fall
- "Introduction to Deep Learning" - ISE 4984/5984	2022 Spring
- "Introduction to Machine Learning Platforms" - ISE 4984/5984	2022 Spring

Mentoring Experience, University of Texas at Rio Grande Valley

- Fiber-reinforced Inclined Additive Manufacturing - Senior Design	2020 Fall

Mentoring Experience, Virginia Tech

- Manufacturing Lab Session	2020 Spring
- Digital Manufacturing Project With AMT - Senior Design	2021 Fall
- Connected Robot in Intelligent Factory - Senior Design	2021 Fall
- Machine Learning for Advanced Manufacturing - Undergraduate Research	2022 Spring
- Graduate Student Mentor	2022 Spring

PROFESSIONAL ACTIVITIES

- Student Board Member of IISE/QCRE Division	2021-2022
- President Elect of INFORMS Student Chapter, Virginia Tech	2021-2022
- Event VP of INFORMS Student Chapter, Virginia Tech	2019-2020

- Session Chair for:

  - General Session "Data Science for Quality and Reliability (1)", IISE Annual Conference & Expo 2022, Seattle, WA, May 2022 (Expected)
  - General Session "Anomaly Detection and Diagnosis", IISE Annual Conference & Expo 2022, Seattle, WA, May 2022 (Expected)
  - General Session "Machine Learning for Quality Assurance and Decision-making in Advanced Manufacturing", INFORMS 2022, Indianapolis, IN, Oct. 2022 (Expected)

- Reviewer for:

  - *ASME Journal of Manufacturing Science and Engineering*
  - *IEEE Transactions on Automation Science and Engineering*
  - *IEEE/ASME Transactions on Mechatronics*
  - *IEEE Robotics and Automation Letters*
  - *IISE Transactions*
  - *IET Image Processing*
  - *Journal of Intelligent Manufacturing*
  - *NPJ Material Degradation*
  - *IEEE International Conference on Automation Science and Engineering*

PROFESSIONAL MEMBERSHIPS

- Student Member of American Statistical Association (ASA)
- Student Member of American Society of Quality (ASQ)
- Student Member of the American Society of Mechanical Engineers (ASME)
- Student Member of Institute of Industrial and Systems Engineers (IISE)
- Student Member of Institute for Operations Research and the Management Sciences (INFORMS)
- Student Member of Society of Manufacturing Engineers (SME)