YINAN WANG

Grado Department of Industrial and Systems Engineering, Virginia Tech
116 Durham Hall, 1145 Perry Street, Blacksburg, VA 24061
(917)797-8840 ⋄ yinanw@vt.edu

EDUCATION

Virginia Tech — **Blacksburg, VA**
Ph.D. in Industrial and Systems Engineering — 01/2019 - Present

Columbia University — **New York, NY**
M.S. in Electrical Engineering. — 08/2017 - 12/2018

Xi'an Jiaotong University — **Xi'an, CN**
B.S. in Electrical Engineering and Automation. — 09/2013 - 06/2017

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.

EMPLOYMENT

Virginia Tech — 01/2019 - Present
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

HONORS AND AWARDS

Featured article in ISE Magazine, IISE	01/2022
2022 SPES + Q&P Best Student Paper Award (Winner), American Statistical Association (ASA)	01/2022
Selected to join the IISE Future Faculty Fellows (3F) program	11/2021
INFORMS Data Mining & Decision Analytics (DMDA) Best Theoretical Paper Award (Winner)	10/2021
INFORMS QSR Best Student Paper Award (Finalist)	10/2021
Educational Foundation Scholarship, International Society of Automation (ISA)	06/2021
Analysis Division Scholarship, International Society of Automation (ISA)	06/2021
MSEC 2021 Best Poster Award, ASME and SME	06/2021
Gilbreth Memorial Fellowship, IISE	05/2021
NSF Student Travel Award to QPRC 2021	04/2021
2021 IISE Manufacturing and Design Student Sponsorship Award	04/2021
NSF Student Travel Award to NAMRC 49 / MSEC 2021	04/2021
SDSS Student Award, American Statistical Association (ASA)	05/2020
3rd place of INFORMS & HFES Student Poster Competition, ISE, Virginia Tech	10/2019
FTC Student Scholarship, American Society for Quality (ASQ)	06/2019
Applied Machine Learning Summer Research Fellowship, Los Alamos National Laboratory	05/2019
Tesla Scholarship, Columbia University	10/2017
Cyrus Tang Scholarship, Xi'an Jiaotong University	04/2017

Yuan Dong Scholarship, Xi'an Jiaotong University	12/2016
Meritorious winner of Interdisciplinary Contest in Modeling, INFORMS, SIAM, ASA	04/2016
First Prize of Shaanxi Division, China Undergraduate Mathematical Contest in Modeling	11/2015
National Inspirational Scholarship	2013-2014
Excellent Student Leader of Xi'an Jiaotong University	2013-2014

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).

PRESENTATIONS

1. **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.

2. **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.
3. **Spatial-temporal Prediction of Evolving "Cloud" in the Air**
   - Summer Students Poster Symposium, Lawrence Livermore National Laboratory (Virtual), Aug. 2021.
   - Deep Learning for Climate Science and Weather Prediction Session, AGU Fall Meeting, Dec. 2021.
4. **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.
5. **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.

TEACHING EXPERIENCES

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 "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 Transactions on Mechatronics*
  - *IEEE Robotics and Automation Letters*
  - *IISE Transactions*
  - *IET Image Processing*
  - *Journal of Intelligent Manufacturing*
  - *NPJ Material Degradation*

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 International Society of Automation (ISA)
- Student Member of Society of Manufacturing Engineers (SME)
- Associate Member of Sigma Xi

TECHNICAL STRENGTHS

Languages	Python, Matlab, SQL, VBA
Software & Tools	Tensorflow, Pytorch, Keras, Caffe, LaTex