Yumeng Wang

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Education

- Ph.D. Candidate in Computational and Applied Mathematics
  Missouri University of Science and Technology (expected graduation: 2026)
  Advisor: Dr. Yanzhi Zhang
- M.S. in Management Science and Engineering
  Tongji University, China (2019)
- Exchange student in Management Science
  Emlyon Business School, France (2017)
- B.S. in Engineering Management
  Beijing University of Civil Engineering and Architecture, China (2015)

Research Interests

- Data-driven modeling and simulation
- Scientific Machine Learning
  1. Deep neural networks, such as FNN, CNN, RNN, GNN, Transformer in solving PDEs
  2. Operator learning in PDEs
  3. Generative model in solving PDEs
  4. Model order reduction in high dimensions

Awards and Certificates

- Eloe Research Award, Missouri University of Science and Technology, 2024
- Second place at the Pi Day Celebration Poster Session, Missouri University of Science and Technology, 2023
- Gaoxiong Gan Scholarship, Missouri University of Science and Technology, 2022
- Certificates in Deep Learning, Coursera, 2021
  1. Convolutional Neural Networks
  2. Neural Networks and Deep Learning

3. Sequences, Time Series and Prediction
4. Introduction to TensorFlow for Artificial Intelligence, Machine Learning and Deep Learning
5. TensorFlow Developer from DeepLearning.AI

Publications and Preprints

1. *Parametric model reduction with convolutional neural networks*, Y. Wang, S. Zhou, and Y. Zhang, International Journal of Numerical Analysis and Modeling, 21(5):716–738, 2024.

2. *Research on the classification of grants based on data mining and random forest algorithm*, Y. Wang, X. Wu and Y. Luo, Appl. Math. Chinese Market 03(2019), pp. 50–52.

3. *Convolutional neural network-based reduced-order modeling for parametric nonlocal PDEs* , Y. Wang and Y. Zhang, (submitted).

4. *Foundation model accelerating Physics-informed neural network in solving PDEs*, Y. Wang, J. Hauck and Y. Zhang, in preparation (2025).

5. *Data driven modeling with generative adversarial networks*, Y. Wang and Y. Zhang, in preparation (2025).

Presentations

1. Poster presentation: *Parametric reduced order modeling for nonlocal PDEs.* Brown University, Providence, RI, 01/2025.

2. Mini-symposium talk: *Parametric reduced order modeling for nonlocal PDEs.* University of Missouri-Kansas city, Kansas City, MO, 10/2024.

3. Poster presentation: *dvancing catalyst design through generative modeling and machine learning.* Lawrence Berkeley National Laboratory, Berkeley, CA, 8/2024.

4. Contributed talk: *Learning temporal evolution of parameterized PDEs with convolutional neural networks.* University of Nebraska-Lincoln, Lincoln, NE, 10/2023.

5. Seminar talk: *Data driven modeling with generative adversarial networks.* Graduate seminar at Missouri University of Science and Technology, Rolla, MO, 4/2023.

6. Poster presentation: *Data driven modeling with generative adversarial networks.* Pi Day at Missouri University of Science and Technology, Rolla, MO, 3/2023.

Research Experience

- Missouri University of Science and Technology

  1. Neural network applied in Bose-Einstein Condensation
  2. Operator learning for PDEs
  3. Learning temporal evolution with Transformer
  4. Parametric model reduction with deep neural networks
  5. Deep Learning (Generative models, physics-informed neural networks) in solving differential equations

- Tongji University

  1. Classification of grants based on data mining and random forest algorithm
  2. Classification of financial aid based on data mining

Industry Experience

- Data Analyst 3/2020 – 4/2021
  Department of Data Science, Beijing One Zero Wave Technology Co., Ltd.
  Main task: Performing data analysis and designing risk schemes for oversea loans.

- Data Analyst 3/2019 – 2/2020
  FinSight Lab, Beijing Fantaike Technology Co., Ltd.

  1. Risk Management: Building and updating application score card model
  2. Asset Evaluation: Utilizing application score card model to assess the applicants' assets quality.
  3. Customer Loss Warning: Performing data engineering and building customer churn alarm model for commercial banks.
  4. Loans Prediction: Building LSTM neural network and ARIMA to predict loans applications daily and weekly.

Academic Experience

- Computing science intern 6/2024 – 8/2024
  Scientific Data Division
  Lawrence Berkeley National Lab(LBNL)

  – Generative model (VAE, GAN, Diffusion Model) in developing new catalyst
  – 3D representation in molecular

- Graduate Teaching Assistant 9/2023 – present, 8/2021 – 5/2022
  Department of Mathematics and Statistics
  Missouri University of Science and Technology

1. Math 2222: *Mathematics Calculus for Engineers III* Spring 2024, Fall 2024
2. Math 5680: *Mathematics in Machine Learning* Fall 2023
3. Math 1215: *Mathematics Calculus for Engineers II* Spring 2022

- Graduate Research Assistant 6/2022 – 2023/12
  Department of Mathematics and Statistics
  Missouri University of Science and Technology

Workshops Attended

- Computational Learning for Model Reduction
  Brown University, Providence, RI, 1/2025.
- Mathematical Problems in Industry Workshop
  Vironix: Chronic Kidney Disease Classification using Patient Clinical Characteristic Data. New Jersey Institute of Technology, Newark, NJ, 6/2023.
- Graduate Student Mathematical Modeling Camp
  Particle Filtering to Clarify Impure Models and Data. University of Delaware, Newark, DE, 6/2023.

Professional Memberships

- Society for Industrial and Applied Mathematics (SIAM) 2023 – present
- Institute of Mathematical Statistics (IMS) 2023 – present
- American Mathematical Society (AMS) 2023 – present

Selected Courses

- Computational Mathematics: Mathematics of Machine Learning, Nonlinear Optimization in Machine Learning, Machine Learning in Computer Vision, Marketing Revolution with Machine Learning, Applied Matrix Theory, Mathematical Foundation of Finite Element Methods, Partial Differential Equations, Introduction to Numerical Methods for Differential Equations, Introduction to Numerical Analysis, Mathematical Statistics, Functional Analysis, Introduction to Natural Language Process, Stochastic Process.
- Management Science: Multi-variable Statistics, Operations Research, Management Optimization Methods, Python Data Analysis

Skills

- Specialized in Scientific Machine Learning in solving PDEs.
- Skilled in Python (TensorFlow, PyTorch), MATLAB, SQL, git, Tableau and LaTeX, C, Linux.