YUYANG QIU | CV

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EDUCATION

Rutgers University *Fall 2020 – Spring 2025 (expected)*
Major: Industrial and Systems Engineering
Intended Degree: Ph.D.
Advisor: Dr. Farzad Yousefian

Northeastern University (Boston) *Sep. 2018 – Aug. 2020*
Major: Applied Mathematics
Degree: Master of Science

Jiangsu University *Sep. 2014 – Jun. 2018*
Major: Mathematics and Applied Mathematics
Degree: Bachelor of Science

EMPLOYMENT HISTORY

Givens Associates (Intern) Summer 2024
Mathematics and Computer Science Division, Argonne National Laboratory
- Under supervision of Dr. Charikleia (Hara) Iakovidou. Worked on memory and communication-efficient asynchronous Federated Learning.

Graduate Research Assistant Fall 2022 - present
Dept. of Industrial and Systems Engineering, Rutgers University
- Under supervision of Dr. Farzad Yousefian. Working on two DOE funded projects: (1) Randomized Federated Learning for Nonsmooth, Nonconvex and Hierarchical Optimization; (2) Privacy-Preserving Federated Learning for Science: Building Sustainable and Trustworthy Foundation Models.

RESEARCH

Research Interests
- Distributed/Federated Optimization
- Stochastic Optimization
- Nonsmooth Optimization
- Hierarchical Optimization
- Nonconvex/Convex Optimization
- Mathematical Programs with Equilibrium Constraints

Research Applications
- Training neural networks, hyperparameter tuning, and game theoretical problems.

PUBLICATIONS

Conference Proceedings
1. Yuyang Qiu, Uday V. Shanbhag, Farzad Yousefian. *Zeroth-Order Methods for Nondifferentiable, Nonconvex, and Hierarchical Federated Optimization.* Thirty-seventh Conference on Neural Information Processing Systems (**NeurIPS 2023**).
Paper: https://arxiv.org/abs/2309.13024
Poster: https://nips.cc/media/PosterPDFs/NeurIPS%202023/72874.png?t=1699387657.060764
Video presentation (5 mins): https://neurips.cc/virtual/2023/poster/72874

Journal Articles

0. Yuyang Qiu, Uday V. Shanbhag, Farzad Yousefian. *Zeroth-order federated methods for stochastic MPECs and nondifferentiable nonconvex hierarchical optimization.* **Mathematics of Operations Research** (under first revision).
1. Lijuan Qian, Raghda Attia, Yuyang Qiu, Dianchen Lu, Mostafa Khater. *The shock peakon wave solutions of the general Degasperis-Procesi equation.* **International Journal of Modern Physics** B, 33. 1950351, 2019. doi: 10.1142/S021797921950351X.
2. Mostafa Khater, Dianchen Lu, Raghda Attia, Li Juan, Yuyang Qiu. *On Breather and Cuspon waves solutions for the generalized higher-order nonlinear Schrodinger equation with light-wave promulgation in an optical fiber.* **Numerical and Computational Methods in Sciences & Engineering**, 1, pp.101-110, 2019. doi: 10.18576/ncmse/010205.
3. Jing Li, Yuyang Qiu, Dianchen Lu, Raghda Attia, Mostafa Khater. *Study on the solitary wave solutions of the ionic currents on microtubules equation by using the modified Khater method.* **Thermal Science**, 23. 370-370, 2019. doi: 10.2298/TSCI190722370L.

PRESENTATIONS

2024 INFORMS Annual Meeting (Job Talk) **1:03 PM - 1:21 PM, Oct. 22, 2024**
Session: Federated Learning and Optimization: I **Location: Regency - 709**

- Presentation title: Zeroth-Order Federated Methods for Stochastic MPECs and Nondifferentiable Nonconvex Hierarchical Optimization

25th International Symposium on Mathematical Programming (ISMP 2024) Jul. 2024
Session: Nonconvexity, stochasticity and hierarchy in optimization problems

- Presentation: Zeroth-Order Federated Methods for Stochastic MPECs and Nondifferentiable Nonconvex Hierarchical Optimization

37th Annual Conference on Neural Information Processing Systems (NeurIPS 2023) Dec. 2023
Poster Session 1

- Poster presentation: Zeroth-Order Methods for Nondifferentiable, Nonconvex, and Hierarchical Federated Optimization
- Poster link: https://nips.cc/media/PosterPDFs/NeurIPS%202023/72874.png?t=1699387657.060764

2023 INFORMS Annual Meeting Oct. 2023
Session: On Hierarchical and Federated Optimization

- Presentation title: Randomized Zeroth-Order Federated Methods for Nonsmooth Nonconvex and Hierarchical Optimization

SIAM Conference on Optimization (OP23) Jun. 2023
Session: On Addressing Nonsmoothness, Hierarchy, and Uncertainty in Optimization and Games

- Presentation title: Randomized Methods for Nonsmooth and Nonconvex Federated Optimization
- Abstract: https://meetings.siam.org/sess/dsp_talk.cfm?p=128796

UNDERGRADUATE ADVISING

Anuraag Sarkar (*Freshman, Mathematics & Computer Science Major at Rutgers*) Summer 2023
Project: Numerical Validation of Randomized Zeroth-Order Methods for Nonsmooth Federated Learning

- Taught the student the basics of optimization theory and algorithms, such as convexity and gradient-based methods. Also taught the student how to code algorithms in Python
- Introduced the idea of zeroth-order methods and federated learning to the student, helped student code federated algorithms such as Federated Averaging and its zeroth-order variant
- Student successfully completed the project and made a poster presentation at the 2023 Summer Research Symposium.
  Poster link: https://drive.google.com/file/d/1CX5jonsM-7VR2j9SVDN2bfzxGv0CWGvd/view

SERVICE

Reviewer

- Institute of Industrial and Systems Engineers (IISE) Transactions Journal

INTERNSHIP

Yi Jia He Technology Co., Ltd Jun. 2018 –Aug. 2018
Intern in the department of software development *Nanjing, China*

- Learned how the power transformer substation inspection robot works
- Learned to use robot recognition and image processing skills

NARI Group Corporation/State Grid Electric Power Research Institute Dec. 2017 –Feb. 2018
Intern in the department of software development *Nanjing, China*

- Learned the working principle and working method of substation inspection robot

EXTRACURRICULAR ACTIVITIES

INFORMS Rutgers Student Chapter Sep. 2022- present
Serving as Treasurer of the chapter *Chapter Advisor: Prof. Ahmed Aziz Ezzat*

- Organized and participated in Research Panel for undergraduate and graduate students
- Organized and participated in weekly Q & A sessions with the department seminar speakers
- Organized and participated in a social gathering for the graduate students in the ISE department
- Organized and participated in an online Zoom event aimed to boost LinkedIn page
- Offered advices on coursework to first-year graduate students Chapter Linkedin:

College Student Union Public Relations Department Sep. 2014- Jun. 2015

- Participated in planning and negotiated with sponsors

TECHNICAL STRENGTH

Optimization Solvers

- CVX, CVXPY
- Gurobi

Python

- Familiar with Python libraries such as NumPy, Pandas, Scikit-learn, TensorFlow and PyTorch
- Good at implementing new algorithms that are not built-in with Jupyter Notebook, use coding as a way to understand the idea of algorithms

Matlab & R

- Familiar with toolboxes, data analysis

PROFESSIONAL AFFILIATIONS

- Institute for Operations Research and the Management Sciences (INFORMS)
- Society for Industrial and Applied Mathematics (SIAM)
- Mathematical Optimization Society (MOS)