YUYANG QIU | CV

◇ Website: https://yuyangqiu2023.github.io/YuyangQiu/
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EDUCATION

Rutgers University Sep. 2020 – May 2025
Major: Industrial and Systems Engineering
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 – June 2018
Major: Mathematics and Applied Mathematics
Degree: Bachelor of Science

EMPLOYMENT HISTORY

Postdoctoral Scholar July 2025 - June 2027 (expected)
Dept. of Electrical and Computer Engineering, University of California, Santa Barbara

- Under supervision of Dr. Zheng Zhang. Focusing on theory and algorithm implementation of numerical optimization for efficient training of large language models and of edge AI.

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 - Spring 2025
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
- Foundation Models/Large Language Models
- Nonsmooth and Hierarchical Optimization
- Nonconvex/Convex Optimization
- Mathematical Programs with Equilibrium Constraints

PUBLICATIONS

Conference Proceedings

1. Yuyang Qiu, Uday V. Shanbhag, and 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/2309.13024v2
   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

0.1 Yuyang Qiu, Uday V. Shanbhag, and Farzad Yousefian. *Zeroth-order federated methods for stochastic MPECs and nondifferentiable nonconvex hierarchical optimization.* **Mathematics of Operations Research** (under first revision). arXiv preprint: https://arxiv.org/abs/2309.13024

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.

Under-review Manuscripts

1. Yuyang Qiu, Kibaek Kim, and Farzad Yousefian. *A Randomized Zeroth-Order Hierarchical Framework for Heterogeneous Federated Learning.* (Submitted to the 64th IEEE **Conference on Decision and Control**.) arXiv preprint: http://arxiv.org/abs/2504.01839
2. Mohammadjavad Ebrahimi, Yuyang Qiu, Shisheng Cui, and Farzad Yousefian. *Regularized federated methods with universal guarantees for simple bilevel optimization.* **Optimization Methods and Software** (submitted, under review). arXiv preprint: https://arxiv.org/abs/2503.08634
3. Yuyang Qiu, Farzad Yousefian, and Brian Zhang. *Iteratively regularized gradient tracking methods for optimal equilibrium seeking.* **IEEE Transactions on Automatic Control** (submitted, under review). arXiv preprint: https://arxiv.org/abs/2411.18883

PRESENTATIONS

The 8th International Conference on Continuous Optimization (ICCOPT 2025) July 2025
Parallel Sessions 9H *July 23, 4:40pm - 5:05pm PDT, Taper Hall 116*

- Presentation title: Federated Simple Bilevel Optimization: A Universal Regularized Scheme with Guarantees

2024 INFORMS Annual Meeting Oct. 2024
Session: Federated Learning and Optimization: I

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

25th International Symposium on Mathematical Programming (ISMP 2024) July 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) June 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

- In collaboration with Aresty Research Center
- 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`

Krishaan Chaudhary (*Junior, Mathematics & Computer Science Major at Rutgers*) Sep. 2024 - Apr. 2025
Project: Prompting sparsity with Proximal ℓ_1 Regularization in Federated Learning with Non-iid datasets

- In collaboration with Aresty Research Center
- Taught the student the basics of federated learning, introduced two popular federated methods, FedAvg and Fedprox. Also taught the student about ℓ_1 regularization technique and its proximal variant
- Student successfully completed the project and made a poster presentation at the 2025 ISE Research Day (April 2025), won the first place in the Undergraduate Research Track
  Poster link: `https://docs.google.com/presentation/d/1HqqFFgFYO5wiPHPr2NrgFKXy_AM7xvUK/edit#slide=id.p1`

SERVICE

Journal Reviewer

- Science China Information Sciences
- Institute of Industrial and Systems Engineers (IISE) Transactions Journal

Conference Reviewer

- The 64th IEEE Conference on Decision and Control (CDC 2025)

INTERNSHIP

Yi Jia He Technology Co., Ltd June 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 - May 2025
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 - June 2015

- Participated in planning and negotiated with sponsors

TECHNICAL STRENGTH

Optimization Solvers

- Gurobi
- CVX, CVXPY

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)
- Institute of Electrical and Electronics Engineers (IEEE)