

# YUYANG QIU | CV

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## EDUCATION

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### Rutgers University

Sep. 2020 – May 2025

Major: Industrial and Systems Engineering

Degree: Ph.D.

Advisor: 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

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### Postdoctoral Scholar

July 2025 - present

*Dept. of Electrical and Computer Engineering, University of California, Santa Barbara*

- Under supervision of Prof. 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 Prof. 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

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### 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

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### Conference Proceedings

1. Yuyang Qiu, Kibaek Kim, and Farzad Yousefian. *A Randomized Zeroth-Order Hierarchical Framework for Heterogeneous Federated Learning*. (Accepted at the 64th IEEE **Conference on Decision and Control (CDC 2025)**.) arXiv preprint: <http://arxiv.org/abs/2504.01839>
2. 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** (submitted, under second review). 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. 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>
2. Yuyang Qiu, Farzad Yousefian, and Brian Zhang. *Iteratively regularized gradient tracking methods for optimal equilibrium seeking*. **IEEE Transactions on Automatic Control** (submitted, under revision). arXiv preprint: <https://arxiv.org/abs/2411.18883>

## PRESENTATIONS

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**The 8th International Conference on Continuous Optimization (ICCOPT 2025)** July 2025  
*Parallel Sessions 9H*

- 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](https://meetings.siam.org/sess/dsp_talk.cfm?p=128796)

## UNDERGRADUATE ADVISING

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**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  $\ell_1$  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  $\ell_1$  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/1HqqFFgFY05wiPHPr2NrgFKXy\\_AM7xvUK/edit#slide=id.p1](https://docs.google.com/presentation/d/1HqqFFgFY05wiPHPr2NrgFKXy_AM7xvUK/edit#slide=id.p1)

## SERVICE

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### Journal Reviewer

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

### Conference Reviewer

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

## INTERNSHIP

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### **Yi Jia He Technology Co., Ltd**

*Intern in the department of software development*

June 2018 – Aug. 2018

*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**

*Intern in the department of software development*

Dec. 2017 – Feb. 2018

*Nanjing, China*

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

## EXTRACURRICULAR ACTIVITIES

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### **INFORMS Rutgers Student Chapter**

*Serving as treasurer of the chapter*

Sep. 2022 - May 2025

*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: <https://www.linkedin.com/company/71508174>

### **College Student Union Public Relations Department**

Sep. 2014 - June 2015

- Participated in planning and negotiated with sponsors

## TECHNICAL STRENGTH

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### **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

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- 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)