

# MIT-UF-NEU 2026 Joint Summer Research Camp

## Program Description

MIT-UF-NEU 2026 joint summer research camp is organized by Prof. Jinhua Zhao from the Department of Urban Studies and Planning at MIT, Prof. Cathy Wu from the Department of Civil and Environmental Engineering at MIT, Prof. Shenhao Wang from the Department of Urban and Regional Planning at the University of Florida, and Prof. Haris Koutsopoulos from the Department of Civil and Environmental Engineering at Northeastern University. The program aims to recruit students who are passionate about research in transportation, urban planning, and the computational methodology behind them, (e.g., machine learning, generative AI, optimization for complex systems). The research camp will primarily be held online, and the length of the program is three months. Past attendees with exceptional performance have published in top journals and conferences in transportation, urban planning, and AI, and have gone on to top PhD programs in transportation, urban planning, and computer science.

## Program Team

PI Team:

- Dr. Jinhua Zhao(<https://zhaojinhua.com/>)
- Dr. Cathy Wu(<https://www.wucathy.com/> )
- Dr. Shenhao Wang([https://dcp.ufl.edu/urp/people\\_wang\\_sl/](https://dcp.ufl.edu/urp/people_wang_sl/))
- Dr. Haris Koutsopoulos (<https://coe.northeastern.edu/people/koutsopoulos-haris/> )

Mentors:

- Dr. Awad Abdelhalim (<https://mobility.mit.edu/people/awad-abdelhalim/>)
- Dr. Yuzhou Chen (<https://scholar.google.com/citations?user=som0dXAAAAAJ&hl=en>)
- Dr. Heye Huang (<https://scholar.google.com/citations?user=BWUpn24AAAAJ&hl=en>)
- Dr. Xuan Jiang (<https://xuan-1998.github.io/>)
- Dr. Yuebing Liang (<https://yuebingliang.github.io/>)
- Dr. Yining Ma (<https://yining043.github.io/>)
- Dr. Baichuan Mo (<https://www.mit.edu/~baichuan/>)
- Dr. Austin Saragih (<https://sites.mit.edu/austinsaragih/>)
- Dr. Xinyi Wang ([https://scholar.google.com/citations?user=oNsj\\_mEAAAAJ&hl=en](https://scholar.google.com/citations?user=oNsj_mEAAAAJ&hl=en))
- Dr. Xingjing Xu (<https://scholar.google.com/citations?user=TwjZCdkAAAAJ&hl=en>)
- Dr. Yunhan Zheng (<https://zhengyunhan.github.io/>)
- Jung-Hoon Cho (<https://www.junghooncho.com/>)
- Ryan Hardesty (<https://hardesty.ai>)
- Xinyi Huang (<https://mobility.mit.edu/people/xinyi-huang/>)
- Chonghe Jiang (<https://sites.mit.edu/chonghej/>)
- Qi Kang (<https://scholar.google.com/citations?user=FU9fC0UAAAAJ&hl=en>)
- Michael Leong (<https://mobility.mit.edu/people/michael-leong/>)
- Wenbin Ouyang (<https://scholar.google.com/citations?user=H0GGylkAAAAJ&hl=en>)
- Ao Qu (<https://quao627.github.io/>)
- Yihong Tang (<https://yihongt.github.io/>)

- Hanyong Xu (<https://hanyongxu.com/>)
- Han Zheng (<https://mikezheng777.github.io/>)
- Tianyue Zhou (<https://scholar.google.com/citations?user=GCeMu2MAAAAJ&hl=en>)
- Dingyi Zhuang (<https://zhuangdingyi.github.io/>)

## Target Student

Students who will apply for PhDs (and masters) in the upcoming 2026 fall semester.

Background (type 1): major in urban planning, urban management, economics, GIS, landscape, human geography, or architecture, but also with a background and strong interests in quantitative methods such as machine learning, statistics, and other advanced technical topics.

Background (type 2): major in transportation, civil engineering, automation, computer science, or other engineering fields, with strong interests in smart city applications.

Background (type 3): major in computer science, operations research, mathematics, or related engineering/science disciplines, with strong interests in machine learning methods, generative AI, algorithmic decision-making, and scalable optimization methods for complex systems

## Anticipated Task

1. Conduct research: After being matched with a doctoral student, the student should complete the research project designed by the doctoral student. Think about the research project in your own way and have some extensions.
2. Paper writing and publication: The student should collaborate with the doctoral student to complete a research paper based on the research project, submit it to a journal, and eventually publish it. This task is not limited to the summer of 2026 and should continue until the paper is published.
3. Project presentation: The student should present the results at the end of the summer research project (early September).

## Past year project highlights:

In our previous summer camps, mentors and mentees have collaboratively explored a diverse set of research topics. These projects span multiple interdisciplinary directions, including but not limited to the following areas:

- (i) Social Science: Understanding urban systems, public policy, and institutional dynamics in complex societal environments.
- (ii) Operations Research: Modeling and solving large-scale decision-making problems arising from real-world systems.
- (iii) Machine Learning: Developing reliable, robust, and trustworthy machine learning methodologies for modern data-driven applications.
- (iv) Generative AI: Advancing generative AI techniques for perception, reasoning, and decision-making tasks.

Sample projects and their information are listed below.

Paper: [GETS: Ensemble Temperature Scaling for Calibration in Graph Neural Networks](#)

Mentor: Dingyi Zhuang

Mentee: Chonghe Jiang (Now a PhD student at MIT)

Project description: This paper proposes Graph Ensemble Temperature Scaling (GETS), a calibration framework for graph neural networks that integrates input and model ensemble strategies within a Graph Mixture-of-Experts architecture. GETS adaptively selects specialized calibration experts for each node and significantly improves uncertainty calibration in GNN tasks. The work was published at the International Conference on Learning Representations (**ICLR 2025**) and was selected as a **Spotlight** paper.

Paper: [Sparkle: Mastering Basic Spatial Capabilities in Vision Language Models Elicits Generalization to Spatial Reasoning](#)

Mentor: Dingyi Zhuang, Ao Qu

Mentee: Yihong Tang (Now a PhD student at McGill)

Project description: This paper proposes Sparkle, a synthetic supervision framework that enhances fundamental spatial reasoning in vision language models (VLMs), improving their ability to generalize to composite and out-of-distribution spatial reasoning tasks. This method inspired many subsequent impactful works in visual spatial reasoning and provides deep insights into the compositional reasoning abilities of multimodal language models. The work was published at *The 2025 Conference on Empirical Methods in Natural Language Processing (EMNLP)*, a top venue for natural language processing and was recognized by *The First Workshop on Multimodal Knowledge and Language Modeling at the IJCAI 2025 Conference* with the **Best Paper Award**.

Paper: [Robust Vehicle Rebalancing with Deep Uncertainty in Autonomous Mobility-on-Demand Systems](#)

Mentor: Xiaotong Guo, Qingyi Wang

Mentee: Xinling Li (Now a PhD student at MIT)

Project description: This project developed the DURO framework, which automates uncertainty quantification in robust optimization using deep neural networks. Applied to vehicle rebalancing in ride-hailing systems, this approach predicts uncertainty parameters to inform downstream robust optimization models. The result demonstrated improved system performance compared to its deterministic counterpart and other canonical robust optimization frameworks. This approach ensures reliable service in the face of unpredictable passenger demand.

Paper: [Human-guided urban form generation using multimodal diffusion models](#)

Mentor: Yuebing Liang

Mentee: Mingyi He (Now a MST student at MIT)

Project description: This project introduces a human-in-the-loop generative framework for urban form design using multimodal diffusion models. By structuring the generation process as a hierarchical, stepwise pipeline, the framework enables high-fidelity, environmentally responsive, and functionally viable urban forms under expert guidance. The work was published in **Building and Environment**, highlighting its contribution to AI-driven and collaborative urban design research.

Paper: [Quantifying the nonlinear causal impact of commute time on U.S. remote work](#)

Mentor: Yunhan Zheng

Mentee: Donghang Li (Now a MST student at MIT)

Project description: This study integrates large-scale survey data with rigorous causal inference methods to provide quantitative evidence on how commuting constraints shape work arrangements. Unlike much of the existing literature, which focuses on simple correlations, our analysis identifies a substantial and nonlinear causal effect of commuting time on telework decisions—an effect that has been largely overlooked. The findings offer new insights into the role of commute-related barriers in shaping flexible work arrangements and contribute to sustainable transportation research. This work was published in *Transportation Research Part D*, highlighting its methodological contributions and policy relevance.

Paper: [AlphaOPT: Formulating Optimization Programs with Self-Improving LLM Experience Library](#)

Mentor: Ao Qu, Xiaotong Guo

Mentee: Minwei Kong (Now a Research Engineer at the Singapore-MIT Alliance for Research and Technology)

Project description: This project introduces a self-improving experience library framework that enables large language models to learn optimization modeling knowledge from limited supervision by extracting and refining structured, reusable insights to improve formulation performance across tasks. The work was recognized by the *INFORMS Data Mining Society as a 2025 Best Paper Finalist*.

## Application Portal

For students who are interested in this program, please fill out the following form:

<https://forms.gle/QY1fG3eRoc27R5r17>

## Timeline (Anywhere on Earth, AoE):

- Application Period: Now – April 17, 2026
- Application Review & Interviews: April 18 – April 30, 2026
- Applicant Notification: May 4, 2026
- Program Kickoff Meeting: Late May 2026
- Research Period: Late May – Early September 2026
- Final Project Presentations: September 2026

## Point of Contact

If you have any questions about the program and application, feel free to reach out to Ao Qu [qua@mit.edu](mailto:qua@mit.edu)