

Duan Tu

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EDUCATION

University of Illinois Chicago, Chicago, IL

Ph.D. Candidate in Mathematics

Expected May 2026

M.S. in Mathematics

May 2020 – Dec 2022

- Advisor: Lev Reyzin

University of Florida, Gainesville, FL

B.S. in Mathematics, *magna cum laude*

Aug 2016 – May 2020

- Honors Thesis: Modeling Cell Population and Morphology of Microglia and Dopamine Neurons in the Midbrain of Mice During Aging, advised by Maia Martcheva
- Minor in Violin Performance

RESEARCH INTERESTS

Statistical machine learning theory, differential privacy, combinatorial optimization, theoretical deep learning.

PUBLICATIONS

(* indicates alphabetical order)

1. On Lower Bounds for Local Versions of Metric Embeddings

Vishesh Jain*, Duan Tu*.

Submitted. [\[Manuscript\]](#)

2. On Sample Reuse Methods for Answering k-wise Statistical Queries

Lev Reyzin*, Duan Tu*.

[\[ISAIM Conference\]](#) [\[AMAI Journal\]](#)

3. Explaining Landscape Connectivity in Multi-Task Learning for Multilayer Networks

Joint with Ren Wang and Hongkang Li

In preparation.

4. Efficient Base Synopsis Generator for Private Data Release

Joint with Lev Reyzin

In preparation.

5. Microglia Senescence Occurs in Both Substantia Nigra and Ventral Tegmental Area

Fatemeh Shaerzadeh, Leah Phan, Douglas Miller, Maxwell Dacquel, William Hachmeister, Carissa Hansen, Alexandra Bechtle, Duan Tu, Maia Martcheva, Thomas Foster, Ashok Kumar, Wolfgang Streit, Habibeh Khoshbouei.

[\[Glia. 2020;68 \(11\), 2228-2245.\]](#)

TALKS

On Lower Bounds for Local Versions of Metric Embeddings

- Poster presentation, Princeton ML Theory Summer School, Princeton, NJ Aug 2025

On Sample Reuse Methods for Answering k-wise Statistical Queries

- UIC Graduate Student Colloquium, Chicago, IL Jan 2024
- ISAIM 2024, Fort Lauderdale, FL Jan 2024
- SLMath Summer Graduate School, IBM Research Almaden, CA Jul 2023

Modeling Cell Population and Morphology of Microglia and Dopamine Neurons in the Midbrain of Mice During Aging

- NIMBioS Annual Undergraduate Research Conference, UT Knoxville, TN Nov 2019

WORK EXPERIENCE

Argonne National Laboratory, Lemont, IL

PhD. Research Aide May 2024 – Aug 2024

- Developed MLP and Graph Neural Network (GNN) models to predict traffic volume of selected highway roads in the Greater Chicago Area
- Trained the models with real and simulated traffic network data

AbbVie Inc., Chicago, IL

Mathematical Modeling Intern May 2022 – Aug 2022

- Developed a MATLAB Web App to calculate the minimal dose rate of antibodies against soluble targets
- Launched the app to an internal web server and demonstrated to the intended user base of 500 scientists

TEACHING AND MENTORING

Directed Reading Program at UIC

Mentor

Topic: Mathematical Foundations of Machine Learning Spring 2024, Spring 2025
Topic: Differential Privacy and Its Real-Life Applications Fall 2024

University of Illinois Chicago

- Instructor
 - Math 182 Emerging Scholars Workshop for Calculus II: Spring 2024
- Teaching Assistant
 - Math 181 Calculus II: Spring 2023, Fall 2023, Spring 2024
 - Math 180 Calculus I: Fall 2020, Spring 2021, Spring 2022
 - Math 110 College Algebra: Fall 2021
 - Math 105 Mathematical Reasoning: Fall 2022
- Grader
 - STAT 401 Introduction to Probability: Fall 2023

SERVICE

UIC CS Theory Seminar , Co-organizer	Aug 2023 – May 2024
UIC AWM Chapter , Organizing Member	Nov 2023 – Present
IDEAL Get Ready for Research Workshop for Undergraduates , Chicago, IL Facilitator, Panelist.	Jun 2023

HONORS AND AWARDS

COMAP Mathematical Contest in Modeling	Feb 2020
Honorable Mention Award	
Davis United World College Scholar	Aug 2016 – May 2020

SKILLS

Programming: MATLAB, Python (PyTorch, NumPy, Pandas), R, SQL, Linux, Git, GitHub, HTML.
Languages: Mandarin Chinese (Native), English (Fluent), Spanish (Basic).