

# Duan Tu

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## EDUCATION

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**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

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

## PUBLICATIONS

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(\* 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

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### **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

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### **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

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### **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

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

## HONORS AND AWARDS

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<b>COMAP Mathematical Contest in Modeling</b> Honorable Mention Award	Feb 2020
<b>Davis United World College Scholar</b> Full tuition and living expenses for attending the University of Florida	Aug 2016 – May 2020

## SKILLS

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