Xifan Yu

Contact Information

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Research Interests

I have a broad interest in theoretical computer science. The specific areas of interest to me are the design of approximation algorithms for combinatorial optimization problems, and the interplay between combinatorics, graph theory, computational complexity, and classical mathematics such as linear algebra, probability theory, and analysis.

Education

University of Chicago *Sept 2017 - Present*

M.S. in Computer Science (expected June 2021)
B.S. in Computer Science (expected June 2021)
B.S. in Mathematics (expected June 2021)

Research Experience

Anomaly Detection on Connected Subgraph *Jan 2020 - Present*
Advisor: Lorenzo Orecchia *University of Chicago*

- Working on the elevated mean detection problem on connected subgraph. [Abstract]

Weekly Reading Groups *Feb 2020 - Present*

- Attending weekly reading groups on topics including convex optimization and calculus of variation with Prof. Lorenzo Orecchia's research group, starting Feb 2020.
- Attending weekly reading groups on diverse topics in theoretical computer science organized by TTIC-UChicago theory group, starting Aug 2020.

Dynamic Tree for Flow Improvement *July 2020 - Present*
Advisor: Lorenzo Orecchia *University of Chicago*

- Implemented a link-cut tree module in C for graphtools, a repository maintained by Prof. Lorenzo Orecchia that supports various kinds of graph partitioning.

Research Experience for Undergraduates *June 2020 - Aug 2020*
Mentor: Adán Medrano Martín del Campo *University of Chicago*

- Wrote a survey on the Neggers-Stanley conjecture and the related open questions.
- A survey of the Neggers-Stanley conjecture. [Link]

Reading Course on Theoretical Computer Science *Oct 2019 - Dec 2019*
Advisor: László Babai *University of Chicago*

- Studied topics including discrepancy methods, the Sensitivity Conjecture, and polynomial methods.

Professional Experience

University of Chicago, Department of Computer Science *Oct 2020 - Present*
Teaching Assistant *Chicago, IL*

- CMSC 37115 Intro to Mathematical Reasoning, Prof. László Babai, Autumn 2020

University of Chicago, Department of Computer Science *April 2019 - June 2020*
Grader *Chicago, IL*

- CMSC 27500 Graph Theory, Prof. Ketan Mulmuley, Spring 2020
- CMSC 37000 Algorithms, Prof. Yury Makarychev, Winter 2020
- CMSC 27530 Honors Graph Theory, Prof. László Babai, Spring 2019

Horizon Robotics Inc. *June 2019 - Sept 2019*
Software Engineer *Cupertino, CA*

Honors and Awards

- **Phi Beta Kappa, Inducted** *June 2020*
  University of Chicago
- **Student Marshall** *June 2020*
  University of Chicago
- **Dean's List** *2017-2018, 2018-2019, 2019-2020*
  University of Chicago

Programming Competition Awards

- **Top 1000 in Round 2** *May 2020*
  Google Code Jam 2020
- **North America Finalist** *Feb 2020*
  International Collegiate Programming Contest's inaugural North America Championship

- **Top 500 in Round 2** *July 2019*
  Facebook Hacker Cup 2019
- **World Finalist** *April 2019*
  43rd Annual World Finals of the International Collegiate Programming Contest

COURSEWORK

Graduate Coursework

• TTIC 31120	Statistical and Computational Learning Theory (Nathan Srebro)	Autumn 2020
• CMSC 35480	Topics in Optimization (Lorenzo Orecchia)	Autumn 2020
• TTIC 31250	Introduction to the Theory of Machine Learning (Avrim Blum)	Spring 2020
• MATH 38405	Arithmetic Combinatorics (Alexander Razborov)	Spring 2020
• CMSC 38410	Quantum Computing (Alexander Razborov)	Winter 2020
• CMSC 35470	Convex Optimization (Nathan Srebro)	Winter 2020
• CMSC 37503	Approximation Algorithms (Julia Chuzhoy)	Autumn 2019
• CMSC 38800	Complexity Theory (Alexander Razborov)	Spring 2019
• CMSC 37000	Algorithms (Avrim Blum)	Winter 2019

Selected Undergraduate Coursework

• MATH 25900	Honors Basic Algebra-III (Frank Calegari)	Spring 2020
• CMSC 27410	Honors Combinatorics (László Babai)	Spring 2020
• MATH 25800	Honors Basic Algebra-II (Nikita Rozenblyum)	Winter 2020
• MATH 27000	Basic Complex Variables (Luis Silvestre)	Autumn 2019
• MATH 25700	Honors Basic Algebra-I (Frank Calegari)	Autumn 2019
• CMSC 27530	Honors Graph Theory (László Babai)	Spring 2019
• MATH 20900	Honors Analysis in Rn-III (Marianna Csornyei)	Spring 2019
• MATH 20800	Honors Analysis in Rn-II (Charles Smart)	Winter 2019
• CMSC 27130	Honors Discrete Mathematics (Alexander Razborov)	Autumn 2018
• MATH 20700	Honors Analysis in Rn-I (Panagiotis Souganidis)	Autumn 2018

SKILLS C++, Python, Haskell, Matlab, LaTeX

LANGUAGES Chinese (native), English (fluent)

INTELLECTUAL INTERESTS
- Competitive Programming
- Sudoku
- Go (board game): I am a member of UChicago Go Team. My Go rank is one dan (1d).

REFERENCES

László Babai
Bruce V. and Diana M. Rauner Distinguished Service Professor
Departments of Computer Science and Mathematics, University of Chicago
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