

Gary Peng

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RESEARCH INTERESTS

I am broadly interested in mechanism design and algorithms/complexity. I am currently working on **profit maximization in bilateral trade** and **lower bounds for (bi)clique**.

EDUCATION

University of Maryland

Fall 2022 – Spring 2026

Bachelor of Science, Computer Science and Mathematics

GPA: 4.00 / 4.00

RESEARCH EXPERIENCE

University of Maryland

January 2024 - Present

Advisors: MohammadTaghi Hajiaghayi, Suho Shin

- Showed that the approximation ratio to the first-best gains-from-trade can be arbitrarily close to zero in bilateral trade with a profit-maximizing broker
- Proved that a simple single-sample mechanism simultaneously achieves constant-factor approximations to the first-best gains-from-trade, first-best social welfare, and optimal profit in certain regimes of bilateral trade

Rutgers University

April 2025 - Present

Advisor: Karthik C.S.

- Collaborated with two other undergraduates to prove super-linear lower bounds for biclique and gap-clique when the parameters are certain small fixed constants
- Discovered a simple proof bypassing the highly non-trivial PCP Theorem that any constant-factor approximation for clique requires $n^{\Omega(\log n)}$ time under the Exponential Time Hypothesis

INTERNSHIPS

DIMACS Research Experience for Undergraduates, Rutgers University

Summer 2025

Advisor: Karthik C.S.

Director's Summer Program, National Security Agency (*regretfully declined*)

Summer 2025

AWARDS & HONORS

John D. Gannon Scholarship

July 2025

Department of Computer Science, University of Maryland

Award Amount: \$3,243.04

Philip Merrill Presidential Scholar

May 2025

University of Maryland

Abramowitz Award

May 2025

Department of Mathematics, University of Maryland

Award Amount: \$1,000.00

Honorable Mention for Outstanding Undergraduate Researcher Award

January 2025

Computing Research Association

President's Scholarship

February 2022

University of Maryland

Award Amount: \$12,000.00 (annually)

Platinum Contestant

April 2021

USA Computing Olympiad

ACCEPTED PAPERS

Gains-from-Trade in Bilateral Trade with a Broker

SODA25

Ilya Hajiaghayi, MohammadTaghi Hajiaghayi, Gary Peng, Suho Shin

SUBMITTED PAPERS

Single-Sample Bilateral Trade with a Broker

MohammadTaghi Hajiaghayi, Gary Peng, Suho Shin

WORKING PAPERS

The Sample Complexity of Profit Maximization in Bilateral Trade

MohammadTaghi Hajiaghayi, Gary Peng, Suho Shin

On Inapproximability of Cliques and Bicliques of Small Size

Reina Itakura, Karthik C.S., Mayank Motwani, Gary Peng

PROFESSIONAL SERVICE

External Reviewer

SODA26

TEACHING EXPERIENCE

Calculus II (MATH141), University of Maryland

Spring 2025

Strauss Teaching Assistant

Calculus I (MATH140), University of Maryland

Fall 2024

Strauss Teaching Assistant

Design and Analysis of Computer Algorithms (CMSC451), University of Maryland

Summer 2024

Teaching Assistant

Discrete Structures (CMSC250), University of Maryland

Spring 2023

Teaching Assistant