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   **Apil 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