

# Gary Peng

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## RESEARCH INTERESTS

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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

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### University of Maryland

*Bachelor of Science, Computer Science and Mathematics*

GPA: 4.00 / 4.00

Fall 2022 – Spring 2026

## RESEARCH EXPERIENCE

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### University of Maryland

*Advisors: MohammadTaghi Hajiaghayi, Suho Shin*

January 2024 - Present

- 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

*Advisor: Karthik C.S.*

April 2025 - Present

- 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

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### 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

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### John D. Gannon Scholarship

*Department of Computer Science, University of Maryland*

July 2025

Award Amount: \$3,243.04

### Philip Merrill Presidential Scholar

*University of Maryland*

May 2025

### Abramowitz Award

*Department of Mathematics, University of Maryland*

May 2025

Award Amount: \$1,000.00

### Honorable Mention for Outstanding Undergraduate Researcher Award

*Computing Research Association*

January 2025

### President's Scholarship

*University of Maryland*

February 2022

Award Amount: \$12,000.00 (annually)

### Platinum Contestant

*USA Computing Olympiad*

April 2021

## **ACCEPTED PAPERS**

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### **Gains-from-Trade in Bilateral Trade with a Broker**

*Ilya Hajiaghayi, MohammadTaghi Hajiaghayi, Gary Peng, Suho Shin*

**SODA25**

## **SUBMITTED PAPERS**

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### **Single-Sample Bilateral Trade with a Broker**

*MohammadTaghi Hajiaghayi, Gary Peng, Suho Shin*

## **WORKING PAPERS**

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### **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**

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### **External Reviewer**

**SODA26**

## **TEACHING EXPERIENCE**

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### **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*