

# CHENGHAN ZHOU

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## RESEARCH INTERESTS

Algorithmic Game Theory, Algorithmic Mechanism Design, Computational Economics

## EDUCATION

**University of Virginia**, Charlottesville, Virginia Aug 2017 - Dec 2020  
B.A. in Computer Science & Cognitive Science GPA: 3.97/4.0

**Princeton University**, Princeton, New Jersey Sep 2022 - Present  
M.S.E. in Computer Science GPA: 4.0/4.0

## RESEARCH EXPERIENCE

**Princeton University, Theory of Computation Group** Sep. 2022 – Present

- Advisor: Professor [Matt Weinberg](#).
- Research Topics: Mechanism Design in Cryptocurrency.
- Research Focus:  
Characterize statistical detectable strategies from a macroscopic perspective and explore how the design of blockchain protocols influences detectability of selfish behaviors.  
Construct model for blockchain payment system and centralized payment system using upstream/downstream model from Industrial Organization theory and reason about pros and cons for decentralization.

**Princeton University, Theory of Computation Group** Dec. 2022 – Present

- Research Advisor: Professor [Mark Braverman](#).
- Research Topics: VCG mechanism for two-sided matching.
- Research Focus: Attempt to understand APEX algorithm from [Optimization-Friendly Generic Mechanisms without Money](#) in two-sided matching markets by defining equilibrium concept, externality and VCG price implications.

**Shanghai University of Finance and Economics, Institute for Theoretical Computer Science** Sep. 2021 – Jun. 2022

- Advisor: Professor [Pinyan Lu](#).
- Research Topics: Mechanism Design, Combinatorial Auctions, Approximation Algorithms.
- Research Focus: Improved approximation ratio of combinatorial auctions with interdependent valuations under incentive-compatible constraints.

**University of Virginia, Strategic Intelligence for Machine Agents Lab** Jan. 2019 – Jul. 2022

- Advisor: Professor [Haifeng Xu](#).
- Research Topics: Information Design, Convex Optimization, Complexity.
- Research Focus: Identified possibilities and limits of algorithmic information design in congestion games and security games for social welfare maximization.

## PUBLICATIONS

( $\alpha - \beta$ ) [Pinyan Lu, Enze Sun, Chenghan Zhou, Better Approximation for Interdependent SOS Valuations](#), In Proc. of the 18th Conference on Web and Internet Economics (WINE 2022) [[arxiv](#)].

[Chenghan Zhou, Andrew Spivey, Haifeng Xu, Thanh H. Nguyen, Information Design for Multiple Uncoordinated Defenders: Work Less, Pay Off](#), In Proc. of the Conference on Uncertainty in Artificial Intelligence (UAI 2022), also accepted to [MDPI Games Journal](#).

[Chenghan Zhou, Thanh H. Nguyen, Haifeng Xu, Algorithmic Information Design in Multi-Player Games: Possibility and Limits in Singleton Congestion](#), In Proc. of the 23rd ACM Conference on Economics and Computation (EC 2022) [[arxiv](#)].

## INDUSTRIAL EXPERIENCE

**NetEase Game Department, Algorithm Engineer Intern** Jun. 2021 – Aug. 2021

- Designed a skill-point allocation algorithm with max-flow min-cost that can dynamically recommend skill-point strategy based on different lineup matches. Implemented statistical inference, Bayesian Neural Networks and Simplex algorithm for max-flow min-cost in Python 2.7 without any dependency.
- Integrated the algorithm with the game codebase and released this feature to over 100 million players.

**Google LLC, Pigweed Project, Software Engineer Intern** May. 2020 – Aug. 2020

- Added automated test for QEMU simulator and improved performance of 2~3 seconds on Mac OS in Python.
- Replaced C library's dynamic memory allocation in C++, GN, linked script and design tooling API to provide memory summary. visualized heap fragmentation, detect heap corruption, create prototype of debug information, etc.

## SERVICE

*Program Committee* for **Advances in Financial Technologies 2023 (AFT'23)**.

Conference Referee for **Innovations in Theoretical Computer Science 2024 (ITCS'24)**.

## AWARDS

<b>CRA Undergraduate Research Awards, <i>Honorable Mentions</i></b>	2020
<b>Women in CyberSecurity Conference, <i>Scholarship</i></b>	2019
<b>Dean's List</b>	Fall 2017, Fall/Spring 2018, Spring/Fall 2019

## TEACHING

<b>Theory of Computation (COS487), <i>teaching assistant</i></b>	Princeton 2023F
<b>Economics and Computation (COS445), <i>teaching assistant &amp; preceptor</i></b>	Princeton 2023S
<b>Theory of Algorithms (COS423), <i>teaching assistant &amp; preceptor</i></b>	Princeton 2022F
<b>Artificial Intelligence (CS4710), <i>teaching assistant</i></b>	UVA 2020S
<b>Computer Architecture (CS3330), <i>teaching assistant</i></b>	UVA 2019F
<b>Algorithm (CS4102), <i>teaching assistant</i></b>	UVA 2019F