

JIATU LI

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Education

Undergraduate: Tsinghua University

Institute for Interdisciplinary Information Sciences (Yao Class), GPA: 3.95, TOEFL: 107

Sep. 2019 - July 2023

Beijing, China

Research Experiences

Research Internship: Shanghai Qi Zhi Institute

Advisor: Dr. Yilei Chen

Aug. 2022 - Sep. 2022

Shanghai, China

Research Internship: The University of Warwick

Advisor: Dr. Igor Carboni Oliveira

Mar. 2022 - July 2022

Coventry, UK

Research Interests

- Computational Complexity: Circuit Lower Bounds, Meta-Complexity, Hardness Magnification, etc.
- Cryptography: Complexity of Cryptography, Application of Cryptography in Complexity Theory, etc.
- Mathematical Logic: Proof Complexity, Bounded Arithmetic, Formalizing Mathematics in Proof Assistants, etc.

Publications

(In theoretical computer science, authors are usually listed in the alphabetic order)

CCC 2022 Extremely Efficient Constructions of Hash Functions, with Applications to Hardness Magnification and PRFs. [Conference Version] [Full Version]
Lijie Chen (MIT), [Jiatu Li](#), Tianqi Yang (Tsinghua University)

STOC 2022 The Exact Complexity of Pseudorandom Functions and the Black-Box Natural Proof Barrier for Bootstrapping Results in Computational Complexity. [Conference Version] [Full Version]
Zhiyuan Fan (Tsinghua University), [Jiatu Li](#), Tianqi Yang (Tsinghua University)

Best Student Paper co-winner. Invited to **Special Issue of SICOMP** (Top 10-15%).

STOC 2022 $3.1n-o(n)$ Circuit Lower Bounds for Explicit Functions. [Conference Version] [Full Version]
[Jiatu Li](#), Tianqi Yang (Tsinghua University).

Submitted to STOC 2023 Unprovability of Strong Complexity Lower Bounds in Bounded Arithmetic.
[Jiatu Li](#), Igor C. Oliveira (University of Warwick).

Submitted to STOC 2023 Indistinguishability Obfuscation, Range Avoidance, and Bounded Arithmetic.
Rahul Ilango (MIT), [Jiatu Li](#), Ryan Williams (MIT).

Submitted to STOC 2023 Range Avoidance, Remote Point, and Hard Partial Truth Table via Satisfying-Pairs Algorithms
Yeyuan Chen (Xi'an Jiaotong University), Yizhi Huang (Tsinghua University), [Jiatu Li](#), Hanlin Ren (University of Oxford).

Awards and Scholarships

- **STOC 2022 Danny Lewin Best Student Paper Award.**
- **Yao Award 1st Prize (1/62), 2022.**
- National Student Computer System Capability Challenge (Compiler track) 2020, 2nd Prize (rank 4).
- International Collegiate Programming Contest, Asia-East Continent Final 2019, 1st Prize.
- National Olympiad in Informatics 2018, 1st Prize. National Training Team member.
- Social Service Excellence Scholarship of Tsinghua University, 2022.
- Scientific Innovation Excellence Scholarship of Tsinghua University, 2022.
- Academic Excellence Scholarship of Tsinghua University, 2021.
- Comprehensive Excellence Scholarship of Tsinghua University, 2020.
- Second-Class Freshmen Scholarship of Tsinghua University, 2019.

Academic Talks

- $3.1n-o(n)$ Circuit Lower Bounds for Explicit Functions. STOC 2022 (Online).
- The Exact Complexity of Pseudorandom Functions and the Black-Box Natural Proof Barrier. STOC 2022 (recorded full version talk on Youtube).

- Formalization of PAL in Lean. LIRa Seminar of the Amsterdam Dynamics Group. 2021. Online.
- Towards better circuit lower bounds for explicit functions. Yao Class Seminar. 2021. Tsinghua University.

Professional Service

- Conference Reviewing: CCC
- Seminar Hosting: Yao Class Seminar (2022)

Social Service

Problem setting for Olympiad in Informatics in China

- Joint Provincial Selection Contest of 12 Provinces (2019), National Olympiad in Informatics (2020) and Informatics Winter Camp of Tsinghua University (2020).

Tutorials for Olympiad in Informatics

- Paging and Caching (in Chinese). In tutorial session together with Asia-Pacific Informatics Olympiad 2019.
- Logic, Program and Formal Verification (in Chinese). In tutorial session of NOI Winter Camp 2021.

Other Projects

Formalization of PAL-S5 in Theorem Prover

Course Project: Logic, Game and Computation (2020 Fall)

- Technical Report: <https://arxiv.org/abs/2012.09388>.

A Quick Introduction to Mathematical Logic

Scribe Note: Foundation of Logic (2020 Spring)

- Note: <https://ljt12138.github.io/files/logic/logic.pdf>

Cutepiler: A Compiler for a C-like Language

June 2020 - Aug. 2020

- In National Student Computer System Capability Challenge (Compiler track).
- A joint work with Runda Liu, Zhidong Wang and Mengdi Wu.
- Github: <https://github.com/Cutepiler/Cutepiler-Sysy2020>

Hyper OS: An Operating System Simulator in C++

Course Project: Operating System (2019 Spring)

- A joint work with Tianqi Yang. Github: <https://github.com/tqyaaaang/Hyper-OS>

Miscellaneous

- Programming Languages: C, C++, Python, Go
- Interactive Theorem Prover: Coq, Lean