



Jingyi Lyu

Institute for Interdisciplinary Information Sciences
Tsinghua University, Beijing, China

+86-13671192823

lyucaro1369@gmail.com

[GitHub Profile](#)

EDUCATION BACKGROUNDS

- **Tsinghua University, Beijing, China**

Computer Science and Technology (Experimental Class), Undergraduate

2022 - 2026 (Expected)

GPA: 3.90

AWARDS AND HONORS

- **National Olympiad of Informatics 2020**, Bronze medal

2020.8

RESEARCH INTERESTS

My primary research interest lies in **computational complexity**. I am particularly fascinated by these themes:

- **Meta-complexity** and its applications to foundational questions in cryptography and complexity theory;
- **Pseudorandomness and derandomization**, as well as their applications;
- **Circuit complexity**, especially frontier techniques and limitations on proving lower bounds.

I am currently seeking a PhD position in theoretical computer science to deeply explore the broad picture of computational complexity, and contribute to understanding the fundamental limits of computation.

PUBLICATIONS

- **Synergies Between Complexity Theory and Nondeterministic Kolmogorov Complexity**

Halley Goldberg, Jinqiao Hu, Zhenjian Lu, **Jingyi Lyu**, Igor C. Oliveira

In Submission to STOC 2026

We investigate central questions in complexity theory through the lens of time-bounded Kolmogorov complexity, focusing on their extended notions in *nondeterministic* or *randomized* settings, for example, nK , rnK and pnK .

We proved super-polynomial unconditional lower bounds for nK and rnK .

We investigated *Symmetry of Information (SoI)* property on pnK , showed a gap between the average-case SoI and worst-case SoI which relates closely to the substantial NP vs. coAM problem.

Generalizing the nondeterministic notions to higher levels of polynomial hierarchy, we showed that investigating the complexity of approximating the complexity measure in different parameter settings is necessary to understand average-case easiness of PH.

RESEARCH EXPERIENCE

- **Igor C. Oliveira, University of Warwick**

Research intern, Project: Non-deterministic Kolmogorov complexity and its application

2025.3 - 2025.6

- **Hao Su, University of California, San Diego**

Research intern (remote), Project: Efficient physical simulation of elastic rods

2024.5 - 2024.8

- **Tao Du, Tsinghua University**

Research intern, Project: Physical simulation

2023.12 - 2024.6

MY PROJECTS

- **Paper Reading Report**

On SAT Reduces to the Minimum Circuit Size Problem with a Random Oracle

2024.6

- A collaborated project for course *Fundamentals of cryptography*. The final outcome is a 20-minute presentation plus a written report in brief. I contributed mainly to comprehend motivation and intuition behind the technical proof.
- Documents: [Link](#)

- **Paper Reading Report**

On NP-Hardness of Approximating Meta-Complexity: A Cryptographic Approach

2024.12

- A project for course *Advanced topic in cryptography*. The final outcome is a 25-minute presentation plus a written report in brief. This project is finished by myself independently.
- Documents: [Link](#)