# Jiaqi Lu

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## Research Interest

I have a broad interest in complexity theory, especially proof complexity, meta-complexity and pseudorandomness.

## Education

**Imperial College London, Department of Computing** — London, United Kingdom
*MRes. in AI and Machine Learning* — *Oct 2023 – Sept 2024 (Expected)*
*Supervisor: Iddo Tzameret*

- **Project:** Limitations on Learning Algorithms and Provability (working on proof complexity, especially algebraic proof system)

**University of Oxford, Mathematical Institute** — Oxford, United Kingdom
*M.Sc. in Mathematics and Foundations of Computer Science* — *Oct 2022 – Sept 2023*
*Disseration Supervisor: Jan Pich and Rahul Santhanam*

- **Dissertation:** Connection between Rudich's and Razborov's Conjectures

**Beijing University of Posts and Telecommunications, School Of Computer Science** — Beijing, China
*B.Eng. in Computer Science and Technology* — *Sept 2018 – July 2022*
*Rankings: 15/386; GPA: 91.05/100 or 3.77/4.0*

## Research Experience

**Limitations on Learning Algorithms and Provability** — **Imperial College London**
*Supervisor: Prof. Iddo Tzameret* — *Oct 2023 – Sept 2024*

- Connection between the automatability of Algebraic proof system (Ideal Proof System) and VP-automatability
- Extend the result in [ST21]: Could we prove that VP $\neq$ VNP iff for all polynomial f there does not exist a short IPS refutation of "IPS cannot efficiently refute f is not in VP "?

**Connection between Rudich's and Razborov's Conjectures** — **Univeristy of Oxford**
*Supervisor: Dr. Jan Pich and Prof. Rahul Santhanam* — *May 2023 – Aug 2023*

- Study the standard assumptions for Rudich's conjecture and the techniques of stretching pseudorandom bits in the non-deterministic setting
- Understand the intuition of Rudich's conjecture and Razborov's conjecture
- Find the possible connection between Rudich's conjecture and Razborov's conjecture

**Information-Theoretic Approximation of Large Markov Chains** — **McMaster University**
*Supervisor: Prof. George Karakostas* — *Jun 2021 – Sept 2021*

- Studied, both theoretically and experimentally, methods of MC reduction, formulated them as optimization problems, and then developed provably good algorithms for solving the latter.
- Finished the problem formulation and modelling side and focused on the theoretical analysis of proposed solutions.

**Recursive Teaching Dimension Versus VC Dimension Institute of Computing Technology, CAS**
*Supervisor: Prof. Xingwu Liu* — *Spring 2020 – Fall 2020*

- Studied the quantitative relation between the recursive teaching dimension(RTD) and the well-known learning complexity measure VC dimension(VCD).
- Studied the Book Introductory Combinatorics by Richard A. Brualdi.

## Visiting & Internship

**Department of Computing Software, McMaster University** — Hamilton, Canada
*MITACS internship from 2021 Jun to 2021 Sept* — *Adviser: Prof. George Karakostas*

**Institute of Computing Technology, Chinese Academy of Sciences** — Beijing, China
*Reseaarch Intern from 2020 Spring to 2020 Fall* — *Adviser: Prof. Xingwu Liu*

## Selected Awards & Scholarships

**2019 The Third Prize National Scholarship**

**2020 The Third Prize National Scholarship**

## Skills

**Programming:** C, C++, Python, MATLAB, Latex, Sagemath

**Languages:** Mandarin (Native), English (Fluent)