

Hanlin Ren

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Education

Oct 2021 – present

📖 **University of Oxford, UK**
DPhil in computer science
Advisor: Prof. Rahul Santhanam

Aug 2016 – Jun 2021

📖 **Tsinghua University, China**
Bachelor of engineering
Major: computer science (Special Pilot CS Class, a.k.a Yao Class)
GPA: 3.83/4; rank: 8/38

Publications

(Note: in theoretical computer science, the list of authors are usually sorted in alphabetical order.)

- 📖 **Bounded Relativization.**
Shuichi Hirahara, Zhenjian Lu, and [Hanlin Ren](#)
CCC 2023.
- 📖 **Range Avoidance, Remote Point, and Hard Partial Truth Table via Satisfying-Pairs Algorithms.**
Yeyuan Chen, Yizhi Huang, Jiayu Li, and [Hanlin Ren](#).
STOC 2023.
- 📖 **NP-Hardness of Approximating Meta-Complexity: A Cryptographic Approach.**
Yizhi Huang, Rahul Ilango, and [Hanlin Ren](#)
STOC 2023.
- 📖 **On the Range Avoidance Problem for Circuits.**
[Hanlin Ren](#), Rahul Santhanam, and Zhikun Wang.
FOCS 2022.
- 📖 **Maintaining Exact Distances under Multiple Edge Failures.**
Ran Duan and [Hanlin Ren](#).
STOC 2022.
- 📖 **Robustness of Average-Case Meta-Complexity via Pseudorandomness.**
Rahul Ilango, [Hanlin Ren](#), and Rahul Santhanam.
STOC 2022.
- 📖 **A Relativization Perspective on Meta-Complexity.**
[Hanlin Ren](#) and Rahul Santhanam.
STACS 2022.
- 📖 **Hardness of KT Characterizes Parallel Cryptography.**
[Hanlin Ren](#) and Rahul Santhanam.
CCC 2021. *Invited to the ToC special issue for CCC 2021.*
- 📖 **Constructing a Distance Sensitivity Oracle in $O(n^{2.5794}M)$ Time.**
Yong Gu and [Hanlin Ren](#).
ICALP 2021.

Publications (Continued)

- **Approximate Distance Oracles Subject to Multiple Vertex Failures.**
Ran Duan, Yong Gu, and Hanlin Ren.
SODA 2021.
- **Improved Distance Sensitivity Oracles with Subcubic Preprocessing Time.**
Hanlin Ren.
ESA 2020. *Invited to the JCSS special issue for ESA 2020.*
- **Strong Average-Case Circuit Lower Bounds from Non-trivial Derandomization.**
Lijie Chen and Hanlin Ren.
STOC 2020. *Invited to the SICOMP special issue for STOC 2020.*
- **Approximating All-Pair Bounded-Leg Shortest Path and APSP-AF in Truly-Subcubic Time.**
Ran Duan and Hanlin Ren.
ICALP 2018.

Manuscripts / In Submission

- **Polynomial-Time Pseudodeterministic Construction of Primes.**
Lijie Chen, Zhenjian Lu, Igor Oliveira, Hanlin Ren, and Rahul Santhanam

Academic Talks

- **NP-Hardness of Approximating Meta-Complexity: A Cryptographic Approach.**
Minimal Complexity Assumptions for Cryptography, Meta-Complexity 2023, Simons Institute. <https://youtu.be/v9JiEf2WH58> May 2023
- **Robustness of Average-Case Meta-Complexity.**
Seminar at Meta-Complexity 2023, Simons Institute. Mar 2023
- **Bounded Relativization.**
Student Seminar, Meta-Complexity 2023, Simons Institute. Feb 2023
- **Range Avoidance, Remote Point, and Hard Partial Truth Table via Satisfying-Pairs Algorithms.**
Lower Bounds, Learning, and Average-Case Complexity, Meta-Complexity 2023, Simons Institute. <https://youtu.be/pd45Av1iTLw> Feb 2023
- **Recent Advances in the Range Avoidance Problem.**
Yaoclass Seminar (online). Dec 2022
- **Range Avoidance Part II: Beyond Circuit Lower Bounds.**
New Directions in Derandomization, FOCS 2022 Workshop. <https://vimeo.com/user39621409/review/772183410/1201f3a1d4> Nov 2022
- **On the Range Avoidance Problem for Circuits.**
ICMS workshop on Mathematical Approaches to Lower Bounds: Complexity of Proofs and Computation. Jul 2022
Warwick complexity meetings (online). Aug 2022
FOCS 2022. <https://vimeo.com/user39621409/review/771296149/46488425a3> Nov 2022
- **Maintaining Exact Distances under Multiple Edge Failures.**
STOC 2022. <http://youtu.be/B1wMXgTCy8o> Jun 2022
- **A Relativization Perspective on Meta-Complexity.**
STACS 2022 (online). Mar 2022

Academic Talks (Continued)

- **Faster Algorithms for Distance Sensitivity Oracles.**
IJTCS 2021 (hybrid). Aug 2021
Yaoclass Seminar. Nov 2021
- **Constructing a Distance Sensitivity Oracle in $O(n^{2.5794}M)$ Time.**
ICALP 2021 (online). <http://youtu.be/uIFouc6d4> Jul 2021
- **Hardness of KT Characterizes Parallel Cryptography.**
DIMACS workshop on meta-complexity, barriers, and derandomization. <http://youtu.be/hZZaEuumtTY> Apr 2022
CCC 2021 (online). <http://youtu.be/esFxj1cNLCE> Jul 2021
Yaoclass Seminar. Apr 2021
Oxford-Warwick complexity meetings (online). Apr 2021
- **Approximate Distance Oracles Subject to Multiple Vertex Failures.**
SODA 2021 (online). <https://player.vimeo.com/video/496602190>. Jan 2021
Yaoclass Seminar. Dec 2020
- **Improved Distance Sensitivity Oracles with Subcubic Preprocessing Time.**
ESA 2020 (online). <https://youtu.be/2Z46AybFkJ8>. Sep 2020
- **Strong Average-Case Circuit Lower Bounds from Non-trivial Derandomization.**
STOC 2020 (online). <https://youtu.be/xWDQ4Lef0Vs>. Jun 2020
SIGMA, ICT, Chinese Academy of Science (online). Mar 2020
- **Approximating All-Pair Bounded-Leg Shortest Path and APSP-AF in Truly-Subcubic Time.**
ICALP 2018, Prague, Czech Republic. Jul 2018

Special Issue Invitation

- STOC 2020, ESA 2020, CCC 2021

Teaching Experience

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| 2020 Fall | ■ Design and Analysis of Algorithms (graduate level)
<i>Instructor: Prof. Ran Duan</i>
Teaching assistant |
| 2021 Spring | ■ Theory of Computation (undergraduate level)
<i>Instructor: Prof. Ran Duan</i>
Teaching assistant |
| 2022 Michaelmas Term | ■ Advanced Complexity Theory (Part C)
<i>Instructor: Prof. Rahul Santhanam</i>
Marker and tutor |

Selected Awards

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| 2021 | ■ Clarendon Scholarship |
| 2019 | ■ Yao Award, bronze prize |
| 2018 | ■ Evergrande Scholarship |
| 2017 | ■ Baidu “Future Star” Scholarship |
| 2015 | ■ Gold medal (15th place) in Chinese National Olympiad in Informatics (NOI) |