Hanlin Ren

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https://hanlin-ren.github.io/ Last updated: Nov 2023

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.)

- **Polynomial-Time Pseudodeterministic Construction of Primes.**
  Lijie Chen, Zhenjian Lu, Igor Oliveira, Hanlin Ren, and Rahul Santhanam
  FOCS 2023.
- **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, Jiatu 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.*

Publications (Continued)

- **Constructing a Distance Sensitivity Oracle in $O(n^{2.5794}M)$ Time.**
  Yong Gu and Hanlin Ren.
  ICALP 2021.
- **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

- **Symmetric Exponential Time Requires Near-Maximum Circuit Size.**
  Lijie Chen, Shuichi Hirahara, and Hanlin Ren

Academic Talks

- **The Iterative Win-Win Method, and Explicit Constructions (without) Using It.**
  A series of two talks at the CSDM Seminar, Institute for Advanced Study. https://youtu.be/uxyN2eVYKic Nov 2023
- **Polynomial-Time Pseudodeterministic Construction of Primes.**
  DIMAP Seminar, University of Warwick. Jun 2023
  TCS+. https://youtu.be/yalaX02fVow Sep 2023
  Algorithms and Complexity Theory Seminars, University of Oxford. Oct 2023
  FOCS 2023. Nov 2023
  Recent Developments in Explicit Constructions, FOCS 2023 Workshop. Nov 2023
- **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
  ICT, Chinese Academy of Sciences (online). May 2023
  STOC 2023. https://youtu.be/DtJQ5-3zptE Jun 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
  CCC 2023. Jul 2023
  Warwick complexity meetings (online). Nov 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
  STOC 2023. Jun 2023

Academic Talks (Continued)

- **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
- **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/uIFoucab6d4 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/xWDQ4LefOVs. Jun 2020
  SIGMA, ICT, Chinese Academy of Sciences (online). Mar 2020
- **Approximating All-Pair Bounded-Leg Shortest Path and APSP-AF in Truly-Subcubic Time.**
  ICALP 2018. Jul 2018

Special Issue Invitation

- STOC 2020, ESA 2020, CCC 2021

Teaching Experience

2020 Fall
- **Design and Analysis of Algorithms** (graduate level)
  Instructor: Prof. Ran Duan
  Teaching assistant

2021 Spring
- **Theory of Computation** (undergraduate level)
  Instructor: Prof. Ran Duan
  Teaching assistant

Teaching Experience (Continued)

2022 Michaelmas Term
- **Advanced Complexity Theory** (Part C)
  Instructor: Prof. Rahul Santhanam
  Marker and tutor

Selected Awards

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)