CV

Personal Information

Full Name: Shuo Pang

Address: Rebslagervej 10 Copenhagen 2400, Denmark

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Research Interests

Computational complexity, discrete math, proof complexity, optimization

Employments

Postdoc, University of Copenhagen   2022/11–Present
Algorithms and Complexity Section, Department of Computer Science
Host: Jakob Nordström

Education

Ph.D. in Mathematics, University of Chicago   2016/10–2022/4
Dissertation: *Some Results in Proof Complexity and SAT Solving*
Adviser: Alexander Razborov

B.S. in Mathematics, Peking University   2012/9–2016/7

Paper Refereeing

- Journal: Computational Complexity (2020, 2021), SIAM Journal on Discrete Mathematics (2023)

- Conference: STOC (2019, 2023), CCC (2021,2024), SAT (2023, 2024), ICALP (2024, 2024)

Conference Attendance

1. Annual IEEE Symposium on Foundations of Computer Science (FOCS 2023)   2023/11
   Paper, *Graph Colouring Is Hard on Average for Polynomial Calculus and Nullstellensatz*

2. Computational Complexity Conference (CCC 2021)   2021/7
   Paper & talk, *SoS Degree Lower Bounds for Exact Planted Clique*

3. International Computer Science Symposium in Russia (CSR 2021)
   Paper & talk, *Large Clique Is Hard on Average for Resolution*   2021/7

4. Theory and Applications of Satisfiability Testing (SAT 2020)   2020/7
   Paper, *On CDCL-based Proof Systems with the Ordered Decision Strategy*

Workshop and Seminar

1. Faculty of Mathematics, Informatics, and Mechanics, University of Warsaw   2024/4
   Invited talk at automata seminar, *Robust Trade-off for Weisfeiler–Leman via Compression*.
   Host: Mikołaj Bojańczyk

2. *Proof Complexity and Beyond*, Oberwolfach Workshop   2024/3
   Invited talk, *Supercritical and Robust Trade-off for Resolution Depth Versus Width and Weisfeiler–Leman*

3. *Danish Digitalization, Data Science and AI Conference* (D3A), hosted by Danish Data Science Academy and Digital Research Center Denmark (DDAS, DIREC)   2024/2
   Invited talk, *Graph Colouring is Hard on Average for Polynomial Calculus and Nullstellenstatz*

4. *SAT Extended Reunion*, Simons Institute program at UC Berkeley   2023/4
   Invited visiting scientist. Talk: *Graph Colouring is Hard on Average for Polynomial Calculus and Nullstellensatz*

5. MIAO seminar, University of Copenhagen   2022/12
   Invited talk, *SoS Degree Lower Bound for Exact Clique*

6. *Complexity Workshop*, Banff International Research Station (BIRS)   2020/1
   Invited talk, *(Mildly) Large Clique is Hard on Average for Resolution*

7. BARC seminar and MIAO seminar, University of Copenhagen and Lund University   2019/9
   Invited talks, *Large Clique is Hard on Average for Resolution*, and *On CDCL-based Proof Systems with the Ordered Decision Strategy*
   Host: Jakob Nordström

8. *Complexity Theory Workshop*, Clay Math Institute. Student attendee   2018

9. Math REU at Peking University. Student attendee   2014
   Project *On Bott Periodicity*. Supervisor: Houhong Fan

Teaching Experience

Instructor   2018–21

Nine undergraduate math courses, University of Chicago (f/w/s: fall/winter/spring quarter)
- *Calculus I*, MATH 15100 (f19)
- *Calculus II*, MATH 15200 (f18, w20, f21)
- *Calculus III*, MATH 15300 (w19, s19, s20, f20, w21)

Co-instructor

Graduate courses in computer science, University of Copenhagen   2023–24
- *Computability and Complexity*, 2023 (with Jakob Nordström), 2024 (with Jakob Nordström, Srikanth Srinivasan and Amir Yehudayoff)

TA

Math courses, University of Chicago   2017–18
- *Honors Calculus 3*, MATH 16300, with Sarah Ziesler (fall 2017)
- *Point Set Topology*, MATH 26200, with Kurt Vinhage (winter 2018)
- *Complex Variables*, MATH 27000, with Danny Calegari (fall 2018)

Publications

1 Graph Colouring Is Hard on Average for Polynomial Calculus and Nullstellensatz   2023

With Jonas Conneryd, Susanna de Rezende, Jakob Norström, and Kilian Risse.

Proceedings of the 64th Annual IEEE Symposium on Foundations of Computer Science (FOCS 2023)

⋆ Some Results in Proof Complexity and SAT Solving   2022

PhD dissertation, UChicago open access

2 SoS Lower Bound for Exact Planted Clique   2021

Proceedings of the 36th Computational Complexity Conference (CCC 2021)

3 On CDCL-Based Proof Systems With the Ordered Decision Strategy   2019

With Nathan Mull and Alexander Razborov.

Proceedings of the 23rd Theory and Applications of Satisfiability Testing (SAT 2020)

SIAM Journal on Computing (SICOMP), Volume 51, Issue 4, 2022

4 Large Clique Is Hard on Average for Resolution   2019

Proceedings of the 16th International Computer Science Symposium in Russia (CSR 2021)

Work in Preparation

5 Supercritical and Robust Trade-offs for Resolution Depth Versus Width and Weisfeiler–Leman   Expected 2024

With Duri Janett and Jakob Norström.

6 SoS Lower Bound for Non-Gaussian Component Analysis   Expected 2024

With Ilias Diakonikolas, Sushrut Karmalkar, and Aaron Potechin.

Awards

Grant, Fellowship

- EU Horizon MSCA Postdoctoral Fellowship in 2023   2024/4–
  Project *NoShortProof*. Amount: 230774.40 eur
- S. McCormick Fellowship for math graduates, UChicago   2016–17

Contest

- S.-T. Yau College Student Math Contest   2015
  1st place in team contest, 3rd place in individual geometry & topology
- Chinese Mathematics Competitions (CMC) in math major, first prize   2014
- High school
  China Mathematics Olympiad (CMO), second prize   2012
  China Western Mathematics Olympiad (CWMO), first prize   2010
  China Northern Mathematics Olympiad (CNMO), first prize   2010
  Chinese Physics Olympiad in Provincial Round, first prize   2011

Reference

Alexander Razborov	**Jakob Nordström**	**Aaron Potechin**
Professor	Professor	Assistant Professor
Department of Mathematics,	Department of Computer Science	Department of Computer Science
Department of Computer Science	University of Copenhagen &	University of Chicago
University of Chicago & Steklov	Lund University	potechin@uchicago.edu
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