Bruno Pasqualotto Cavalar

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http://brunopc.github.io

EMPLOYMENT

Research Associate

July 2024 - now

University of Oxford

Department of Computer Science

Host: Dr. Ján Pich

EDUCATION

Ph.D. in Computer Science

2020 - 2024

University of Warwick

Department of Computer Science Advisor: Igor Carboni Oliveira

Thesis: Complexity Theory of Classical and Quantum Computational Devices

M.Sc. in Computer Science

2018 - 2020

University of Sao Paulo

Institute of Mathematics and Statistics (IME-USP)

Advisor: Yoshiharu Kohayakawa

Thesis: Sunflower theorems in monotone circuit complexity

B.Sc. in Computer Science (with honours)

2014 - 2017

Average: 9.1/10

University of Sao Paulo (IME-USP)

Ranked 1st among 37 Computer Science students

Advisor: Yoshiharu Kohayakawa

Thesis: Ramsey-type problems in orientations of graphs

FUNDING, DISTINCTIONS AND AWARDS

Best Master Thesis Award: Winner of the Latin American Master Thesis Contest (CLTM - XXVII) at the Latin American Computing Conference (CLEI 2021).

Best Master Thesis Award: Winner of the Contest of Theses and Dissertations (CTD - XXXIV) at the Congress of the Brazilian Computer Society (CSBC 2021).

Alejandro Lópes-Ortiz Best Paper Award: For the paper Monotone Circuit Lower Bounds from Robust Sunflowers at the LATIN 2020 conference, joint work with Benjamin Rossman and Mrinal Kumar.

2021

Chancellor's International Scholarship: Awarded to the 30 most outstanding international PhD applicants to the University of Warwick.

2020

Computational Complexity and extremal combinatorics September 2018 - August 2020 FAPESP Grant for M.Sc. research

Computational Complexity and extremal combinatorics

January 2019 - July 2019

FAPESP Grant for research internship abroad (University of Toronto)

Best student award of IME-USP: Awarded to the best student among all students graduating at IME-USP in a given year, including all majors in Mathematics, Applied Mathematics, Statistics and Computer Science.

2017

2019

FAPESP Grant for undergraduate research

Second place, in the admission exam of the University of Sao Paulo for undergraduate studies in Computer Science (over 3,500 applicants).

PUBLICATIONS

8. Boolean Circuit Complexity and Two-Dimensional Cover Problems 2024 Bruno P. Cavalar, Igor C. Oliveira Submitted Available at https://brunopc.github.io/files/CO24.pdf 7. On the Computational Hardness of Quantum One-wayness 2023 Bruno P. Cavalar, Eli Goldin, Matthew Gray, Peter Hall, Yanyi Liu, Angelos Pelecanos Submitted Available at https://arxiv.org/abs/2312.08363 6. Constant-Depth Circuits vs. Monotone Circuits 2023 Bruno P. Cavalar, Igor Carboni Oliveira Proc. 38th Computational Complexity Conference (CCC), LIPIcs, Vol. 264, 29:1–29:37 Available at https://arxiv.org/abs/2305.06821 5. Algorithms and Lower Bounds for Comparator Circuits from Shrinkage 2022 Bruno P. Cavalar, Zhenjian Lu Proc. 13th Innovations in Theoretical Computer Science Conference (ITCS), LIPIcs, Vol. 215, 34:1–34:21 Algorithmica, 85(7):2131–2155, 2023 Available at https://arxiv.org/abs/2111.14974 4. Directed graphs with lower orientation Ramsey thresholds 2021 Gabriel Ferreira Barros, Bruno P. Cavalar, Yoshiharu Kohayakawa, Guilherme Oliveira Mota, Tássio Naia Extended Abstracts EuroComb, Trends in Mathematics, Vol. 14, 799–804 Available at https://arxiv.org/abs/2211.07033 3. Orientation Ramsey thresholds for cycles and cliques 2021 Gabriel Ferreira Barros, Bruno P. Cavalar, Yoshiharu Kohayakawa, Tássio Naia SIAM Journal on Discrete Mathematics (SIDMA), 35(4):2844–2857, 2021 Available at https://arxiv.org/abs/2012.08632 2. Monotone circuit lower bounds from robust sunflowers 2020 Bruno P. Cavalar, Mrinal Kumar, Benjamin Rossman Proc. 14th Latin American Theoretical Informatics Symposium (LATIN), LNCS Vol. 12118, 311-322 Winner of the Alejandro Lópes-Ortiz Best Paper Award at LATIN Algorithmica, 84(12):3655–3685, 2022 Available at https://arxiv.org/abs/2012.03883

1. Anti-Ramsey threshold of cycles

Gabriel Ferreira Barros, Bruno P. Cavalar, Guilherme Oliveira Mota, Olaf Parczyk Proc. 10th Latin American Algorithms, Graphs and Optimization Symposium (**LAGOS**) 2019, ENTCS Vol. 346, 89-98

Discrete Applied Mathematics (**DAM**), 323:228–235, 2022

Available at https://arxiv.org/abs/2006.02079

ACADEMIC VISITS

Lund University and University of Copenhagen Visiting Graduate Student Host: Susanna Rezende	October 202.
École Polytechnique Fédérale de Lausanne (EPFL) Visiting Graduate Student Host: Mika Göös	May 2023 - June 202
Simons Institute for the Theory of Computing (UC Berkeley) Visiting Graduate Student Program: Meta-Complexity	Jan 2023 - March 202
University of Toronto International Visiting Graduate Student (IVGS) Host: Benjamin Rossman	Jan 2019 - Jul 201
ACHING ACTIVITIES	
University of Warwick	
 Discrete Mathematics and its Applications 1 Marking and teaching of seminars (~ 10 students). 1st year course for Discrete Mathematics undergraduates. 	202
 Quantum Computing Marking and teaching of seminars (~ 40 students). Undergraduate and graduate students of Computer Science. 	2021, 202
• Computational Learning Theory Marking and teaching of seminars (~ 20 students). Undergraduate and graduate students of Computer Science.	202
 Algorithms Teaching of seminars (~ 40 students). 2nd year course for Computer Science undergraduates. 	202
University of São Paulo	
• Introduction to Graph Theory Marking and teaching of seminars (~ 20 students). Undergraduate/graduate course.	202
• Foundations of Data Science Marking and teaching of seminars (~ 20 students). Undergraduate/graduate course.	201
• Combinatorial Optimization Marking and teaching of seminars (~ 20 students). Undergraduate course.	201
• Languages, Automata and Computability Marking and teaching of seminars (\sim 80 students). Graduate course.	201
• Introduction to Computer Science Marking and teaching of seminars (~ 40 students). 1st year undergraduate course.	201

SELECTED TALKS AND SEMINARS

Constant-depth Circuits vs. Monotone Circuits	
MIAO Seminar (University of Copenhagen)	2023
EPFL Theory Coffee Seminar (EPFL)	2023
Computational Complexity Conference (CCC)	2023
39th British Colloquium for Theoretical Computer Science (BCTCS)	2023
Simons Institute for the Theory of Computing	2023
Complexity Network UK (Imperial College London)	2022
Algorithms and Lower Bounds for Comparator Circuits from Shrinkage	
13th Innovations in Theoretical Computer Science (ITCS)	2022
$Complexity\ Network\ UK$	2022
Monotone circuit lower bounds from robust sunflowers	
37th British Colloquium for Theoretical Computer Science (BCTCS)	2021
14th Latin American Theoretical Informatics Symposium (LATIN)	2021

LEADERSHIP AND SCIENTIFIC SERVICE

Organisation of events:

- Warwick-Imperial-Oxford Complexity Network
 Online and Local Events. Running since December 2021
- Complexity Lunches at Warwick.

Journal reviewing: Journal of Graph Theory, Theory of Computing, Random Structures and Algorithms

Conference reviewing: Computational Complexity Conference (CCC), Innovations in Theoretical Computer Science (ITCS), Symposium on Theory of Computing (STOC)