

Bruno Pasqualotto Cavalar

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EDUCATION

Ph.D. in Computer Science

2020 - 2024 (expected)

University of Warwick

Department of Computer Science

Advisor: Igor Carboni Oliveira

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

University of Sao Paulo (IME-USP)

Average: 9.1/10

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). 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). 2021

Alejandro López-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

Bridges in Mathematics and Computing April 2016 - December 2017
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). 2014

PUBLICATIONS

7. **On the Computational Hardness of Quantum One-wayness** 2023
Bruno P. Cavalar, Eli Goldin, Matthew Gray, Peter Hall, Yanyi Liu, Angelos Pelecanos
In preparation
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 López-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** 2019
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

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| Lund University and University of Copenhagen
Visiting Graduate Student
<i>Host:</i> Susanna Rezende | <i>October 2023</i> |
| École Polytechnique Fédérale de Lausanne (EPFL)
Visiting Graduate Student
<i>Host:</i> Mika Göös | <i>May 2023 - June 2023</i> |
| Simons Institute for the Theory of Computing (UC Berkeley)
Visiting Graduate Student
<i>Program:</i> Meta-Complexity | <i>Jan 2023 - March 2023</i> |

TEACHING ACTIVITIES

University of Warwick

- *Discrete Mathematics and its Applications 1* 2022
Marking and teaching of seminars (~ 10 students).
1st year course for Discrete Mathematics undergraduates.
- *Quantum Computing* 2021, 2022
Marking and teaching of seminars (~ 40 students).
Undergraduate and graduate students of Computer Science.
- *Computational Learning Theory* 2021
Marking and teaching of seminars (~ 20 students).
Undergraduate and graduate students of Computer Science.
- *Algorithms* 2020
Teaching of seminars (~ 40 students).
2nd year course for Computer Science undergraduates.

University of São Paulo

- *Introduction to Graph Theory* 2020
Marking and teaching of seminars (~ 20 students).
Undergraduate/graduate course.
- *Foundations of Data Science* 2019
Marking and teaching of seminars (~ 20 students).
Undergraduate/graduate course.
- *Combinatorial Optimization* 2018
Marking and teaching of seminars (~ 20 students).
Undergraduate course.
- *Languages, Automata and Computability* 2018
Marking and teaching of seminars (~ 80 students).
Graduate course.
- *Introduction to Computer Science* 2015
Marking and teaching of seminars (~ 40 students).
1st year undergraduate course.
- *Mathematical Foundations for Computer Science* 2015
Marking and teaching of seminars (~ 60 students).
1st year undergraduate course.

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)