# Bruno Pasqualotto Cavalar

Bruno.Pasqualotto-Cavalar@warwick.ac.uk
www.ime.usp.br/~brunopc

## RESEARCH INTERESTS

Computational complexity theory, pseudorandomness, extremal and probabilistic combinatorics and algorithms.

## 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 honors)** *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*

## VISITING POSITIONS

**Simons Institute for the Theory of Computing (UC Berkeley)** *Jan 2023 - March 2023*
Visiting Graduate Student
Program: `Meta-Complexity`

**University of Toronto** *Jan 2019 - Jul 2019*
International Visiting Graduate Student (IVGS)
Advisor: Benjamin Rossman

## PUBLICATIONS AND MANUSCRIPTS

6. **Constant-Depth Circuits vs. Monotone Circuits** *2023*
   Bruno Pasqualotto Cavalar, Igor Carboni Oliveira
   In preparation

5. **Algorithms and Lower Bounds for Comparator Circuits from Shrinkage** *2022*
   Bruno Pasqualotto Cavalar, Zhenjian Lu
   ITCS 2022

4. **Oriented graphs with lower orientation Ramsey thresholds** *2021*
   Gabriel Ferreira Barros, Bruno Pasqualotto Cavalar, Yoshiharu Kohayakawa, Guilherme Oliveira Mota, Tássio Naia
   EUROCOMB 2021

3. **Orientation Ramsey thresholds for cycles and cliques** *2021*
   Gabriel Ferreira Barros, Bruno Pasqualotto Cavalar, Yoshiharu Kohayakawa, Tássio Naia
   SIAM Journal on Discrete Mathematics, 2021
   `https://arxiv.org/abs/2012.08632`

2. **Monotone circuit lower bounds from robust sunflowers** *2020*
Bruno Pasqualotto Cavalar, Mrinal Kumar, Benjamin Rossman
LATIN 2020 (Alejandro Lópes-Ortiz Best Paper Award)
Algorithmica (Invited to Special Issue) 2022
`https://arxiv.org/abs/2012.03883`

1. **Anti-Ramsey threshold of cycles for sparse graphs** *2019*
Gabriel Ferreira Barros, Bruno Pasqualotto Cavalar, Guilherme Oliveira Mota, Olaf Parczyk
LAGOS 2019
Discrete Applied Mathematics 2021
`https://arxiv.org/abs/2006.02079`

## AWARDS AND DISTINCTIONS

**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 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*

**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*

**Second place**, in the admission exam of the University of Sao Paulo for undergraduate studies in Computer Science (over 3,500 applicants). *2014*

## GRANTS

**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)

**Bridges in Mathematics and Computing** *April 2016 - December 2017*
FAPESP Grant for undergraduate research

## TALKS

**Constant-depth Circuits vs. Monotone Circuits**

*Complexity Network UK* *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*

## SCIENTIFIC SERVICE

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

**Conference reviewing:** Computational Complexity Conference (CCC)

## PARTICIPATION IN EVENTS

DIMAP Theory Day *2022*

Mathematical Approaches to Lower Bounds (ICMS Workshop) *2022*

13th Innovations in Theoretical Computer Science (ITCS) *2022*

53rd Annual ACM Symposium on Theory of Computing (STOC) *2021*

36th Computational Complexity Conference (CCC) *2021*

37th British Colloquium for Theoretical Computer Science (BCTCS) *2021*

14th Latin American Theoretical Informatics Symposium (LATIN) 2020/2021 *2021*

Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM) *2019*

50 Years of Complexity Theory: A Celebration of the Work of Stephen Cook *2019*
Fields Institute

2nd Sao Paulo Workshop in Optimization, Combinatorics and Algorithms *2018*

Combinatorics: Extremal, Probabilistic and Additive (ICM Satellite) *2018*
**Poster presentation**: Ramsey-type problems for orientations of graphs

International Congress of Mathematicians (ICM) *2018*

1st Sao Paulo Workshop in Optimization, Combinatorics and Algorithms *2017*

2nd Meeting of Theoretical Computer Science *2017*
Congress of the Brazilian Computing Society (II ETC - CSBC)
**Oral presentation**: The Algorithmic Lovász Local Lemma and Applications

Sao Paulo School of Advanced Science on Algorithms, Combinatorics and Optimization, *2016*
University of Sao Paulo

## TEACHING ASSISTANT

Learning Theory *2021*
Quantum Computing *2021, 2022*
Algorithms *2020*
Introduction to Graph Theory *2020*
Foundations of Data Science *2019*
Combinatorial Optimization *2018*
Languages, Automata and Computability *2018*
Introduction to Computer Science *2015*
Mathematical Foundations of Computer Science *2015*