Susanna F. de Rezende

CONTACT
INFORMATION

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CURRENT
POSITION

Postdoc at the Institute of Mathematics of the Czech Academy of Sciences in Prague, Czech Republic hosted by Professor Pavel Pudlák with a grant from the Knut and Alice Wallenberg Foundation

RESEARCH
INTERESTS

Computational complexity, proof and circuit complexity, communication complexity, graph theory and algorithms

EDUCATION

School of Electrical Engineering and Computer Science, **KTH Royal Institute of Technology**, **Stockholm, Sweden**

Ph.D. in Theoretical Computer Science, August 2014 – August 2019

- PhD Thesis: Lower Bounds and Trade-offs in Proof Complexity
- Advisor: Prof. Jakob Nordström

Institute of Mathematics and Statistics, **University of São Paulo**, **Brazil**

M.Sc. in Computer Science, March 2012 – May 2014

- Master's Dissertation: Longest Paths in Graphs
- Advisor: Prof. Yoshiko Wakabayashi
- Funding: Grant from Fapesp 11/16348-0

B.Sc. in Computer Science, February 2008 – December 2011

- GPA 8.8 (out of 10)
- Scientific Initiation Scholarship, August 2009 – February 2012
  - Title: *Topics in Combinatorics and Graph Theory*
  - Advisor: Prof. Yoshiko Wakabayashi
  - Funding: Grants from CNPq 116402/2009-1, 123740/2010-0, 800430/2011-5

POSITIONS

Simons Institute for the Theory of Computing, **Berkeley CA, USA**

Research Fellow, January – May 2021 (upcoming)

- Program: Satisfiability: Theory, Practice, and Beyond

Institute of Mathematics of the Czech Academy of Sciences, **Prague, Czech Republic**

Postdoc, January 2020 – December 2021 (current)

- Host: Professor Pavel Pudlák
- Funding: Grant from the Knut and Alice Wallenberg Foundation

Simons Institute for the Theory of Computing, Berkeley CA, USA

Research Fellow, August – December 2018

- Program: Lower Bounds in Computational Complexity

AWARDS AND
HONORS
- Featured as one of the "rising stars" women in TCS at STOC 2020 – June 25, 2020
- Prize for Excellent Doctoral Dissertation 2018/2019 awarded by SMC (Stockholm Mathematics Centre).
- M.Sc. thesis selected by CSBC (Congress of the Brazilian Society of Computer Science) among the top 10 in Brazil in the area of Computer Science in 2014
- B.Sc. degree awarded Honorable Mention for Outstanding Achievement, Apr 2012
- Gold Medal in the V National Symposium of Scientific Initiation held at the Institute of Pure and Applied Mathematics (IMPA), Rio de Janeiro, Nov 2010

PARTICIPATION
IN CONFERENCES
- FOCS 2020 – Virtual conference, November 16 - 19, 2020
  - Presentation: KRW Composition Theorem via Lifting
  - Accepted paper: Lifting with Simple Gadgets and Applications to Circuit and Proof Complexity
- CCC 2020 – Virtual conference, July 28 - 30, 2020
  - Accepted paper: Exponential Resolution Lower Bounds for Weak Pigeonhole Principle and Perfect Matching Formulas over Sparse Graphs
- TCS Women Spotlight Workshop, STOC 2020 – June 25, 2020
  - Invited talk: Finding Algebraic Proofs is NP-Hard
- CCC 2019 – New Brunswick, NJ, USA, July 18 - 20, 2019
  - Presentation: Nullstellensatz Size-Degree Trade-offs from Reversible Pebbling
- STOC 2018 – Los Angeles, CA, USA, June 25 - 29, 2018
  - Presentation: Clique is Hard on Average for Regular Resolution
- ITCS 2017 – Berkeley, CA, USA, January 8 - 11, 2017
  - Accepted paper: Cumulative Space in Black-White Pebbling and Resolution
- FOCS 2016 – New Brunswick, NJ, USA, October 9 - 11, 2016
  - Presentation: How Limited Interaction Hinders Real Communication (and What It Means for Proof and Circuit Complexity)
- ICGT 2014 – Grenoble, France, June 30 - July 4, 2014
  - Accepted extended abstract: On the Proper Orientation Number of Bipartite Graphs
- EuroComb 2011 – Budapest, Hungary, August 29 - September 2, 2011
  - Presentation: Intersection of Longest Paths in a Graph

INVITED
WORKSHOPS
- Dagstuhl Seminar 20061 - SAT and Interactions – held at Dagstuhl, Germany, February 2 - 7, 2020
- Proof Complexity – held at Banff International Research Station (BIRS), Canada, January 19 - 24, 2020
  - Presentation: Lifting with Simple Gadgets and Applications to Circuit and Proof Complexity
- Algebraic Techniques in Computational Complexity – held at Banff International Research Station (BIRS), Canada, July 7 - 12, 2019
  - Presentation: Lifting with Simple Gadgets and Applications to Circuit and Proof Complexity

○ [Theory and Practice of Satisfiability Solving](#) – held at Casa Matemtica Oaxaca (CMO), Mexico, August 26 - 31, 2018
  ○ Presentation: Clique is Hard for State-of-the-Art Algorithms
○ [Proof Complexity and Beyond](#) – held at Mathematisches Forschungsinstitut Oberwolfach, Germany, August 13 - 19, 2017
  ○ Presentation: Clique is Hard on Average for Regular Resolution
○ [Dagstuhl Seminar 14421](#) - Optimal algorithms and proofs – held at Dagstuhl, Germany, October 12 - 17, 2014

SELECTED INVITED TALKS	○ Oct 2020 TCS+ seminar ○ Jun 2020 TCS Women Rising Stars workshop at STOC '20 ○ Jan 2020 Proof Complexity, BIRS, Canada ○ Jul 2019 Algebraic Techniques in Computational Complexity, BIRS, Canada ○ Nov 2018 Google, Mountain View CA, USA ○ Sep 2018 Boolean Devices, Simons Institute, Berkeley CA, USA ○ Aug 2018 Theory and Practice of Satisfiability Solving, CMO, Mexico ○ Aug 2017 Proof Complexity and Beyond, Oberwolfach, Germany
OTHER ACTIVITIES	○ Main organizer of the [Rising Stars at KTH workshop](#), April 2019 ○ Co-initiator and committee member of the [Women PhD Candidates at KTH network (WOP@KTH)](#), 2016–2019

LANGUAGE PROFICIENCY		
English, Portuguese and Spanish	Fluent	
Swedish and French	Intermediate	
German	Basic	

RESEARCH PAPERS

1. **Susanna F. de Rezende**, "Automating Tree-Like Resolution in Time $n^{o(\log n/\log\log n)}$ Is ETH-Hard", submitted manuscript, 2020.

2. **Susanna F. de Rezende**, Mika Göös, Jakob Nordström, Toniann Pitassi, Robert Robere, Dmitry Sokolov, ["Automating Algebraic Proof Systems is NP-Hard"](#), Technical Report TR20-064, *Electronic Colloquium on Computational Complexity (ECCC)*, 2020.

3. **Susanna F. de Rezende**, Or Meir, Jakob Nordström, Toniann Pitassi, Robert Robere, ["KRW Composition Theorems via Lifting"](#), in *Proceedings of the 61st Annual IEEE Symposium on Foundations of Computer Science (FOCS '20)*, November 2020.

4. **Susanna F. de Rezende**, Or Meir, Jakob Nordström, Toniann Pitassi, Robert Robere, Marc Vinyals, ["Lifting with Simple Gadgets and Applications to Circuit and Proof Complexity"](#), in *Proceedings of the 61st Annual IEEE Symposium on Foundations of Computer Science (FOCS '20)*, November 2020.

5. **Susanna F. de Rezende**, Jakob Nordström, Dmitry Sokolov, Kilian Risse, ["Exponential Lower Bounds for Weak Pigeonhole Principle and Perfect Matching Formulas over Sparse Graphs"](#), in *Proceedings of the 35th Annual Computational Complexity Conference (CCC '20)*, July 2020.

6. **Susanna F. de Rezende**, Or Meir, Jakob Nordström, Robert Robere, "Nullstellensatz Size-Degree Trade-offs from Reversible Pebbling", in *Proceedings of the 34th Computational Complexity Conference (CCC '19)*, July 2019. To appear in Computational Complexity.

7. Albert Atserias, Ilario Bonacina, **Susanna F. de Rezende**, Massimo Lauria, Jakob Nordström, Alexander Razborov, "Clique is Hard on Average for Regular Resolution", in *Proceedings of the 50th Annual ACM Symposium on Theory of Computing (STOC '18)*, June 2018. To appear in JACM.

8. Joël Alwen, **Susanna F. de Rezende**, Jakob Nordström, Marc Vinyals, "Cumulative Space in Black-White Pebbling and Resolution", in *Proceedings of the 8th Innovations in Theoretical Computer Science Conference (ITCS '17)*, 67:38:1–38:21, January 2017.

9. **Susanna F. de Rezende**, Jakob Nordström, Marc Vinyals, "How Limited Interaction Hinders Real Communication (and What It Means for Proof and Circuit Complexity)", in *Proceedings of the 57th Annual IEEE Symposium on Foundations of Computer Science (FOCS '16)*, 295–304, October 2016.

10. Julio Araujo, Nathann Cohen, **Susanna F. de Rezende**, Frédéric Havet, Phablo F.S. Moura, "On the proper orientation number of bipartite graphs", *Theoretical Computer Science*, 566:59–75, February 2015.

11. **Susanna F. de Rezende**, Cristina G. Fernandes, Daniel M. Martin, Yoshiko Wakabayashi, "Intersecting Longest Paths", *Discrete Mathematics*, 313(12):1401–1408, June 2013.

12. **Susanna F. de Rezende**, Cristina G. Fernandes, Daniel M. Martin, Yoshiko Wakabayashi, "Intersection of Longest Paths in a Graph", *Electronic Notes in Discrete Mathematics (EuroComb '11)*, 38:743–748, September 2011.