Susanna F. de Rezende

CONTACT INFORMATION
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CURRENT POSITION
Assistant professor at the Department of Computer Science, LTH, Lund University

RESEARCH INTERESTS
Computational complexity, in particular connections between proof, circuit and communication complexity; graph theory and algorithms

EDUCATION

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

Ph.D. in 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

- 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

Department of Computer Science, LTH Lund University, Lund, Sweden

Assistant Professor, December 2021 (current)

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

Postdoc, December 2019 – November 2021

- 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, January – May 2021

- Program: Satisfiability: Theory, Practice, and Beyond

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

Research Fellow, August – December 2018

- Program: Lower Bounds in Computational Complexity

Research Grants

- VR Research project grant within natural and engineering sciences
- Knut and Alice Wallenberg Postdoctoral Scholarship Program
- Simons-Berkeley Google Research Fellowship

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 Stockholm Mathematics Centre (SMC).
- M.Sc. thesis selected among the top 10 in Brazil in the area of Computer Science in 2014 by the Brazilian Society of Computation (SBC)
- 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

Selected Invited Talks

- July 2022 Mathematical Approaches to Lower Bounds, ICMS, Edinburgh, UK
- June 2022 Logic Colloquium, Reykjavik, Iceland
- June 2022 Satisfiability: Theory, Practice, and Beyond Reunion, Simons Institute, Berkeley CA, USA
- Dec 2021 Tel Aviv University theory seminar, Israel
- Sep 2021 Rigorous Evidence for Information-Computation Trade-offs, Simons Institute, Berkeley CA, USA
- Mar 2021 50 Years of Satisfiability, Simons Institute, Berkeley CA, USA
- Mar 2021 Theoretical Foundations of SAT/SMT Solving, Simons Institute, Berkeley CA, USA
- Feb 2021 Oxford-Warwick Complexity Meetings, UK
- 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
- May 2019 Gödel Lecture special session, ASL North American Annual Meeting, New York City NY, USA
- 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

Invited Workshops

- Communication Complexity and Applications, III – held at Banff International Research Station (BIRS), Canada, July 24 - 29, 2022
- 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 Matemática 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

Professional service

Workshops

- Co-organiser of the proof complexity workshop at FOCS '21, February 2022
- Local organizer of Future Digileaders, Stockholm, November 2019
- Main organizer of the Rising Stars at KTH workshop, April 2019
- Main organizer of career-development seminar and workshop at KTH, April 2017

Conference committees

- Computer Science in Russia (CSR) 2021
- IEEE Foundation of Computer Science (FOCS) 2021
- ACM Symposium on Theory of Computing (STOC) 2023
- Computational Complexity Conference (CCC) 2023

Research Papers

Google scholar profile: https://scholar.google.com/citations?user=AZRM7A8AAAAJ

1. Susanna F. de Rezende, Mika Göös, Robert Robere. **Proofs, Circuits, and Communication**. In *SIGACT News Complexity Theory Column*, March 2022.

2. Susanna F. de Rezende, Massimo Lauria, Jakob Nordström, and Dmitry Sokolov. **The Power of Negative Reasoning**. In *Proceedings of the 36th Annual Computational Complexity Conference (CCC '21)*, July 2021.

3. Susanna F. de Rezende, Mika Göös, Jakob Nordström, Toniann Pitassi, Robert Robere, and Dmitry Sokolov. **Automating Algebraic Proof Systems Is NP-Hard**. In *Proceedings of the 53rd Annual ACM Symposium on Theory of Computing (STOC '21)*, pages 209–222, June 2021. (ECCC)

4. Susanna F. de Rezende. **Automating Tree-Like Resolution in Time $n^{o(\log n)}$ Is ETH-Hard**. In *Proceedings of the 11th Latin and American Algorithms, Graphs and Optimization Symposium (LAGOS '21)*, May 2021. (ECCC)

5. Susanna F. de Rezende, Or Meir, Jakob Nordström, Toniann Pitassi, and Robert Robere. **KRW Composition Theorems via Lifting**. In *Proceedings of the 61st Annual IEEE Symposium on Foundations of Computer Science (FOCS '20)*, pages 43–49, November 2020. (arXiv, ECCC)

6. Susanna F. de Rezende, Or Meir, Jakob Nordström, Toniann Pitassi, Robert Robere, and 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)*, pages 24–30, November 2020. (arXiv, ECCC)

7. Susanna F. de Rezende, Jakob Nordström, Dmitry Sokolov, and 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)*, volume 169, pages 28:1–28:24, July 2020. (ECCC)

8. Susanna F. de Rezende, Or Meir, Jakob Nordström, and Robert Robere. **Nullstellensatz Size-Degree Trade-offs from Reversible Pebbling**. *Computational Complexity*, volume 30, article 4, February 2021. Preliminary version in *CCC '19*. (ECCC)

9. Albert Atserias, Ilario Bonacina, Susanna F. de Rezende, Massimo Lauria, Jakob Nordström, and Alexander Razborov. **Clique Is Hard on Average for Regular Resolution**. To appear in *Journal of the ACM*, 2021. Preliminary version in *STOC '18*. (arXiv)

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

11. Susanna F. de Rezende, Jakob Nordström, and 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)*, pages 295–304, October 2016. (ECCC)

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

13. Susanna F. de Rezende, Cristina G. Fernandes, Daniel M. Martin, and Yoshiko Wakabayashi. **Intersecting Longest Paths**. *Discrete Mathematics*, volume 313, number 12, pages 1401–1408, June 2013. Preliminary version in *EuroComb '11*.