Jakob Nordström

Curriculum Vitae

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Research Interests

Computational complexity, combinatorial optimization, automated reasoning, certifying algorithms

Education and Degrees

2015	Docent degree (habilitation) in Computer Science at KTH Royal Institute of Technology, Stockholm, Sweden
2008	PhD in Computer Science at KTH Royal Institute of Technology under the supervision of Professor Johan Håstad
2001	MSc in Computer Science and Mathematics at Stockholm University, Sweden
1999–2003	Russian studies up to finished C level (the equivalent of one and a half year's full-time studies) at Uppsala University and Stockholm University, Sweden
1993	Higher Certificate from the Natural Sciences Programme with extended music education at Stockholm Music Upper Secondary School , Sweden
1992	Diploma in Choir Conducting with extended Music Theory from Tallinn Music Upper Secondary School and the Tallinn Conservatory, Estonia

Positions Held

Mar-May 2023	Visiting Scientist at the Simons Institute for the Theory of Computing at UC Berkeley, USA
Spring 2021	Visiting Scientist at the Simons Institute for the Theory of Computing *[program converted to virtual format due to the Covid-19 pandemic]*
2020–present	Professor at the University of Copenhagen, Denmark
2020–present	Professor (part-time affiliation) at Lund University, Sweden
2019–2020	Associate Professor at the University of Copenhagen
Autumn 2018	Visiting Scientist at the Simons Institute for the Theory of Computing
2015–2019	Associate Professor at KTH Royal Institute of Technology, Sweden
2011–2015	Assistant Professor at KTH Royal Institute of Technology
2008–2010	Postdoctoral researcher at the Massachusetts Institute of Technology, USA, hosted by Professor Madhu Sudan

Teaching

Lecturer on the following courses at the University of Copenhagen:

- Advanced Algorithms and Data Structures, MSc level, 2023/24, 2024/25
- Computability and Complexity, MSc level, 2021/22, 2022/23, 2023/24
- Discrete Mathematics and Algorithms, BSc level, 2020/21
- Discrete Mathematics and Formal Languages, BSc level, 2019/20, 2020/21, 2021/2022, 2022/23
- Introduction to Discrete Mathematics and Algorithms, BSc level, 2023/24, 2024/25
- Logics in Computer Science, BSc level, 2021/22

Lecturer on the following courses at KTH Royal Institute of Technology:

- Complexity Theory, MSc/PhD level, 2013/14, 2015/16, 2017/18
- Current Research in Proof Complexity, MSc/PhD level, 2011/12

- Seminars on Theoretical Computer Science: Proof Complexity, MSc/PhD level, 2016/17
- Seminars on Theoretical Computer Science: Algebraic Gems in TCS, MSc/PhD level, 2014/15
- Seminars on Theoretical Computer Science: Communication Complexity, MSc/PhD level, 2012/13

Supervision

Graduated PhD students:
- Kilian Risse (PhD 2022, co-advised with Johan Håstad and Per Austrin)
- Stephan Gocht (PhD Jun 2022)
- Susanna de Rezende (PhD June 2019)
- Marc Vinyals (PhD June 2017)
- Mladen Mikša (PhD January 2017)

Hosted postdoctoral researchers:
- Shuo Pang (2022-2025)
- Jo Devriendt (2018-2020)
- Janne Kokkala (2018-2020)
- Dmitry Sokolov (2017-2020)
- Guillaume Lagarde (2018-2019, hosted jointly with Johan Håstad and Per Austrin)
- Meysam Aghighi (2017-2018)
- Sagnik Mukhopadhyay (2017-2018)
- Aaron Potechin (2017-2018, hosted jointly with Johan Håstad and Per Austrin)
- Ilario Bonacina (2015-2017)
- Jesús Giráldez Crú (2016-2017)
- Christoph Berkholz (February-August 2015)
- Massimo Lauria (2012-2015)

Currently advising 8 PhD students.

Professional Service

Workshops, PhD Courses, Et Cetera

- Main organizer of the workshop *Theory and Practice of SAT and Combinatorial Solving* at Banff International Research Station (BIRS) Jan 2026 *[planned]*
- Main organizer of the *2nd International Workshop on Highlights in Organizing and Optimizing Proof-logging Systems (WHOOPS '25)* in Paris, France, Sep 2024 *[planned]*
- Main organizer of the workshop *Certifying Algorithms for Automated Reasoning* at Schloss Dagstuhl – Leibniz-Zentrum für Informatik Jun 2025
- Organizer of the *International Workshop on Solving Linear Optimization Problems for Pseudo-Booleans and Yonder (SLOPPY '24)* in Lund, Sweden, Nov 2024
- Organizer of the *1st International Workshop on Highlights in Organizing and Optimizing Proof-logging Systems (WHOOPS '24)* in Copenhagen, Denmark, May 2024
- Main organizer of the workshop *Proof Complexity and Beyond* at Mathematisches Forschungsinstitut Oberwolfach, Mar 2024
- Co-organizer of tutorial *Combinatorial Solving with Provably Correct Results* at the *32nd International Joint Conference on Artificial Intelligence*, Aug 2023
- Program chair of the *NordConsNet 2023* workshop, Odense, Denmark, Jun 2023
- Chair of organizing committee for the extended reunion for the program *Satisfiability: Theory, Practice and Beyond* at the Simons Institute for the Theory of Computing at UC Berkeley, Mar–May 2023
- Main organizer of the workshop *Theory and Practice of SAT and Combinatorial Solving* at Dagstuhl, Oct 2022
- Chair of the 25th Anniversary of SAT session at the *25th International Conference on Theory and Applications of Satisfiability Testing (SAT '22)*, Aug 2022
- Member of organizing committee for the semester program *Satisfiability: Theory, Practice and Beyond* at the Simons Institute for the Theory of Computing in the spring of 2021 *[converted to virtual format due to the Covid-19 pandemic]*

- Main organizer of the workshop *Proof Complexity* at BIRS, Jan 2020
- Main organizer of the *Swedish Summer School in Computer Science* 2014–2019 (`s3cs.eecs.kth.se`)
- Main organizer of the workshop *Theory and Practice of Satisfiability Solving* at Casa Matemática Oaxaca (affiliated with BIRS), Aug 2018
- Main organizer of the workshop *Proof Complexity* at Dagstuhl, Jan–Feb 2018
- Main organizer of the workshop *Proof Complexity and Beyond* at Oberwolfach, Aug 2017
- Member of organizing committee for the workshop *Theoretical Foundations of SAT Solving* at the Fields Institute for Research in Mathematical Sciences, Aug 2016
- Member of program committee for the workshop *Beyond NP* affiliated with the *30th AAAI Conference on Artificial Intelligence (AAAI '16)*, Feb 2016
- Main organizer of the workshop *Theory and Practice of SAT Solving* at Dagstuhl, Apr 2015
- Main organizer of the workshop *Theoretical Foundations of Applied SAT Solving* at BIRS, Jan 2014

Conference Program Committee Chairing

- *International Conference on Theory and Applications of Satisfiability Testing (SAT)* 2025

Conference Program Committees

- *AAAI Conference on Artificial Intelligence (AAAI)* 2019–2025
- *Computational Complexity Conference (CCC)* 2013, 2016, 2026
- *European Conference on Artificial Intelligence (ECAI)* 2024–2025
- *International Colloquium on Automata, Languages and Programming (ICALP)* 2020, 2024
- *International Computer Science Symposium in Russia (CSR)* 2018
- *International Conference on Automated Deduction (CADE)* 2025
- *International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM)* 2013
- *International Conference on the Integration of Constraint Programming, Artificial Intelligence, and Operations Research (CPAIOR)* 2021
- *International Conference on Principles and Practice of Constraint Programming (CP)* 2023
- *International Conference on Tests and Proofs (TAP)* 2022–2023
- *International Conference on Theory and Applications of Satisfiability Testing (SAT)* 2013–2016, 2018–2020, 2023–2024
- *International Joint Conference on Artificial Intelligence (IJCAI)* 2018–2025
- *International Symposium on Theoretical Aspects of Computer Science (STACS)* 2019
- *Symposium on Theory of Computing (STOC)* 2016

Editorial Boards

- *Electronic Colloquium on Computational Complexity (ECCC)*
- *Journal on Artificial Intelligence Research*
- *Journal on Satisfiability, Boolean Modeling and Computation*
- *Theory of Computing*

Scientific Evaluations

- External reviewer for PhD theses of Pierre Montalbano, Université Fédérale de Toulouse, 2023; Tuomas Hakoniemi, UPC, 2021; Romain Wallon, Université d'Artois, 2020; Daniela Kaufmann, JKU Linz, 2020; and Bangsheng Tang, Tsinghua University, 2013
- Chair of examination committee for PhD theses of Jakob Bæk Tejs Houen, University of Copenhagen, 2023; and Maximilian Probst Gutenberg, University of Copenhagen, 2020
- Examination committee member for PhD theses of Jing Yang, Lund University, 2021; Joel Larsson, Umeå University, 2018; and Simon Ståhlberg, Linköping University, 2017
- Member of the Expert Panel on Mathematics, Computer Science, and Informatics of the Estonian Research Council (ETAg), 2022–2023
- External reviewer of research proposals for the Austrian Science Fund (FWF) 2016, Czech Science Foundation (GAČR) 2018, Natural Sciences and Engineering Research Council of Canada (NSERC) 2021, and Swiss National Science Foundation (SNSF) 2016

Community Service

- Mentor for the Swedish Youth National Research Team, 2020
- Member of Swedish jury for the Research Science Institute program for high school students, 2019

Commissions of Trust

2018–2023	Member of the Young Academy of Sweden
2020–2023	Member of the board of the Young Academy of Sweden
2004–2007	President of the PhD Students' Council and PhD student representative in the Board and the Executive Group at the School of Computer Science and Communication, KTH

Awards and Honours

2022	Best paper award at the *25th International Conference on Theory and Applications of Satisfiability Testing (SAT '22)*
2022	Distinguished paper award at the *36th AAAI Conference on Artificial Intelligence (AAAI '22)*
2009	*Ackermann Award* for "outstanding dissertation in Logic in Computer Science" from the European Association for Computer Science Logic
2006	Best student paper award at the *38th ACM Symposium on Theory of Computing (STOC '06)*
2006	The 2006 Meritorious Achievement Award at the School of Computer Science and Communication, KTH

Awards and Honours for PhD Students

2024	*SAT Association Fahiem Bacchus PhD Award in Satisfiability* runner-up for Stephan Gocht
2023	*Wallenberg Academy Fellowship* (for promising young researchers) to Susanna de Rezende
2023	*Association for Constraint Programming Doctoral Research Award* to Stephan Gocht
2019	*Stockholm Mathematics Centre Excellent PhD Thesis Award* to Susanna de Rezende

Grants

2024–2029	Academic Doctoral Student Grant from the Wallenberg AI, Autonomous Systems and Software Program (WASP) [ca 400 k€]
2023–2028	Academic Doctoral Student Grant from WASP [ca 400 k€]
2021–2026	Academic Doctoral Student Grant from WASP [ca 400 k€]
2020–2026	Research project 2 grant from the Independent Research Fund Denmark [ca 831 k€]
2017–2022	Consolidator Grant from the Swedish Research Council [ca 1.17 M€]
2017–2022	Grant for Research Projects with High Scientific Potential from the Knut and Alice Wallenberg (KAW) Foundation (co-PI) [ca 3.13 M€]
2017–2020	Postdoctoral Scholarship Program in Mathematics Grant from KAW [ca 170 k€]
2013–2018	Breakthrough Research Grant from the Swedish Research Council [ca 388 k€]
2012–2018	Starting Independent Researcher Grant from the European Research Council [1.46 M€]
2011–2014	Junior Researcher Position from the Swedish Research Council [ca 416 k€]

Selected Invited Presentations (Plenary Talks, Lectures, Tutorials, Etc.)

Jul 2024	*25th International Symposium on Mathematical Programming*, Montreal, Canada
Jun 2024	*International SAT/SMT/AR Summer School*, Nancy, France
Dec 2023	*Complexity Days*, Paris, France
Aug 2023	*32nd International Joint Conference on Artificial Intelligence (IJCAI)*, Macau, China
Mar 2023	*North American Annual Meeting of the Association for Symbolic Logic*, Irvine, USA
Dec 2022	*Indian SAT+SMT Winter School*, Chennai, India
Aug 2022	*28th Conference on Principles and Practice of Constraint Programming (CP '22)*, Haifa, Israel

Feb 2021	Boot Camp for the *Satisfiability: Theory, Practice, and Beyond* program, Simons Institute for the Theory of Computing, Berkeley, USA *[virtual presentation]*
Dec 2018	*Algebraic Methods*, Simons Institute for the Theory of Computing, Berkeley, USA
Jun 2016	*International SAT/SMT/AR Summer School*, Lisbon, Portugal
May 2016	Proof complexity workshop during the *Special Semester Program on Computational and Proof Complexity*, St. Petersburg State University, Russia
Apr 2016	*Workshop on Algorithms in Communication Complexity, Property Testing and Combinatorics*, Skolkovo Institute of Science and Technology, Moscow, Russia
Apr 2016	*Workshop on Theoretical Computer Science*, National Research University Higher School of Economics, Moscow, Russia
Feb 2016	*Semidefinite and Matrix Methods for Optimization and Communication*, Institute for Mathematical Sciences, Singapore
Jul 2014	*17th Conference on Theory and Applications of Satisfiability Testing (SAT '14)*, Vienna, Austria
May 2013	*1st Symposium on Structure in Hard Combinatorial Problems*, Vienna Center for Logic and Algorithms, Austria
Feb–Mar 2012	*Estonian Winter School in Computer Science (EWSCS '12)*, Palmse, Estonia
Jun 2011	*Complexity and Finite Models (CMF '11)*, Paris, France
Jul 2010	*International Workshop on Tractability*, Microsoft Research, Cambridge, UK
Sep 2009	*18th EACSL Conference on Computer Science Logic (CSL '09)*, Coimbra, Portugal
Sep 2007	*Fall School of Logic and Complexity*, Třešť, Czech Republic

Peer-Reviewed Conference Publications

In computer science, the most important publication venues are conferences and not journals.

1. Simon Dold, Malte Helmert, Jakob Nordström, Gabriele Röger, and Tanja Schindler. **Pseudo-Boolean Proof Logging for Optimal Classical Planning.** To appear in *Proceedings of the 35th International Conference on Automated Planning and Scheduling (ICAPS '25),* November 2025.
2. Susanna F. de Rezende, Noah Fleming, Duri Andrea Janett, Jakob Nordström, and Shuo Pang. **Truly Supercritical Trade-offs for Resolution, Cutting Planes, Monotone Circuits, and Weisfeiler–Leman.** To appear in *Proceedings of the 57th Annual ACM Symposium on Theory of Computing (STOC '25),* June 2025.
3. Jeremias Berg, Bart Bogaerts, Jakob Nordström, Andy Oertel, Tobias Paxian, and Dieter Vandesande. **Certifying Without Loss of Generality Reasoning in Solution-Improving Maximum Satisfiability.** In *Proceedings of the 30th International Conference on Principles and Practice of Constraint Programming (CP '24),* pages 4:1–4:28, September 2024.
4. Emir Demirović, Ciaran McCreesh, Matthew McIlree, Jakob Nordström, Andy Oertel, and Konstantin Sidorov. **Pseudo-Boolean Reasoning About States and Transitions to Certify Dynamic Programming and Decision Diagram Algorithms.** In *Proceedings of the 30th International Conference on Principles and Practice of Constraint Programming (CP '24),* pages 9:1–9:21, September 2024.
5. Hannes Ihalainen, Andy Oertel, Yong Kiam Tan, Jeremias Berg, Matti Järvisalo, Magnus O. Myreen, and Jakob Nordström. **Certified MaxSAT Preprocessing.** In *Proceedings of the 12th International Joint Conference on Automated Reasoning (IJCAR '24),* pages 396–418, July 2024.
6. Alexander Hoen, Andy Oertel, Ambros Gleixner, and Jakob Nordström. **Certifying MIP-based Presolve Reductions for 0-1 Integer Linear Programs.** In *Proceedings of the 21st International Conference on the Integration of Constraint Programming, Artificial Intelligence, and Operations Research (CPAIOR '24),* pages 310–328, May 2024.
7. Matthew McIlree, Ciaran McCreesh, and Jakob Nordström. **Proof Logging for the Circuit Constraint.** In *Proceedings of the 21st International Conference on the Integration of Constraint Programming, Artificial Intelligence, and Operations Research (CPAIOR '24),* pages 38–55, May 2024.
8. Stephan Gocht, Ciaran McCreesh, Magnus O. Myreen, Jakob Nordström, Andy Oertel, and Yong Kiam Tan. **End-to-End Verification for Subgraph Solving.** In *Proceedings of the 38th AAAI Conference on Artificial Intelligence (AAAI '24),* pages 8038–8047, February 2024.
9. Jonas Conneryd, Susanna F. de Rezende, Jakob Nordström, Shuo Pang, and Kilian Risse. **Graph Colouring Is Hard on Average for Polynomial Calculus and Nullstellensatz.** In *Proceedings of the 64th Annual*

IEEE Symposium on Foundations of Computer Science (FOCS '23), pages 1–11, November 2023.

10. Gioni Mexi, Timo Berthold, Ambros Gleixner, and Jakob Nordström. **Improving Conflict Analysis in MIP Solvers by Pseudo-Boolean Reasoning.** In *Proceedings of the 29th International Conference on Principles and Practice of Constraint Programming (CP '23),* pages 27:1–27:19, September 2023.
11. Jeremias Berg, Bart Bogaerts, Jakob Nordström, Andy Oertel, and Dieter Vandesande. **Certified Core-Guided MaxSAT Solving.** In *Proceedings of the 29th International Conference on Automated Deduction (CADE-29),* pages 1–22, July 2023.
12. Stephan Gocht, Ciaran McCreesh, and Jakob Nordström. **An Auditable Constraint Programming Solver.** In *Proceedings of the 28th International Conference on Principles and Practice of Constraint Programming (CP '22),* pages 25:1–25:18, August 2022.
13. Stephan Gocht, Ruben Martins, Jakob Nordström, and Andy Oertel. **Certified CNF Translations for Pseudo-Boolean Solving.** In *Proceedings of the 25th International Conference on Theory and Applications of Satisfiability Testing (SAT '22),* pages 16:1–16:25, August 2022. *SAT '22 best paper award.*
14. Daniela Kaufmann, Paul Beame, Armin Biere and Jakob Nordström. **Adding Dual Variables to Algebraic Reasoning for Gate-Level Multiplier Verification.** In *Proceedings of the 25th Design, Automation and Test in Europe Conference (DATE '22),* pages 1435–1440, March 2022.
15. Bart Bogaerts, Stephan Gocht, Ciaran McCreesh, and Jakob Nordström. **Certified Symmetry and Dominance Breaking for Combinatorial Optimisation.** In *Proceedings of the 36th AAAI Conference on Artificial Intelligence (AAAI '22),* pages 3698–3707, February 2022. *AAAI '22 distinguished paper award.*
16. 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),* pages 40:1–40:24, July 2021.
17. 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.
18. Jo Devriendt, Stephan Gocht, Emir Demirović, Jakob Nordström, and Peter Stuckey. **Cutting to the Core of Pseudo-Boolean Optimization: Combining Core-Guided Search with Cutting Planes Reasoning.** In *Proceedings of the 35th AAAI Conference on Artificial Intelligence (AAAI '21),* pages 3750–3758, February 2021.
19. Stephan Gocht and Jakob Nordström. **Certifying Parity Reasoning Efficiently Using Pseudo-Boolean Proofs.** In *Proceedings of the 35th AAAI Conference on Artificial Intelligence (AAAI '21),* pages 3768–3777, February 2021.
20. 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.
21. 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.
22. Stephan Gocht, Ross McBride, Ciaran McCreesh, Jakob Nordström, Patrick Prosser, and James Trimble. **Certifying Solvers for Clique and Maximum Common (Connected) Subgraph Problems.** In *Proceedings of the 26th International Conference on Principles and Practice of Constraint Programming (CP '20),* pages 338–357, September 2020.
23. Janne I. Kokkala and Jakob Nordström. **Using Resolution Proofs to Analyse CDCL Solvers.** In *Proceedings of the 26th International Conference on Principles and Practice of Constraint Programming (CP '20),* pages 427–444, September 2020.
24. Buser Say, Jo Devriendt, Jakob Nordström, and Peter Stuckey. **Theoretical and Experimental Results for Planning with Learned Binarized Neural Network Transition Models.** In *Proceedings of the 26th International Conference on Principles and Practice of Constraint Programming (CP '20),* pages 917–934, September 2020.
25. Vincent Liew, Paul Beame, Jo Devriendt, Jan Elffers, and Jakob Nordström. **Verifying Properties of Bit-vector Multiplication Using Cutting Planes Reasoning.** In *Proceedings of the 20th Conference on Formal Methods in Computer-Aided Design (FMCAD '20),* pages 194–204, September 2020.

26. Jo Devriendt, Ambros Gleixner, and Jakob Nordström. **Learn to Relax: Integrating 0-1 Integer Linear Programming with Conflict-Driven Pseudo-Boolean Search.** In *Proceedings of the 17th International Conference on the Integration of Constraint Programming, Artificial Intelligence, and Operations Research (CPAIOR '20),* pages xxiv–xxv, September 2020.
27. Susanna F. de Rezende, Jakob Nordström, Kilian Risse, and Dmitry Sokolov. **Exponential Resolution Lower Bounds for Weak Pigeonhole Principle and Perfect Matching Formulas over Sparse Graphs.** In *Proceedings of the 35th Annual Computational Complexity Conference (CCC '20),* pages 28:1–28:24, July 2020.
28. Marc Vinyals, Jan Elffers, Jan Johannsen, and Jakob Nordström. **Simplified and Improved Separations Between Regular and General Resolution by Lifting.** In *Proceedings of the 23rd International Conference on Theory and Applications of Satisfiability Testing (SAT '20),* pages 182–200, July 2020.
29. Stephan Gocht, Ciaran McCreesh, and Jakob Nordström. **Subgraph Isomorphism Meets Cutting Planes: Solving with Certified Solutions.** In *Proceedings of the 29th International Joint Conference on Artificial Intelligence (IJCAI '20),* pages 1134–1140, July 2020.
30. Jan Elffers, Stephan Gocht, Ciaran McCreesh, and Jakob Nordström. **Justifying All Differences Using Pseudo-Boolean Reasoning.** In *Proceedings of the 34th AAAI Conference on Artificial Intelligence (AAAI '20),* pages 1486–1494, February 2020.
31. Jan Elffers and Jakob Nordström. **A Cardinal Improvement to Pseudo-Boolean Solving.** In *Proceedings of the 34th AAAI Conference on Artificial Intelligence (AAAI '20),* pages 1495–1503, February 2020.
32. Guillaume Lagarde, Jakob Nordström, Dmitry Sokolov, and Joseph Swernofsky. **Trade-offs Between Size and Degree in Polynomial Calculus.** In *Proceedings of the 11th Innovations in Theoretical Computer Science Conference (ITCS '20),* pages 72:1–72:16, January 2020.
33. Stephan Gocht, Jakob Nordström, and Amir Yehudayoff. **On Division Versus Saturation in Pseudo-Boolean Solving.** In *Proceedings of the 28th International Joint Conference on Artificial Intelligence (IJCAI '19),* pages 1711–1718, August 2019.
34. Susanna F. de Rezende, Or Meir, Jakob Nordström, and Robert Robere. **Nullstellensatz Size-Degree Trade-offs from Reversible Pebbling.** In *Proceedings of the 34th Annual Computational Complexity Conference (CCC '19),* pages 18:1–18:16, July 2019.
35. Jan Elffers and Jakob Nordström. **Divide and Conquer: Towards Faster Pseudo-Boolean Solving.** In *Proceedings of the 27th International Joint Conference on Artificial Intelligence (IJCAI '18),* pages 1291–1299, July 2018.
36. Jan Elffers, Jesús Giráldez-Cru, Stephan Gocht, Jakob Nordström, and Laurent Simon. **Seeking Practical CDCL Insights from Theoretical SAT Benchmarks.** In *Proceedings of the 27th International Joint Conference on Artificial Intelligence (IJCAI '18),* pages 1300–1308, July 2018.
37. Jan Elffers, Jesús Giráldez-Cru, Jakob Nordström, and Marc Vinyals. **Using Combinatorial Benchmarks to Probe the Reasoning Power of Pseudo-Boolean Solvers.** In *Proceedings of the 21st International Conference on Theory and Applications of Satisfiability Testing (SAT '18),* pages 75–93, July 2018.
38. Marc Vinyals, Jan Elffers, Jesús Giráldez-Cru, Stephan Gocht, and Jakob Nordström. **In Between Resolution and Cutting Planes: A Study of Proof Systems for Pseudo-Boolean SAT Solving.** In *Proceedings of the 21st International Conference on Theory and Applications of Satisfiability Testing (SAT '18),* pages 292–310, July 2018.
39. Albert Atserias, Ilario Bonacina, Susanna F. de Rezende, Massimo Lauria, Jakob Nordström, and Alexander Razborov. **Clique Is Hard on Average for Regular Resolution.** In *Proceedings of the 50th Annual ACM Symposium on Theory of Computing (STOC '18),* pages 866–877, June 2018.
40. Massimo Lauria, Jan Elffers, Jakob Nordström, and Marc Vinyals. **CNFgen: A Generator of Crafted CNF formulas.** In *Proceedings of the 20th International Conference on Theory and Applications of Satisfiability Testing (SAT '17),* pages 464–473, August 2017.
41. Massimo Lauria and Jakob Nordström. **Graph Colouring is Hard for Algorithms Based on Hilbert's Nullstellensatz and Gröbner Bases.** In *Proceedings of the 32nd Annual Computational Complexity Conference (CCC '17),* pages 2:1–2:20, July 2017.
42. 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),* pages 38:1–38:21, January 2017.

43. 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.
44. Christoph Berkholz and Jakob Nordström. **Supercritical Space-Width Trade-offs for Resolution.** In *Proceedings of the 43rd International Colloquium on Automata, Languages and Programming (ICALP '16),* pages 57:1–57:14, July 2016.
45. Jan Elffers, Jan Johannsen, Massimo Lauria, Thomas Magnard, Jakob Nordström, and Marc Vinyals. **Trade-offs Between Time and Memory in a Tighter Model of CDCL SAT Solvers.** In *Proceedings of the 19th International Conference on Theory and Applications of Satisfiability Testing (SAT '16),* pages 160–176, July 2016.
46. Christoph Berkholz and Jakob Nordström. **Near-Optimal Lower Bounds on Quantifier Depth and Weisfeiler-Leman Refinement Steps.** In *Proceedings of the 31st Annual ACM/IEEE Symposium on Logic in Computer Science (LICS '16),* pages 267–276, July 2016.
47. Siu Man Chan, Massimo Lauria, Jakob Nordström, and Marc Vinyals. **Hardness of Approximation in *PSPACE* and Separation Results for Pebble Games (Extended Abstract).** In *Proceedings of the 56th Annual IEEE Symposium on Foundations of Computer Science (FOCS '15),* pages 466–485, October 2015.
48. Massimo Lauria and Jakob Nordström. **Tight Size-Degree Bounds for Sums-of-Squares Proofs.** In *Proceedings of the 30th Annual Computational Complexity Conference (CCC '15),* pages 448–466, June 2015.
49. Mladen Mikša and Jakob Nordström. **A Generalized Method for Proving Polynomial Calculus Degree Lower Bounds.** In *Proceedings of the 30th Annual Computational Complexity Conference (CCC '15),* pages 467–487, June 2015.
50. Mladen Mikša and Jakob Nordström. **Long Proofs of (Seemingly) Simple Formulas.** In *Proceedings of the 17th International Conference on Theory and Applications of Satisfiability Testing (SAT '14),* pages 121–137, July 2014.
51. Albert Atserias, Massimo Lauria, and Jakob Nordström. **Narrow Proofs May Be Maximally Long.** In *Proceedings of the 29th Annual IEEE Conference on Computational Complexity (CCC '14),* pages 286–297, June 2014.
52. Yuval Filmus, Massimo Lauria, Mladen Mikša, Jakob Nordström, and Marc Vinyals. **From Small Space to Small Width in Resolution.** In *Proceedings of the 31st Symposium on Theoretical Aspects of Computer Science (STACS '14),* pages 300–311, March 2014.
53. Yuval Filmus, Massimo Lauria, Mladen Mikša, Jakob Nordström, and Marc Vinyals. **Towards an Understanding of Polynomial Calculus: New Separations and Lower Bounds (Extended Abstract).** In *Proceedings of the 40th International Colloquium on Automata, Languages and Programming (ICALP '13),* pages 437–448, July 2013.
54. Chris Beck, Jakob Nordström, and Bangsheng Tang. **Some Trade-off Results for Polynomial Calculus (Extended Abstract).** In *Proceedings of the 45th Annual ACM Symposium on Theory of Computing (STOC '13),* pages 813–822, June 2013.
55. Matti Järvisalo, Arie Matsliah, Jakob Nordström, and Stanislav Živný. **Relating Proof Complexity Measures and Practical Hardness of SAT.** In *Proceedings of the 18th International Conference on Principles and Practice of Constraint Programming (CP '12),* pages 316–331, October 2012.
56. Yuval Filmus, Massimo Lauria, Jakob Nordström, Neil Thapen, and Noga Ron-Zewi. **Space Complexity in Polynomial Calculus (Extended Abstract).** In *Proceedings of the 27th Annual IEEE Conference on Computational Complexity (CCC '12),* pages 334–344, June 2012.
57. Trinh Huynh and Jakob Nordström. **On the Virtue of Succinct Proofs: Amplifying Communication Complexity Hardness to Time-Space Trade-offs in Proof Complexity (Extended Abstract).** In *Proceedings of the 44th Annual ACM Symposium on Theory of Computing (STOC '12),* pages 233–248, May 2012.
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60. Jakob Nordström. **On the Relative Strength of Pebbling and Resolution (Extended Abstract).** In

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62. Jakob Nordström and Johan Håstad. **Towards an Optimal Separation of Space and Length in Resolution (Extended Abstract).** In *Proceedings of the 40th Annual ACM Symposium on Theory of Computing (STOC '08),* pages 701–710, May 2008.
63. Jakob Nordström. **Narrow Proofs May Be Spacious: Separating Space and Width in Resolution (Extended Abstract).** In *Proceedings of the 38th Annual ACM Symposium on Theory of Computing (STOC '06),* pages 507—-516, May 2006. *STOC '06 best student paper award.*

Journal Publications

1. Stephan Gocht, Ruben Martins, Jakob Nordström, and Andy Oertel. **Certified CNF Translations for Pseudo-Boolean Solving.** To appear in *Journal of Artificial Intelligence Research*, 2025. (Invited from *SAT '22*.)
2. Stephan Gocht and Jakob Nordström. **Certifying Parity Reasoning Efficiently Using Pseudo-Boolean Proofs.** To appear in *Journal of Artificial Intelligence Research*, 2025.
3. Susanna F. de Rezende, Jakob Nordström, Kilian Risse, and Dmitry Sokolov. **Exponential Resolution Lower Bounds for Weak Pigeonhole Principle and Perfect Matching Formulas over Sparse Graphs.** *TheoretiCS*, volume 4, article 9, pages 1–46, March 2025.
4. Mladen Mikša and Jakob Nordström. **A Generalized Method for Proving Polynomial Calculus Degree Lower Bounds.** *Journal of the ACM*, volume 71, issue 6, article 37, pages 1–43, November 2024.
5. Susanna F. de Rezende, Or Meir, Jakob Nordström, Toniann Pitassi, and Robert Robere. **KRW Composition Theorems via Lifting.** *Computational Complexity*, volume 33, article 4, pages 1–97, April 2024.
6. Christoph Berkholz and Jakob Nordström. **Near-Optimal Lower Bounds on Quantifier Depth and Weisfeiler-Leman Refinement Steps.** *Journal of the ACM*, volume 70, issue 5, article 32, pages 1–32, October 2023.
7. Bart Bogaerts, Stephan Gocht, Ciaran McCreesh, and Jakob Nordström. **Certified Symmetry and Dominance Breaking for Combinatorial Optimisation.** *Journal of Artificial Intelligence Research*, volume 77, pages 1539–1589, August 2023. (Invited from *AAAI '22*.)
8. Albert Atserias, Ilario Bonacina, Susanna F. de Rezende, Massimo Lauria, Jakob Nordström, and Alexander Razborov. **Clique Is Hard on Average for Regular Resolution.** *Journal of the ACM*, volume 68, issue 4, article 23, pages 1–26, August 2021.
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10. Jo Devriendt, Ambros Gleixner, and Jakob Nordström. **Learn to Relax: Integrating 0-1 Integer Linear Programming with Conflict-Driven Pseudo-Boolean Search.** *Constraints*, volume 26, issue 1–4, pages 26–55, October 2021. (Special issue for *CPAIOR '20*.)
11. Christoph Berkholz and Jakob Nordström. **Supercritical Space-Width Trade-offs for Resolution.** *SIAM Journal on Computing*, volume 49, issue 1, pages 98–118, February 2020.
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15. Yuval Filmus, Massimo Lauria, Mladen Mikša, Jakob Nordström, and Marc Vinyals. **From Small Space to Small Width in Resolution.** *ACM Transactions on Computational Logic*, volume 16, issue 4, article 28, pages 1–15, July 2015.
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18. Jakob Nordström. **A Simplified Way of Proving Trade-off Results for Resolution.** *Information Processing Letters*, volume 109, issue 18, pages 1030–1035, August 2009.
19. Jakob Nordström. **Narrow Proofs May Be Spacious: Separating Space and Width in Resolution.** *SIAM Journal on Computing*, volume 39, issue 1, pages 59–121, May 2009. (Special issue for *STOC '06*.)

Survey Articles/Chapters

1. Sam Buss and Jakob Nordström. **Proof Complexity and SAT Solving.** In Armin Biere, Marijn Heule, Hans van Maaren, and Toby Walsh (editors), *Handbook of Satisfiability, 2nd edition*, chapter 7, pages 233–350. IOS Press, 2021.
2. Jakob Nordström. **On the Interplay Between Proof Complexity and SAT Solving.** *ACM SIGLOG News*, volume 2, issue 3, pages 19–44, July 2015.
3. Jakob Nordström. **A (Biased) Proof Complexity Survey for SAT Practitioners.** In *Proceedings of the 17th International Conference on Theory and Applications of Satisfiability Testing (SAT '14),* pages 1–6, July 2014.
4. Jakob Nordström. **Pebble Games, Proof Complexity, and Time-Space Trade-offs.** *Logical Methods in Computer Science*, volume 9, issue 3, article 15, pages 1–63, September 2013.

Other Papers and Manuscripts

1. Jakob Nordström. **New Wine into Old Wineskins: A Survey of Some Pebbling Classics with Supplemental Results.** To appear in *Foundations and Trends in Theoretical Computer Science*. Manuscript in preparation, 2025.
2. Gioni Mexi, Felipe Serrano, Timo Berthold, Ambros Gleixner, and Jakob Nordström. **Cut-based Conflict Analysis in Mixed Integer Programming.** Technical Report 2410.15110, *arXiv.org,* October 2024.
3. Stephan Gocht, Ruben Martins, Jakob Nordström, and Andy Oertel. **Certified CNF Translations for Pseudo-Boolean Solving (Extended Abstract).** Best Papers from Sister Conferences Track in the *Proceedings of the 32nd International Joint Conference on Artificial Intelligence (IJCAI '23),* pages 6436–6441, August 2023.
4. Stephan Gocht, Ciaran McCreesh and Jakob Nordström. **VeriPB: The Easy Way to Make Your Combinatorial Search Algorithm Trustworthy.** Presented at *From Constraint Programming to Trustworthy AI*, workshop affiliated with the *26th International Conference on Principles and Practice of Constraint Programming (CP '20)*, September 2020. Paper available at `www.jakobnordstrom.se/docs/publications/VeriPB_CPTAI2020.pdf`.
5. Arnab Bhattacharyya, Elena Grigorescu, Jakob Nordström, and Ning Xie. **On the Semantics of Local Characterizations for Linear-Invariant Properties.** Manuscript, 2011.

Other Experience

1998–2011	Interpreter and translator between Russian and Swedish/English. Engaged as interpreter for among others HM the King of Sweden, the Prime Minister, and the Speaker of the Swedish Parliament
2002–2005	President of the Swedish Association of Military Interpreters
2001–2002	Secretary of the Swedish Association of Military Interpreters
1994–1999	Artistic director of the vocal ensemble Collegium Vocale Stockholm
1997/98	Compulsory national service as military interpreter at the Swedish Armed Forces Language Institute. Graduated as the best student of the 1998 class