

Curriculum Vitae

Prof. Dr. rer. nat. habil. Markus Lohrey

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personal webpage

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ORCID

1. Education

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|-------------|--|
| 1989 – 1990 | Prediploma in Computer Science at Georg-Simon-Ohm University for applied sciences, Nürnberg, Germany |
| 1991 – 1996 | Diploma in Computer Science at Friedrich-Alexander University of Erlangen-Nürnberg, Germany |
| July 1999 | Ph.D. (Dr. rer. nat.) in Computer Science from the University of Stuttgart, Germany
Thesis title: On the confluence problem for trace rewriting systems
Thesis advisor: Prof. Dr. Volker Diekert |
| June 2003 | Habilitation in Computer Science from the University of Stuttgart, Germany
Thesis title: Computational aspects of infinite monoids |

2. Academic Employments

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| 01/1997 – 11/1997 | Ph.D. scholarship in the postgraduate program <i>Specification of Discrete Processes and Systems of Processes by Operational Models and Logics</i> at Dresden University of Technology, Germany |
| 12/1997 – 04/2000 | Research associate (German BAT IIa) at the Computer Science Department (Theoretical Computer Science) at University of Stuttgart, Germany |
| 05/2000 – 03/2004 | Assistant lecturer (German C 1) at the Computer Science Department (Theoretical Computer Science) at University of Stuttgart, Germany |
| 04/2004 – 09/2004 | Temporary professorship at the chair for <i>Algorithms and Complexity</i> at RWTH Aachen, Germany |

10/2004 – 09/2005	University lecturer (German C 2) at the Computer Science Department
10/2006 – 03/2007	(Theoretical Computer Science) at University of Stuttgart, Germany
10/2005 – 09/2006	Temporary professorship at the chair for <i>Data Structures and Efficient Algorithms</i> at Martin-Luther-University of Halle-Wittenberg, Germany
04/2007 – 08/2013	Full professor (W2) at the Computer Science Department (Algebraic and Logical Foundations of Computer Science) at University of Leipzig, Germany
since 09/2013	Full professor (W3) for <i>Theoretical Computer Science</i> at the Department for Electrical Engineering and Computer Science at University of Siegen, Germany

3. Long term visits

07/2001 – 04/2002	Post-doc researcher at Laboratoire d'Informatique Algorithmique: Fondements et Applications (LIAFA, University Paris 7, France) and Institut de Recherche en Informatique et Systèmes Aléatoires (IRISA, University Rennes 1, France)
03/2005	Invited professor at Laboratoire d'Informatique Algorithmique: Fondements et Applications (LIAFA, University Paris 7, France)
03/2008	Invited professor at Laboratoire Bordelais de Recherche en Informatique (LABRI, University Bordeaux 1, France)

4. Research Interests

Decidability and complexity of problems in automata theory and algebra

Combinatorial group theory (decidability and complexity of algorithmic problems for infinite groups, word problems, solving equations in groups)

Data compression (grammar-based compression, algorithms for compressed data, compression of large tree structures)

Logic in computer science (decidability and complexity of logical theories, model-checking of finite and infinite structures, automatic structures, temporal logics, verification of stochastic systems)

Streaming algorithms

Enumeration algorithms in database theory

5. Publications

Books and book chapters

1. The Compressed Word Problem for Groups, *SpringerBriefs in Mathematics*, 2014.
2. Complexity and Randomness in Group Theory (with Frédérique Bassino, Ilya Kapovich, Alexei Miasnikov, Cyril Nicaud, Andrey Nikolaev, Igor Rivin, Vladimir Shpilrain, Alexander Ushakov and Pascal Weil, *De Gruyter*, 2020
3. Parallel complexity in group theory (in Languages and Automata, GAGTA Book 3, edited by Benjamin Steinberg) *De Gruyter*, 2024

Fully refereed papers in international journals

1. Streaming word problems (with Lukas Lück and Julio Xochitemol), *Information and Computation*, Volume 312, 2026
2. MSO-enumeration over SLP-compressed unranked forests (with Markus Schmid), *TheoretiCS*, Volume 5, 2026
3. Parameterized complexity of factorization problems (with Andreas Rosowski), *Discrete Mathematics and Theoretical Computer Science*, Volume 27:3, 2025
4. Membership problems in finite groups (with Andreas Rosowski and Georg Zetsche), *Journal of Algebra* 675, pp. 23–58, 2025
5. Regular languages in the sliding window model (with Moses Ganardi, Danny Hucce, Konstantinos Mamouras and Tatiana Starikovskaya), *TheoretiCS*, Volume 4, 2025
6. Compressed decision problems in hyperbolic groups (with Derek Holt and Saul Schleimer), *Groups, Geometry, and Dynamics*, 18(4), pp. 1233–1273, 2024
7. The power word problem in graph products (with Florian Stober and Armin Weiß), *Theory of Computing Systems*, 2024 (special issue for DLT 2022)
8. Knapsack and the power word problem in solvable Baumslag-Solitar groups (with Moses Ganardi and Georg Zetsche), *International Journal of Algebra and Computation* 33(3), pp. 617–639, 2023
9. Subgroup membership in $GL(2, \mathbb{Z})$, *Theory of Computing Systems* 68, pp. 1082–1107, 2023 (special issue for STACS 2021)
10. Complexity of word problems for HNN-extensions, *Journal of Computer and System Sciences* 135, pp. 145–157, 2023 (special issue for FCT 2021)
11. Exponent equations in HNN-extensions (with Michael Figelius), *Journal of Groups, Complexity, Cryptology*, 14(2), 2022
12. Groups with ALOGTIME-hard word problems and PSPACE-complete compressed word problems (with Laurent Bartholdi, Michael Figelius and Armin Weiß), *ACM Transactions on Computation Theory* 14(3-4), 2023
13. Entropy bounds for grammar-based tree compressors (with Danny Hucce and Louisa Seelbach), *IEEE Transactions on Information Theory* 67(11), pp. 7596–7615, 2021

14. Closure properties of knapsack semilinear groups (with Michael Figelius and Georg Zetsche), *Journal of Algebra* 589(1), pp. 437–482, 2022
15. Balancing straight-line programs (with Moses Ganardi and Artur Jež), *Journal of the ACM* 68(4), Article No. 27, 2021
16. The smallest grammar problem revisited (with Hideo Bannai, Momoko Hirayama, Danny Hucke, Shunsuke Inenaga, Artur Jež and Carl Philipp Reh), *IEEE Transactions on Information Theory* 67(1), pp. 317–328, 2020
17. Largest common prefix of a regular tree language (with Sebastian Maneth), *Journal of Computer and System Sciences* 115, pp. 235–245, 2020 (special issue for FCT 2019)
18. Derandomization for sliding window algorithms with strict correctness (with Moses Ganardi and Danny Hucke), *Theory of Computing Systems* 115, pp. 235–245, 2020 (special issue for CSR 2019)
19. Combined compression of multiple correlated data streams for online-diagnosis systems (with Simon Meckel, Seungbum Jo, Roman Obermaisser and Simon Plasger), *Microprocessors and Microsystems* 77, 2020 (special issue for Euromicro DSD 2019)
20. Grammar-based compression of unranked trees (with Adria Gascon, Sebastian Maneth, Carl Philipp Reh and Kurt Sieber), *Theory of Computing Systems* 61(1), pp. 141–176, 2020 (special issue for CSR 2018)
21. Universal tree source coding using grammar-based compression (with Moses Ganardi, Danny Hucke and Louisa Seelbach), *IEEE Transactions on Information Theory* 65(10), pp. 6399–6413, 2019
22. Knapsack in hyperbolic groups, *Journal of Algebra* 545, pp. 390–415, 2020
23. Size-optimal top dag compression (with Carl Philipp Reh and Kurt Sieber), *Information Processing Letters* 147, pp. 27–31, 2019
24. The complexity of bisimulation and simulation on finite systems (with Moses Ganardi and Stefan Göller), *Logical Methods in Computer Science* 14(4), 2018
25. A universal tree balancing theorem (with Moses Ganardi), *ACM Transactions on Computation Theory* 11(1), Article No. 1, 2018
26. Parallel identity testing for skew circuits with big powers and applications (with Daniel König), *International Journal of Algebra and Computation* 28(6), pp. 979–1004, 2018
27. An architecture for online-diagnosis systems supporting compressed communication (with Seungbum Jo, Damian Ludwig, Simon Meckel, Roman Obermaisser and Simon Plasger), *Microprocessors and Microsystems* 61, pp. 242–256, 2018 (special issue for Euromicro DSD 2017)
28. Circuits and expressions over finite semirings (with Moses Ganardi, Danny Hucke and Daniel König), *ACM Transactions on Computation Theory* 10(4), Article No. 15, 2018
29. Knapsack in graph groups (with Georg Zetsche), *Theory of Computing Systems* 62(1), pp. 192–246, 2018 (special issue for STACS 2016)
30. Path checking for MTL and TPTL over data words (with Shiguang Feng and Karin Quaas), *Logical Methods in Computer Science* 13(3), 2017

31. Evaluation of circuits over nilpotent and polycyclic groups (with Daniel König), *Algorithmica* 80(5), pp. 1459–1492, 2018 (special issue for COCOON 2015)
32. Constant-time tree traversal and subtree equality check for grammar-compressed trees (with Sebastian Maneth and Carl Philipp Reh), *Algorithmica* 80(7), pp. 2082–2105, 2018 (special issue for DCC 2016),
33. Tree compression using string grammars (with Moses Ganardi, Danny Hucce and Eric Nöth), *Algorithmica* 80(3), pp. 885–917, 2018 (special issue for LATIN 2016)
34. Constructing small tree grammars and small circuits for formulas (with Danny Hucce, Artur Jež, Moses Ganardi and Eric Nöth), *Journal of Computer and System Sciences* 86, pp. 136–158, 2017
35. Satisfiability of ECTL* with local tree constraints (with Claudia Carapelle, Shiguang Feng and Alexander Kartzow), *Theory of Computing Systems* 61(2), pp. 689–720, 2017 (special issue for CSR 2015)
36. On Boolean closed full trios and rational Kripke frames (with Dietrich Kuske and Georg Zetsche), *Theory of Computing Systems* 60(3), pp. 438–472, 2017 (special issue for STACS 2013)
37. Processing succinct matrices and vectors (with Manfred Schmidt-Schauß), *Theory of Computing Systems* 61(2), pp. 322–351, 2017 (special issue for CSR 2014)
38. Approximation of smallest linear tree grammars (with Artur Jež), *Information and Computation* 251, pp. 215–251, 2016
39. Satisfiability of ECTL* with constraints (with Claudia Carapelle and Alexander Kartzow), *Journal of Computer and System Sciences* 82(5), pp. 826–855, 2016
40. Knapsack and subset sum problems in nilpotent, polycyclic, and co-context-free groups (with Daniel König and Georg Zetsche), *Contemporary Mathematics* 677 (Algebra and Computer Science), pp. 129–144, 2016
41. XML compression via directed acyclic graphs (with Mireille Bousquet-Mélou, Sebastian Maneth and Eric Nöth), *Theory of Computing Systems* 57(4), pp. 1322–1371, 2015 (special issue for ICDT 2013)
42. Rational subsets of unitriangular groups, *International Journal of Algebra and Computation* 25(1-2), pp. 113–121, 2015
43. Rational subsets and submonoids of wreath products (with Benjamin Steinberg and Georg Zetsche), *Information and Computation* 243, pp. 191–204, 2015 (special issue for ICALP 2013)
44. The complexity of decomposing modal and first-order theories (with Stefan Göller and Jean Christoph Jung), *ACM Transactions on Computational Logic* 16(1), Artikel Nr. 9, 2015
45. The first-order theory of ground tree rewrite graphs (with Stefan Göller), *Logical Methods of Computer Science* 10(1), Artikel Nr. 7, 2014
46. XML tree structure compression using RePair (with Sebastian Maneth and Roy Menicke), *Information Systems* 38(8), pp. 1150–1167, 2013

47. The isomorphism problem on classes of automatic structures with transitive relations (with Dietrich Kuske and Jiamou Liu), *Transactions of the American Mathematical Society* 365, pp. 5103–5151, 2013
48. Tree-automatic well-founded trees (with Martin Huschenbett, Alexander Kartzow and Jiamou Liu), *Logical Methods in Computer Science* 9(2), Artikel Nr. 10, 2013
49. Branching-time model checking of one-counter processes and timed automata (with Stefan Göller), *SIAM Journal on Computing* 42(3), pp. 884–923, 2013
50. Isomorphism of regular trees and words (with Christian Mathissen), *Information and Computation* 224, pp. 71–105, 2013
51. The isomorphism problem for omega-automatic trees (with Dietrich Kuske and Jiamou Liu), *Annals of Pure and Applied Logic* 164(1), pp. 30–48, 2013
52. Algorithmics on SLP-compressed strings: a survey, *Groups Complexity Cryptology* 4(2), pp. 241–299, 2012
53. Logspace computations in Coxeter groups and graph groups (with Volker Diekert and Jonathan Kausch), *Contemporary Mathematics* 582 (*Proceedings of the AMS Special Session on Computational Algebra, Groups, and Applications*), pp. 77–94, 2012
54. Compressed decision problems for graph products of groups and applications to (outer) automorphism groups (with Niko Haubold and Christian Mathissen), *International Journal of Algebra and Computation* 22(8), 2013
55. Parameter reduction and automata evaluation for grammar-compressed trees (with Sebastian Maneth and Manfred Schmidt-Schauß), *Journal of Computer and System Sciences* 78(5), pp. 1651–1669, 2012
56. Model-checking hierarchical structures, *Journal of Computer and System Sciences* 78(2), pp. 461–490, 2012
57. Automatic structures of bounded degree revisited (with Dietrich Kuske), *Journal of Symbolic Logic* 76(4), pp. 1352–1380, 2011
58. Compressed word problems in HNN-extensions and amalgamated products (with Niko Haubold), *Theory of Computing Systems* 49(2), pp. 283–305, 2011
59. Leaf languages and string compression, *Information and Computation* 209(6), pp. 951–965, 2011
60. Tilings and submonoids of metabelian groups (with Benjamin Steinberg), *Theory of Computing Systems* 48(2), pp. 411–427, 2011
61. Fixpoint logics on hierarchical structures (with Stefan Göller), *Theory of Computing Systems* 48(1), pp. 93–131, 2011
62. Compressed membership problems for regular expressions and hierarchical automata, *International Journal of Foundations of Computer Science* 21(5), pp. 817–841, 2010
63. Submonoids and rational subsets of groups with infinitely many ends (with Benjamin Steinberg), *Journal of Algebra* 324(5), pp. 970–983, 2010
64. Some natural decision problems in automatic graphs (with Dietrich Kuske), *Journal of Symbolic Logic* 75(2), pp. 678–710, 2010

65. An automata theoretic approach to the generalized word problem in graphs of groups (with Benjamin Steinberg), *Proceedings of the AMS* 138, S. 445–453, 2010
66. PDL with intersection and converse: satisfiability and infinite-state model checking (with Stefan Göller and Carsten Lutz), *Journal of Symbolic Logic* 74(1), pp. 279–314, 2009
67. Partially commutative inverse monoids (with Volker Diekert and Alexander Miller), *Semigroup Forum* 77(2), pp. 196–226, 2008
68. The submonoid and rational subset membership problems for graph groups (with Benjamin Steinberg), *Journal of Algebra* 320(2), pp. 728–755, 2008
69. Word equations over graph products (with Volker Diekert), *International Journal of Algebra and Computation* 18(3), pp. 493–533, 2008
70. Algorithmic problems on inverse monoids over virtually-free groups (with Volker Diekert and Nicole Ondrusch), *International Journal of Algebra and Computation* 18(1), pp. 181–208, 2008
71. Rational subsets in HNN-extensions and amalgamated free products (with Géraud Sénizergues), *International Journal of Algebra and Computation* 18(1), pp. 111–163, 2008
72. First-order and counting theories of ω -automatic structures (with Dietrich Kuske), *Journal of Symbolic Logic* 73, pp. 129–150, 2008
73. Efficient memory representation of XML document trees (with Giorgio Busatto und Sebastian Maneth), *Information Systems* 33(4–5), pp. 456–474, 2008
74. Inverse monoids: decidability and complexity of algebraic questions (with Nicole Ondrusch), *Information and Computation* 205(8), pp. 1212–1234, 2007
75. When is a graph product of groups virtually-free? (with Géraud Sénizergues), *Communications in Algebra* 35(2), pp. 617–621, 2007
76. The complexity of tree automata and XPath on grammar-compressed trees (with Sebastian Maneth), *Theoretical Computer Science* 363(2), pp. 196–210, 2006
77. Logical aspects of Cayley-graphs: the monoid case (with Dietrich Kuske), *International Journal of Algebra and Computation* 16(2), pp. 307–340, 2006
78. Word problems and membership problems on compressed words, *SIAM Journal on Computing* 35(5), pp. 1210–1240, 2006
79. Axiomatising divergence (with Pedro D’Argenio and Holger Hermanns), *Information and Computation* 203(2), pp. 115–144, 2005
80. Decidability and complexity in automatic monoids, *International Journal of Foundations of Computer Science* 16(4), pp. 707–722, 2005
81. Complexity results for prefix grammars (with Holger Petersen), *R.A.I.R.O. — Informatique Théorique et Applications* 39, pp. 391–401, 2005
82. Decidable first-order theories of one-step rewriting in trace monoids (with Dietrich Kuske), *Theory of Computing Systems* 38(1), pp. 39–81, 2005
83. Logical aspects of Cayley-graphs: the group case (with Dietrich Kuske), *Annals of Pure and Applied Logic* 131(1–3), pp. 263–286, 2005

84. Bounded MSC communication (with Anca Muscholl), *Information and Computation* 189(2), pp. 160–181, 2004
85. Existential and positive theories of equations in graph products (with Volker Diekert), *Theory of Computing Systems* 37(1), pp. 133–156, 2003
86. Realizability of high-level message sequence charts: closing the gaps, *Theoretical Computer Science* 309(1–3), pp. 529–554, 2003
87. A note on the existential theory of equations in plain groups (with Volker Diekert), *International Journal of Algebra and Computation* 12, pp. 1–7, 2002
88. Confluence problems for trace rewriting, *Information and Computation* 170, pp. 1–25, 2001
89. NP-completeness results concerning the transformation of logic programs into attribute grammars, *Acta Cybernetica* 13, pp. 209–224, 1998

Fully refereed conference papers

1. Ranked MSO-enumeration over compressed words, to appear in *Proceedings of PODS 2027*
2. Distinguishing elements in semigroups (with Alexander Thumm and Julio Xochitemol), *Proceedings of MFCS 2026*, LIPIcs Volume 386
3. Transducers on compressed strings (with Mikołaj Bojańczyk), *Proceedings of ICALP 2026*, LIPIcs Volume 374
4. On the complexity of computing Strahler numbers (with Moses Ganardi), *Proceedings of STACS 2026*, LIPIcs Volume 364
5. Streaming algorithms for products of probabilities (with Leon Rische, Louisa Seelbach, and Julio Xochitemol), *Proceedings of WALCOM 2026*, LNCS 16444, pp. 140–153
6. FO-query enumeration over SLP-compressed structures of bounded degree (with Sebastian Maneth and Markus Schmid), *Proceedings of MFCS 2025*, LIPIcs Volume 345
7. Finding cycle types in permutation groups with few generators (with Andreas Rosowski), *Proceedings of COCOON 2025*, LNCS 15984, pp. 367–380
8. Streaming in graph products (with Julio Xochitemol), *Proceedings of MFCS 2024*, LIPIcs Volume 306
9. Enumeration for MSO-queries on compressed trees (with Markus Schmid), *Proceedings of the ACM on Management of Data*, Volume 2, Issue 2 (Proceedings of PODS 2024)
10. On the complexity of diameter and related problems in permutation groups (with Andreas Rosowski), *Proceedings of ICALP 2023*, LIPIcs Volume 261
11. Low-latency sliding window algorithms for formal languages (with Moses Ganardi, Louis Jachiet and Thomas Schwentick), *Proceedings of FSTTCS 2022*, LIPIcs Volume 250
12. Membership problems in finite groups (with Andreas Rosowski and Georg Zetsche), *Proceedings of MFCS 2022*, LIPIcs Volume 241

13. Streaming word problems (with Lukas Lück), *Proceedings of MFCS 2022*, LIPIcs Volume 241
14. Exponent equations in HNN-extensions (with Michael Figelius), *Proceedings of ISSAC 2022*, pp. 293–301
15. Complexity of word problems for HNN-extensions, *Proceedings of FCT 2021*, LNCS 12867, pp. 371–384
16. Subgroup membership in $GL(2, \mathbb{Z})$, *Proceedings of STACS 2021*, LIPIcs Volume 187
17. A comparison of empirical tree entropies (with Danny Hucce and Louisa Seelbach), *Proceedings of SPIRE 2020*, LNCS 12303, pp. 232–246
18. Knapsack and the power word problem in solvable Baumslag-Solitar groups (with Georg Zetsche), *Proceedings of MFCS 2020*, LIPIcs Volume 170
19. Groups with ALOGTIME-hard word problems and PSPACE-complete compressed word problems (with Laurent Bartholdi, Michael Figelius and Armin Weiß), *Proceedings of CCC 2020*, LIPIcs Volume 169
20. The complexity of knapsack problems in wreath products (with Michael Figelius, Moses Ganardi and Georg Zetsche), *Proceedings of ICALP 2020*, LIPIcs Volume 168
21. Sliding window property testing for regular languages (with Moses Ganardi, Danny Hucce and Tatiana Starikovskaya), *Proceedings of ISAAC 2019*, LIPIcs Volume 149
22. Balancing straight-line programs (with Moses Ganardi and Artur Jež), *Proceedings of FOCS 2019*, pp. 1169–1183
23. The power word problem (with Armin Weiß), *Proceedings of MFCS 2019*, LIPIcs Volume 138
24. Combined compression of multiple correlated data streams for online-diagnosis systems (with Seungbum Jo, Simon Meckel, Roman Obermaisser and Simon Plasger), *Proceedings of Euromicro DSD 2019*, pp. 166–173
25. Largest common prefix of a regular tree languages (with Sebastian Maneth), *Proceedings of FCT 2019*, LNCS 11651, pp. 95–108
26. Entropy bounds for grammar-based tree compressors (with Danny Hucce and Louisa Seelbach), *Proceedings of ISIT 2019*, pp. 1687–1691
27. Derandomization for sliding window algorithms with strict correctness (with Moses Ganardi and Danny Hucce), *Proceedings of CSR 2019*, LNCS 11532, pp. 237–249
28. Compressed decision problems in hyperbolic groups (with Derek Holt and Saul Schleimer), *Proceedings of STACS 2019*, LIPIcs Volume 126
29. Knapsack in hyperbolic groups, *Proceedings of Reachability Problems 2018*, LNCS 11123, pp. 87–102, 2018
30. Average case analysis of leaf-centric binary tree sources (with Louisa Seelbach), *Proceedings of MFCS 2018*, LIPIcs Volume 117
31. Sliding windows over context-free languages (with Moses Ganardi and Artur Jež), *Proceedings of MFCS 2018*, LIPIcs Volume 117

32. Randomized sliding window algorithms for regular languages (with Moses Ganardi and Danny HucKe), *Proceedings of ICALP 2018*, LIPIcs Volume 107
33. Grammar-based compression of unranked trees (with Adria Gascon, Sebastian Maneth, Carl Philipp Reh and Kurt Sieber), *Proceedings of CSR 2018*, LNCS 10846, pp. 118–131, 2018
34. Knapsack problems for wreath products (with Moses Ganardi, Daniel König and Georg Zetsche), *Proceedings of STACS 2018*, LIPIcs Volume 96
35. Automata theory on sliding windows (with Moses Ganardi, Danny HucKe, Daniel König and Konstantinos Mamouras), *Proceedings of STACS 2018*, , LIPIcs Volume 96
36. Counting problems for Parikh images (with Christoph Haase and Stefan Kiefer), *Proceedings of MFCS 2017*, LIPIcs Volume 88
37. An architecture for online-diagnosis systems supporting compressed communication (with Seungbum Jo, Damian Ludwig, Simon Meckel, Roman Obermaisser and Simon Plasger), *Proceedings of Euromicro DSD 2017*, pp. 62–69
38. Universal tree source coding using grammar-based compression (with Danny HucKe), *Proceedings of IEEE ISIT 2017*, pp. 1753–1757
39. Computing quantiles in Markov chains with multi-dimensional costs (with Christoph Haase and Stefan Kiefer), *Proceedings of LICS 2017*
40. Circuit evaluation for finite semirings (with Moses Ganardi, Danny HucKe and Daniel König), *Proceedings of STACS 2017*, LIPIcs Volume 66
41. The complexity of knapsack in graph groups (with Georg Zetsche), *Proceedings of STACS 2017*, LIPIcs Volume 66
42. Compression of unordered XML trees (with Sebastian Maneth and Carl Philipp Reh), *Proceedings of ICDT 2017*, LIPIcs Volume 68
43. Querying regular languages over sliding-windows (with Moses Ganardi and Danny HucKe), *Proceedings of FSTTCS 2016*, LIPIcs Volume 65
44. The smallest grammar problem revisited (with Danny HucKe and Carl Philipp Reh), *Proceedings of SPIRE 2016*, LNCS 9954, pp. 35–49 (Best paper award)
45. On the parallel complexity of bisimulation over finite systems (with Moses Ganardi and Stefan Göller), *Proceedings of CSL 2016*, LIPIcs Volume 62
46. Traversing grammar-compressed trees with constant delay (with Sebastian Maneth and Carl Philipp Reh), *Proceedings of DCC 2016*, pp. 546–555
47. Knapsack in graph groups, HNN-extensions and amalgamated products (with Georg Zetsche), *Proceedings of STACS 2016*, LIPIcs Volume 47, pp. 50:1–50:14, 2016
48. Tree compression using string grammars (with Moses Ganardi, Danny HucKe and Eric Nöth), *Proceedings of LATIN 2016*, LNCS 9644, pp. 590–604, 2016
49. Parallel identity testing for skew circuits with big powers and applications (with Daniel König), *Proceedings of MFCS 2015*, LNCS 9235, pp. 445–458, 2015
50. Path checking for MTL and TPTL over data words (with Shiguang Feng and Karin Quaas), *Proceedings of DLT 2015*, LNCS 9168, pp. 326–339, 2015

51. Evaluating matrix circuits (with Daniel König), *Proceedings of COCOON 2015*, LNCS 9198, pp. 235–248, 2015
52. Compressed tree canonization (with Sebastian Maneth and Fabian Peternek), *Proceedings of ICALP 2015*, LNCS 9135, pp. 337–349, 2015
53. Satisfiability of ECTL* with tree constraints (with Claudia Carapelle, Alexander Kartzow and Shiguang Feng), *Proceedings of CSR 2015*, LNCS 9139, pp. 94–108, 2015
54. Constructing small tree grammars and small circuits for formulas (with Danny Hucce and Eric Nöth), *Proceedings of FSTTCS 2014*, LIPIcs Volume 29, pp. 457–468, 2014
55. Processing succinct matrices and vectors (with Manfred Schmidt-Schauß), *Proceedings of CSR 2014*, LNCS 8476, pp. 245–258, 2014
56. On Boolean closed full trios and rational Kripke frames (with Georg Zetsche), *Proceedings of STACS 2014*, LIPIcs Volume 25, pp. 530–541, 2014
57. Approximation of smallest linear tree grammars (with Artur Jež), *Proceedings of STACS 2014*, LIPIcs Volume 25, pp. 445–457, 2014
58. Satisfiability of CTL* with constraints (with Claudia Carapelle and Alexander Kartzow), *Proceedings of CONCUR 2013*, LNCS 8052, pp. 455–469, 2013
59. Rational subsets and submonoids of wreath products (with Benjamin Steinberg and Georg Zetsche), *Proceedings of ICALP 2013*, LNCS 7966, pp. 361–372, 2013
60. Compression of rewriting systems for termination analysis (with Alexander Bau, Eric Nöth and Johannes Waldmann), *Proceedings of RTA 2013*, LIPIcs Volume 21, pp. 97–112, 2013
61. XML compression via DAGs (with Sebastian Maneth and Eric Nöth), *Proceedings of ICDT 2013*, pp. 69–80, 2013
62. The complexity of decomposing modal and first-order theories (with Stefan Göller and Jean Christoph Jung), *Proceedings of LICS 2012*, pp. 325–334, 2013
63. Tree-automatic well-founded trees (with Alexander Kartzow and Jiamou Liu), *Proceedings of CiE 2012*, LNCS 7318, pp. 363–373
64. Logspace computations in graph groups and Coxeter groups (with Volker Diekert and Jonathan Kausch), *Proceedings of LATIN 2012*, LNCS 7256, pp. 243–254, 2012
65. The first-order theory of ground tree rewrite graphs (with Stefan Göller), *Proceedings of FSTTCS 2011*, LIPIcs Volume 13, pp. 276–287
66. Compressed word problems for inverse monoids, *Proceedings of MFCS 2011*, LNCS 6907, pp. 448–459, 2011
67. Isomorphism of regular trees and words (with Christian Mathissen), *Proceedings of ICALP 2011*, LNCS 6756, pp. 210–221, 2011
68. Compressed membership in automata with compressed labels (with Christian Mathissen), *Proceedings of CSR 2011*, LNCS 6651, pp. 275–288, 2011
69. Tree structure compression with RePair (with Sebastian Maneth and Roy Mennicke), *Proceedings of DCC 2011*, pp. 353–362, 2011

70. The isomorphism problem for omega-automatic trees (with Dietrich Kuske and Jiamou Liu), *Proceedings of CSL 2010*, LNCS 6247, pp. 396–410, 2010
71. Compressed conjugacy and the word problem for outer automorphism groups of graph groups (with Niko Haubold and Christian Mathissen), *Proceedings of DLT 2010*, LNCS 6224, pp. 218–230, 2010
72. The isomorphism problem on classes of automatic structures (with Dietrich Kuske and Jiamou Liu), *Proceedings of LICS 2010*, pp. 160–169, 2010
73. Branching-time model checking of one-counter processes (with Stefan Göller), *Proceedings of STACS 2010*, LIPIcs Volume 5, pp. 405–416
74. Automatic structures of bounded degree revisited (with Dietrich Kuske), *Proceedings of CSL 2009*, LNCS 5771, pp. 364–378, 2009
75. Compressed word problems in HNN-extensions and amalgamated products (with Niko Haubold), *Proceedings of CSR 2009*, LNCS 5675, pp. 237–249, 2009
76. Parameter reduction in grammar-compressed trees (with Sebastian Maneth and Manfred Schmidt-Schauß), *Proceedings of FOSSACS 2009*, LNCS 5504, pp. 212–226, 2009
77. Leaf languages and string compression, *Proceedings of FSTTCS 2008*, LIPIcs Volume 2, pp. 292–303, 2008
78. Hamiltonicity of automatic graphs (with Dietrich Kuske), *Proceedings of IFIP-TCS 2008*, pp. 445–459, 2008
79. Euler paths and ends in automatic and recursive graphs (with Dietrich Kuske), *Proceedings of AFL 2008*, S.245–256, 2008
80. Efficient computation in groups via compression (with Saul Schleimer), *Proceedings of CSR 2007*, LNCS 4649, pp. 249–258, 2007
81. The submonoid and rational subset membership problems for graph groups (with Benjamin Steinberg), *Proceedings of LATA 2007*, pp. 367–378, 2007
82. PDL with intersection and converse is 2EXP-complete (with Stefan Göller and Carsten Lutz), *Proceedings of FOSSACS 2007*, LNCS 4423, pp. 198–212, 2007
83. Infinite state model-checking of propositional dynamic logics (with Stefan Göller), *Proceedings of CSL 2006*, LNCS 4207, pp. 349–364, 2006
84. Partially commutative inverse monoids (with Volker Diekert and Alexander Miller), *Proceedings of MFCS 2006*, LNCS 4162, pp. 292–304, 2006
85. Querying and embedding compressed texts (with Yury Lifshits), *Proceedings of MFCS 2006*, LNCS 4162, pp. 681–692, 2006
86. Monadic chain logic over iterations and applications to pushdown systems (with Dietrich Kuske), *Proceedings of LICS 2006*, pp. 91–100, 2006
87. Theories of HNN-extensions and amalgamated products (with Géraud Sénizergues), *Proceedings of ICALP 2006*, LNCS 4052, pp. 504–515, 2006
88. First-order and counting theories of ω -automatic structures (with Dietrich Kuske), *Proceedings of FOSSACS 2006*, LNCS 3921, pp. 322–336, 2006

89. Tree automata and XPath on compressed trees (with Sebastian Maneth), *Proceedings of CIAA 2005*, LNCS 3845, pp. 225–237, 2006 (Best paper award)
90. Fixpoint logics on hierarchical structures (with Stefan Göller), *Proceedings of FSTTCS 2005*, LNCS 3821, pp. 483–494, 2005
91. Efficient memory representation of XML documents (with Giorgio Busatto and Sebastian Maneth), *Proceedings of DBPL 2005*, LNCS 3774, pp. 199–216, 2005
92. Inverse monoids: decidability and complexity of algebraic questions (with Nicole Ondrusch), *Proceedings of MFCS 2005*, LNCS 3618, pp. 664–675, 2005
93. Model-checking hierarchical structures, *Proceedings of LICS 2005*, pp. 168–177, 2005
94. Decidability and complexity in automatic monoids, *Proceedings of DLT 2004*, LNCS 3340, pp. 308–320, 2004
95. Word problems on compressed words, *Proceedings of ICALP 2004*, LNCS 3142, pp. 906–918, 2004
96. Word equations over graph products (with Volker Diekert), *Proceedings of FSTTCS 2003*, LNCS 2914, pp. 156–167, 2003
97. Automatic structures of bounded degree, *Proceedings of LPAR 2003*, Lecture Notes in Artificial Intelligence 2850, pp. 344–358, 2003
98. Decidable theories of Cayley-graphs (with Dietrich Kuske), *Proceedings of STACS 2003*, LNCS 2607, pp. 463–474, 2003
99. Safe realizability of high-level message sequence charts, *Proceedings of CONCUR 2002*, LNCS 2421, pp. 177–192, 2002
100. On the theory of one-step rewriting in trace monoids (with Dietrich Kuske), *Proceedings of ICALP 2002*, LNCS 2380, pp. 752–763, 2002
101. Axiomatising divergence (with Pedro D’Argenio and Holger Hermanns), *Proceedings of ICALP 2002*, LNCS 2380, pp. 585–596, 2002
102. Bounded MSC communication (with Anca Muscholl), *Proceedings of FOSSACS 2002*, LNCS 2303, S. 295–309, 2002
103. Existential and positive theories of equations in graph products (with Volker Diekert), *Proceedings of STACS 2002*, LNCS 2285, pp. 501–512, 2002
104. Word problems for 2-homogeneous monoids and symmetric logspace, *Proceedings of MFCS 2001*, LNCS 2136, pp. 500–511, 2001
105. On the parallel complexity of tree automata, *Proceedings of RTA 2001*, LNCS 2051, pp. 201–216, 2001
106. Implementing Luby’s algorithm on the Cray T3E (with Jürgen Gross) *High Performance Computing in Science and Engineering*, pp. 467–477, Springer 2000
107. Word problems and confluence problems for restricted semi-Thue systems, *Proceedings of RTA 2000*, LNCS 1833, pp. 172–186, 2000
108. Complexity results for confluence problems, *Proceedings of MFCS 99*, LNCS 1672, pp. 114–124, 1999

109. On the confluence of trace rewriting systems, *Proceedings of FSTTCS 98*, LNCS 1530, pp. 319–330, 1998
110. Priority and maximal progress are completely axiomatisable (extended abstract) (with Holger Hermanns), *Proceedings of CONCUR 98*, LNCS 1466, pp. 237–252, 1998

Invited papers

1. Membership problems in infinite groups, *Proceedings of CiE 2024*, LNCS 14773, pp.44–59
2. Compression techniques in group theory, *Proceedings of CiE 2021*, LNCS 12813, pp. 330–341
3. Balancing straight-line programs for strings and trees, *Proceedings of CiE 2020*, LNCS 12098, pp. 296–300
4. Sliding window algorithms for regular languages (with Moses Ganardi and Danny Hucke) *Proceedings of LATA 2018*, LNCS 10792, pp. 26–35
5. Grammar-based tree compression, *Proceedings of DLT 2015*, LNCS 9168, pp. 46–57
6. Equality testing of compressed strings, *Proceedings of WORDS 2015*, LNCS 9304, pp. 14–26
7. Temporal logics with local constraints (with Claudia Carapelle), *Proceedings of CSL 2015*, pp. 2–13
8. The rational subset membership problem for groups: A survey, *Proceedings of Groups St Andrews 2013*, London Mathematical Society Lecture Note Series 422, pp. 368–389

Other publications

1. Computational aspects of infinite monoids, Habilitation thesis, University of Stuttgart, 2003
2. Das Konfluenzproblem für Spurerzeugungssysteme, PhD thesis, University of Stuttgart, 1999

6. Invited talks at international workshops and conferences

Theories of automatic structures and their computational complexity
International Workshop on Automata, Structures and Logic, Auckland New Zealand, 2004
 (Satellite workshop of Developments in Language Theory 2004)

Algorithmics on compressed strings
12th International Conference on Automata and Formal Languages (AFL 2008)
 Balatonfüred, Hungary, 2008

Rational subsets in groups
Automata, Formal Languages and Algebraic Systems, Kyoto, Japan, 2008
 (Satellite workshop of Developments in Language Theory 2008)

Algorithmic problems in inverse monoids

ESF-Workshop on Automata Theoretic Methods in Algorithmic Algebra

Bratislava, Slovakia, 2008

The compression technique for solving the word problem

International Conference on Semigroups 2009, Porto, Portugal, 2009

Tutorial on automatic structures

GAMES-EPIT Spring School 2011, Carcans-Maubisson, France, 2011

Rational subsets in groups

Fribourg Weekend in Group Theory, Fribourg, Switzerland, 2012

Relating the compressed word problem and the word search problem

Joint AMS and MAA Mathematics Meeting, San Diego, USA, 2013

The compressed word problem for wreath products

Workshop on Questions, Algorithms, and Computations in Abstract Group Theory, Braunschweig, Germany 2013

Rational subsets in groups

International Conference on Geometric, Combinatorial and Dynamics aspects of Semigroup and Group Theory, Tel Aviv, Israel, 2013

Rational subsets in groups

Groups St Andrews 2013, St Andrews, UK, 2013

Isomorphie von endlich präsentierten Strukturen

Workshop Automaten und Logik im Rahmen des Theorietag Automaten und Formale Sprachen 2013, Ilmenau, Germany, 2013

Parallel Complexity of the Compressed Word Problem

ESI Workshop Geometry of computation in groups, Vienna, Austria, 2014

Knapsack problems in nilpotent groups

Joint AMS and MAA Mathematics Meeting, San Antonio, USA, 2015

Deciding membership in rational sets

AutoMathA 2015, Leipzig, Germany, 2015

Temporal logics with constraints

Computer Science Logic (CSL) 2015, Berlin, Germany, 2015

Grammar-based tree compression

Developments in Language Theory (DLT) 2015, Liverpool, UK, 2015

Equivalence of compressed words and polynomial identity testing

WORDS 2015, Kiel, Germany 2015

Knapsack problems in groups

Workshop Equations and formal languages in algebra, Les Diablerets, Switzerland, 2016

Knapsack problems for right-angled Artin groups

Geometric and Asymptotic Group Theory with Applications, Hoboken, USA, 2016

Circuit evaluation for finite semirings

Conference on Semigroups and Automata, Lisbon, Portugal, 2016

Mini course on compression techniques in computational group theory

Young GAGTA 2017, Bilbao, Spain, 2017

Knapsack and subset sum for groups beyond the integers

MealyM Final Event 2017, Paris, France 2017

Knapsack problems in non-commutative groups

Arbeitstagung Allgemeine Algebra (AAA) 2018, Bratislava, Slovakia, 2018

Streaming algorithms in formal language theory

Language and Automata Theory and Applications (LATA) 2018, Tel Aviv, Israel, 2018

Balancing straight-line programs for strings and trees

CiE 2020 (special session on Combinatorial String Matching), Salerno, Italy, 2020

Compression techniques in group theory

CiE 2021, Ghent, Belgium, 2021

Groups with hard compressed word problems

Geometric and Asymptotic Group Theory with Applications, Edinburg, UK, 2021

Straight-Line Programs: From Compression to Algorithmics

Highlights of Logic, Games and Automata, Paris, France, 2022

Grammar-based tree compression: combinatorics and algorithms

Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA2024), Bath, UK, 2024

Membership problems in infinite groups

CiE 2024 (special session on Computable Aspects of Symbolic Dynamics and Tilings), Amsterdam, Netherlands, 2024

Enumeration for MSO-queries on compressed trees

DLT 2024 (Highlights of Language Theory), Göttingen, Germany 2024

Membership problems in groups

SAMSA 2026, Warsaw, Poland, 2026

9. PhD students

Andreas Rosowski, Komplexität algorithmischer Probleme in endlichen Permutationsgruppen
University of Siegen, 09/2026

Michael Figelius, On the knapsack problem and semilinear sets
University of Siegen, 09/2024

Louisa Seelbach Benkner, Combinatorial and information-theoretic aspects of tree compression
University of Siegen, 10/2023

Danny Hucke, Grammar based compression for strings and trees
University of Siegen, 11/2019

Moses Ganardi, Language recognition in the sliding window model
University of Siegen, 10/2019

Carl Philipp Reh, Algorithmic aspects of grammar-compressed trees
University of Siegen, 09/2019

Daniel König, Parallel evaluation of algebraic circuits
University of Siegen, 07/2017

Eric Nöth, Analysis of grammar-based tree compression
University of Siegen, 06/2016

Shiguang Feng, The expressive power, satisfiability and path checking problems of MTL and TPTL over non-monotonic data words
University of Leipzig, 04/2016

Claudia Carapelle, On the satisfiability of temporal logics with concrete domains
University of Leipzig, 11/2015

Niko Haubold, Compressed words problems in groups
University of Leipzig, 02/2012

Stefan Göller, Computational complexity of propositional dynamic logic
University of Leipzig, 12/2008

10. Third-party funds

Factorization in Finite Groups
granted by the German Research Foundation (DFG), 2024–2027
Project volume: 351.312 Euro

Streaming Automata Theory
granted by the German Research Foundation (DFG), 2018–2025
Project volume: 481.512 Euro

Algorithmic problems in group theory
granted by the German Research Foundation (DFG), 2016–2023
Project volume: 532.500 Euro

DAKODIS (Data compression for active diagnosis)
granted by the German Research Foundation (DFG), 2016–2019
Project volume: 247.250 Euro

QUANT-KOMP (Quantitative aspects of grammar-based compression)
granted by the German Research Foundation (DFG), 2015–2020
Project volume: 431.200 Euro

GELO (Graphs with decidable logics)

granted by the German Research Foundation (DFG), 2004–2014

Project volume: approx. 529.000 Euro

ALKODA (Algorithmics on compressed data)

granted by the German Research Foundation (DFG), 2008–2013

Project volume: 300.600 Euro

DFG-Mercator professor position for Prof. Dr. Benjamin Steinberg, 12/2008 – 07/2009

Project volume: 75.600 Euro

DFG-Mercator professor position for Prof. Dr. Sebastian Maneth, 08/2011 – 08/2012

Project volume: 121.320 Euro

Co-investigator of the DFG research training group *Quantitative Logiken und Automaten*

Oktober 2012 – Oktober 2015

DAAD project in the PPP USA program with Prof. Dr. Benjamin Steinberg and Prof. Dr. Alexei Miasnikov, 2010 & 2011

Project volume: 13.100 Euro

11. Organisational activities

Member of program committees

Symposium on Theoretical Aspects of Computer Science (STACS 2006)

Marseille, France, 2006

Automata: from Mathematics to Applications (AutoMathA 2007)

Palermo, Italy, 2007

Current Trends in Theory and Practice of Computer Science (SOFSEM 2008)

Nový Smokovec, Slovakia, 2008

Developments in Language Theory (DLT 2008)

Kyoto, Japan, 2008

Conference on Implementation and Application of Automata (CIAA 2009)

Sydney, Australia, 2009

Co-Chair of *Logic and Computational Complexity* (LCC 2009)

Los Angeles, USA, 2009

Foundations of Software Science and Computation Structures (FOSSACS 2011)

Saarbrücken, Germany, 2011

Language and Automata Theory and Applications (LATA 2011)

Tarragona, Spain, 2011

Unification Workshop (UNIF 2011)
Wrocław, Polen, 2011

Computer Science in Russia (CSR 2012)
Nizhny Novgorod, Russia, 2012

Computer Science Logic (CSL 2012)
Fontainebleau, France, 2012

Symposium on Theoretical Aspects of Computer Science (STACS 2013)
Kiel, Germany, 2013

Highlights of Logic, Games and Automata
Paris, France, 2013

Current Trends in Theory and Practice of Computer Science (SOFSEM 2014)
Nový Smokovec, Slovakia, 2014

International Conference Automata and Formal Languages (AFL 2014)
Szeged, Hungary, 2014

Developments in Language Theory (DLT 2014)
Ekatarinburg, Russland, 2014

Mathematical Foundations of Computer Science (MFCS 2016)
Krakow, Poland, 2016

Conference on Implementation and Application of Automata (CIAA 2017)
Marne-la-Vallée, France, 2017

International Symposium on Fundamentals of Computation Theory (FCT 2017)
Bordeaux, France, 2017

Highlights of Logic, Games and Automata
Berlin, Germany, 2018

Language and Automata Theory and Applications (LATA 2019)
Sankt Petersburg, Russia, 2019

International Colloquium on Automata, Languages and Programming (ICALP 2019)
Patras, Greece, 2019

Language and Automata Theory and Applications (LATA 2020)
Milano, Italy, 2020

Developments in Language Theory (DLT 2020)
Tampa, FL, USA, 2020

Highlights of Logic, Games and Automata
Virtual, 2021

Conference on Implementation and Application of Automata (CIAA 2021)
Bremen, Germany, 2021

Conference on Implementation and Application of Automata (CIAA 2022)
Rouen, France, 2022

International Colloquium on Automata, Languages and Programming (ICALP 2022)
Paris, France, 2022

Conference on Implementation and Application of Automata (CIAA 2023)
Famagusta, North Cyprus, 2023

Symposium on Theoretical Aspects of Computer Science (STACS 2024)
Clermont-Ferrand, France, 2024

Conference on Implementation and Application of Automata (CIAA 2024)
Akita, Japan, 2024

International Computing and Combinatorics Conference (COCOON 2025)
Chengdu, China, 2025

International Computing and Combinatorics Conference (COCOON 2026)
Singapore, 2026

Automata and Formal Languages (AFL 2026)
Košice, Slovakia 2026

Organisation of workshops

Computational Complexity and Decidability in Algebra, Ekatarinburg, Russia, 2007

17. *Theorietag Automaten und Formale Sprachen* (with M. Droste), Leipzig, Germany, 2007

Dagstuhl-Seminar *Algorithmic-logical theory of infinite structures*
(with R. Downey, B. Khoussainov, D. Kuske and M. Vardi), 2007

Dagstuhl-Seminar *Structure-based compression of complex massive data*
(with S. Böttcher, S. Maneth and W. Rytter), 2008

ESF-Workshops *Automata and Algorithmic Logic*
(with T. Colcombet und D. Kuske), Stuttgart, Germany, 2009

17. Annual Meeting of the Special Interest Group *Logic in Computer Science* of the German Informatics Society, Leipzig, Germany, 2010

Algorithmic Model Theory (AIMoTh 2011), Leipzig, Germany, 2011

Algorithmics of Infinite State Systems (with S. Göller), Dubrovnik, Croatia, 2012

Algorithmics of Infinite State Systems (with S. Göller), Vienna, Austria, 2014

Algorithmic Model Theory (AIMoTh 2016), Siegen, Germany, 2016

Dagstuhl-Seminar *Computation over Compressed Structured Data*
(with P. Bille, S. Maneth and G. Navarro), 2016

Dagstuhl-Seminar *Algorithmic Problems in Group Theory*
(with V. Diekert, O. Kharlampovich and A. Miasnikov), 2019

Straight-Line Programs, Word Equations and their Interplay (satellite workshop for ICALP 2022) (with A. Jež), Paris, France, 2022

Editorial work for journals

Groups Complexity Cryptology, member of the editorial board since 2019

Theory of Computing Systems, member of the editorial board since 2018

Semigroup Forum, member of the editorial board since 2013

LMS Journal of Computation and Mathematics, editorial adviser, 2013–2016

Journal of Computational Algebra, member of the editorial board since 2021

Work in scientific boards

2013–2016: chair of the special interest group *Logic in Computer Science* of the GI (Gesellschaft für Informatik)

2013–2017: treasurer of the *European Association for Computer Science Logic (EACSL)* and member of the executive committee

since 10/2022: member of the executive committee of the GAGTA (Geometric and asymptotic group theory with applications) conference series

12. Teaching experience

I gave lectures on the following topics at University of Stuttgart, University of Leipzig, University of Siegen, RWTH Aachen, and University of Halle-Wittenberg.

Lectures on Bachelor level

Foundations of Theoretical Computer Science

Formal Languages and Automata

Computability

Logic

Discrete Structures

Discrete Mathematics for Computer Science

Compiler Construction

Semantics of Programming Languages

Lectures on Master level

Advanced Logic

Algorithmic Problems for Compressed Data

Algorithms

Circuit Complexity

Computational Complexity

Cryptographic Methods

DNA Computing

Formal Semantics

Game Theoretic Methods in Logic

Graph Theory

Model-Checking

Parallel Algorithms

Parameterized Algorithms

Quantum Complexity Theory

Randomized Algorithms

Selected Topics from the Theory of Algorithms

Verification of Infinite State Systems

13. Experience in university self-administration

Head of the Strategic Advisory Board, University of Siegen, since 03/2026

Member of the Faculty Board (Fakultätsrat) of the School of Science and Technology, University of Siegen, since 03/2024

Head of the Department of Electrical Engineering and Computer Science at University of Siegen, 04/2021–03/2022

Deputy head of the Department of Electrical Engineering and Computer Science at University

of Siegen, 04/2020–03/2021

Head of three professor search committees (Berufungskommissionen) at University of Siegen, 2016, 2018, and 2022

Head of the PhD commission (Promotionsausschuss) Dr. Ing. at University of Siegen, 07/2020 – 10/2024

Deputy head of the PhD commission (Promotionsausschuss) Dr. Ing. at University of Siegen, 07/2017–06/2020, since 11/2024

Head of the PhD commission (Promotionsausschuss) for computer science at University of Leipzig, 09/2009–08/2013

Member of the Faculty Board (Fakultätsrat) of the Faculty of Mathematics and Computer Science at University of Leipzig, 10/2008–06/2010