ERIC W. ALLENDER

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CURRENT POSITION:

2008 to present	Distinguished Professor, Department of Computer Science, Rutgers University, New Brunswick, New Jersey. Member of the Graduate Faculty, Member of the DIMACS Center for Discrete Mathematics and Theoretical Computer Science (since 1989), Member of the Graduate Faculty of the Mathematics Department (since 1993).
1997 to 2008	Professor, Department of Computer Science, Rutgers University, New Brunswick, New Jersey.
1991 to 1997	Associate Professor, Department of Computer Science, Rutgers University, New Brunswick, New Jersey.
1985 to 1991	Assistant Professor, Department of Computer Science, Rutgers University, New Brunswick, New Jersey.

VISITING POSITIONS:

Jan.–Feb. 2023	Long-Term Visitor, Simons Institute for the Theory of Computing program on Meta-Complexity, University of California, Berkeley.
Aug.–Dec. 2018	Long-Term Visitor, Simons Institute for the Theory of Computing program on Lower Bounds in Computational Complexity, University of California, Berkeley.
Mar.–Apr. 2015	Long-Term Visitor, Santa Fe Institute, Santa Fe, New Mexico San Diego.
Jan.–Mar. 2015	Visiting Scholar, University of California, San Diego.
Sep.–Oct. 2011	Visiting Scholar, Institute for Theoretical Computer Science, Tsinghua University, Beijing, China.
Jan.–Apr. 2010	Visiting Scholar, Department of Decision Sciences, University of South Africa, Pretoria.
Oct.–Dec. 2009	Visiting Scholar, Department of Mathematics, University of Cape Town, South Africa.
Feb.–Mar. 2003	Long-Term Visitor, Macquarie University, Sydney, Australia.
Dec. 02–Feb. 03	Long-Term Visitor, Victoria University, Wellington, New Zealand.
Oct.–Nov. 2003	Long-Term Visitor, Tokyo Institute of Technology, Japan.

Mar.–June 1997 Gastprofessor, Wilhelm-Schickard-Institut für Informatik, Universität Tübingen, Germany.

Dec. 96–Feb. 97 Visiting Scholar, Department of Theoretical Computer Science, Institute of Mathematical Sciences, Chennai (Madras), India.

1992–1993 Visiting Research Scientist, Department of Computer Science, Princeton University.

May – July 1989 Gastdozent, Institut für Informatik, Universität Würzburg, West Germany.

RESEARCH INTERESTS:

My research interests lie in the area of computational complexity, with particular emphasis on parallel computation, circuit complexity, Kolmogorov complexity, and the structure of complexity classes.

EDUCATION:

Ph. D., 1985 Georgia Institute of Technology, Atlanta, Georgia, School of Information and Computer Science.
Dissertation entitled *Invertible Functions*. K. N. King, advisor.
(President's Fellowship, 1980-1981.)

B. A., 1979 University of Iowa, Iowa City, Iowa, Computer Science/Theatre (double major).
Graduated with highest honors. Phi Beta Kappa, 1978. Omicron Delta Kappa, 1978.

RESEARCH SUPPORT:

NSF Grant, *AF: Small: Algebraic Methods in Codes and Computation*, 2019–2023 ($299,956). [Original PI: Shubhangi Saraf]

NSF Grant, *AF: Small: Computational Complexity Theory and Circuit Complexity*, 2019–2022 ($200,000).

NSF Grant, *AF: Medium: Collaborative Research: Information Compression in Algorithm Design and Statistical Physics*, 2015–2020 ($461,342). [Original PI: Mario Szegedy]

NSF Grant, *EAGER: AF: New approaches to hardness for circuit minimization*, 2015–2017 ($100,000).

NSF Grant, *AF:Medium:Computational Complexity Theory and Circuit Complexity*, 2011–2015 ($432,769).

NSF Grant, *Collaborative Research: Understanding, Coping with, and Benefiting from, Intractability*, 2008–2013 ($10,000,000) (co-PI). Collaborative Research Grant with three other institutions.

NSF Grant, *Computational Complexity Theory and Circuit Complexity*, 2008–2011 ($326,301).

NSF Grant, *FRG: Collaborative Research: Algorithmic Randomness*, 2007–2010 ($559,094) (co-PI). Collaborative Research Grant with ten other institutions.

NSF Grant, *Computational Complexity Theory and Circuit Complexity*, 2005–2008 ($200,000).

NSF Grant, *Computational Complexity Theory and Circuit Complexity*, 2001–2004 ($268,038).

NSF Grant, *Computational Complexity Theory and Circuit Complexity*, 1998–2001 ($238,301).

Deutsche Forschungsgemeinschaft Grant, 1997 (22,483.39 DM).

NSF Grant, *Computational Complexity Theory and Circuit Complexity*, 1995–1998 ($210,000).

NSF Grant, *Computational Complexity Theory and Circuit Complexity*, 1992–1995 ($216,909)

NSF Grant, *Computational Complexity Theory and Circuit Complexity*, 1990–1992 ($53,277).

NSF Research Initiation Grant, *Applications of Kolmogorov Complexity: Pseudorandom Generators, Circuit Complexity, and One-Way Functions*, 1988–1990 ($31,207).

Additional Funding:

NSF Grant, *DIMACS/Simons Collaboration on Lower Bounds in Complexity Theory*, 2018–2021 ($499,490) Co-PI.

NSF Grant, *DIMACS REU in Algorithms from Foundations to Applications*, 2019–2022 ($427,853) Co-PI.

NSF Grant, *AF: Student Travel to Clay Mathematics Institute Complexity Workshop*, 2018–2019 ($10,000).

HONORS:

Eric Allender Day at the Simons Institute, Berkeley, February 13, 2023.

DIMACS Workshop on E+M=C^2 (Eric Allender and Mike Saks are 60), January 26-27, 2017.

Best paper award, 39th International Symposium on Mathematical Foundations of Computer Science (MFCS '14).

Fulbright Research Fellowship, 2009-2010.

Fellow of the ACM, 2007.

ACM Distinguished Scientist, 2006.

DOCTORAL STUDENTS SUPERVISED:

Erick Chastain, 2016 (Now at University of Dallas)

Luke Friedman, 2013 (Now at Google, Silicon Valley)

Fengming Wang, 2011 (Chief Data Officer, Neon)

Sambuddha Roy, 2006 (Now at Microsoft, Redmond)

Detlef Ronneburger, 2004 (Now at Bloomberg L.P.)

Samir Datta, 2004 (Now at Chennai Mathematical Institute, Chennai)

Michal Koucký, 2003 (Now at the Charles University, Prague)

Martin Strauss, 1995 (Now at U. Michigan)

Vivek Gore, 1993 (Now Vice President for Technology at CNSI.)

POSTDOCTORAL FELLOWS I served as mentor for the following DIMACS postdoctoral fellows:

Bireswar Das (2014-15) (Now at IIT Gandhinagar)

Srikanth Srinivasan (2011-12) (Now at IIT Bombay)

Neeraj Kayal (2007-8) (Now at Microsoft Research, Bangalore)

Andrej Bogdanov (2006-7) (Now at Chinese University of Hong Kong)

Venkatesh Srinivasan (2001-2) (Now at U. Victoria)

Dieter van Melkebeek (1999-2000) (Now at U. Wisconsin)

Jeremy Avigad (1995-6) (Now at Carnegie-Mellon University)

Maria-Luisa Bonet (1995-6) (Now at Univ. Politecnica Cat., Barcelona)

Kousha Etessami (1995-6) (Now at U. Edinburgh)

Thomas Wilke (1995-6) (Now at U. Kiel)

COMMITTEES:
Departmental Roles (selected):

2017-2020: Department Associate Chair

2006-2009: Department Chair

2013-2020, 2005-2009, 1998-2003 and 1994-1996: member, Departmental Executive Committee

2006, 1999-2003: Director, Departmental Graduate Program

University Committees (selected):

2021: member, Research Advisory Board

2021: member, Chancellor's and Provost's Awards Committee

2010-2021: member, Presidential Committee on Academic Planning and Review (CAP)

2016-2017: member, Compensation Review Committee

2014-2017: member, Committee on Academic Unit Organization

2015-2016 and 2013-2014: member, Faculty Appeals Board

2005-2009 and 1994-1997: University Senator for Rutgers College

2005-2009: member, Senate Instruction, Curricula, and Advising Committee.

2005-2007 Faculty Mentor for Rutgers College Honors Program

2004-2007: member, Executive Council, Graduate School-New Brunswick.

Student Committees:

Thesis Committees at Rutgers for Jiazhen Cai, Fritz Henglein, Tony Bonner, Ron van der Meyden, Hava Siegelmann, Shiyu Zhou, Ramkrishna Chatterjee, Srikrishnan Divakaran, Navin Goyal, Yixin Xu, Mrinal Kumar, Neil Lutz, Meng-Tsung Tsai, and Sijian Tang.

Thesis Committees for Carme Álvarez (Universitat Politècnica de Catalunya, Barcelona), Sanjeev Khadilkar (Indian Institute of Technology, Kanpur), Hervé Caussinus (Université de Montréal, in French), Francois Lemieux (McGill University), D. Sivakumar (SUNY Buffalo), Huong LêThanh (Université Paris Sud, Orsay, in French), Nicola Galesi (Universitat Politècnica de Catalunya, Barcelona), P. R. Subramanya (Indian Institute of Science, Bangalore), Shuo Sheng (Rutgers ECE), Vladimir Trifonov (University of Texas), Kristoffer Arnsfelt Hansen (Aarhus, Denmark), Sylvain Perifel (Ecole Normale Supérieure de Lyon, in French), T. C. Vijayaraghavan (Institute for Mathematical Sciences, Chennai), Periklis Papakonstantinou (University of Toronto), Rameshwar Pratap (Chennai Mathematical Institute), and Andrew Morgan (University of Wisconsin).

Habilitationsschrift committees for Gerhard Buntrock (Universität Würzburg, in German), for Rainer Schuler (Universität Ulm, in German), and for Carsten Damm (Universität Trier).

PROFESSIONAL ACTIVITIES:

Chair, Search Committee for ACM Transactions on Computing Editor-in-Chief (2019)

Chair, Local Arrangements Committee, Computational Complexity Conference (CCC 2019)

Member, Editorial Board, Computability: The Journal of the Association Computability in Europe (2011-present).

Associate Editor, ACM Transactions on Computation Theory (2007-2021; Editor-in-Chief 2010-2017)

Associate Editor-in-Chief, Chicago Journal of Theoretical Computer Science (2010-present, Consulting Editor 1998-2010, on editorial board since 1994).

Member, Advisory Panel, Springer/CiE book series "Theory and Applications of Computability" (2009-present).

Member, Chief Editorial Committee, DIMACS Book Series, American Mathematical Society (2004-present).

Scientific Board, Electronic Colloquium on Computational Complexity (ECCC), (1995-2021).

SIGACT (STOC) Proceedings chair, 2021-2023.

Treasurer and Member-at-Large, SIGACT Executive Committee, 2018-2021.

Member, Advisory Board, Birkhäuser book series "Progress in Computer Science and Applied Logic" (2013-2017).

Treasurer, and member of the Board of Trustees, Computational Complexity Foundation (2014-2017)

Member, Editorial Board, Computational Complexity (2005-2015).

Member, NSERC Computer Science Evaluation Group (2012-2015); Section Chair (2014-2015).

Member, Panel of Judges, Turing Centenary Research Fellowship and Scholar Competitions (2011-2012).

Co-editor, Special issue of SIAM Journal on Computing covering the 2007 ACM Symposium on Theory of Computing (2007-2009).

Member, Fulbright Fellowship Selection Committee for South Africa, 2010.

Conference Committee, IEEE Computational Complexity Theory Conference (2013-2014, 2006-2009, 1995-2001; chair, 1997-2000).

Member, SIGACT Nominating Committee, 2008.

Member of ACM Focus Group on Revitalizing CACM (2007)

Editor, Special issue of Computational Complexity covering the 2004 IEEE Conference on Computational Complexity (2004-2005).

Editor, Computational Complexity Column, Bulletin of the European Association for Theoretical Computer Science (1997-2000).

Editor, Special issue of Journal of Computer and System Science covering the 1995 IEEE Structure in Complexity Theory Conference.

Chair of the program committee, tenth annual IEEE Structure in Complexity Theory Conference (1995).

Co-organizer, 1995-1996 DIMACS Special Year on Logic and Algorithms.

Member of External Review Committees:

Institute of Mathematical Sciences, Chennai, India (2009)

Graduate Program in Computer Science, SUNY Buffalo (2008)

External Member of Hiring Committee: University of Aarhus, Denmark (2009).

Member of Program Committees:

Annual International Symposium on Theoretical Aspects of Computer Science (STACS 2022, 2013 and 2005).

ACM Symposium on Theory of Computing (STOC 2021, 2018 and 2007).

Annual International Computer Science Symposium in Russia (CSR 2020, 2016, 2015, 2014, and 2007).

Computational Complexity Conference (formerly the IEEE Conference on Computational Complexity) (CCC 2018, 2012 and 2004).

Computability in Europe (CiE 2018)

Latin American Theoretical Informatics Symposium (LATIN 2018)

International Symposium on Mathematical Foundations of Computer Science (MFCS 2018 and 2016).

International Conference on Language and Automata Theory and Applications (LATA 2017 and 2012).

Annual International Computing and Combinatorics Conference (COCOON 2016, 2012, 2011, 2008 and 2001).

Annual Workshop on Logic, Language, Information and Computation (WoLLIC 2014 and 2005).

Annual Conference on Computability, Computation and Randomness (CCR 2013, 2011 and 2010).

Computing: The Australasian Theory Symposium (CATS 2009).

2nd Annual IFIP Conference on Theoretical Computer Science (TCS 2002).

40th Annual IEEE Symposium on Foundations of Computer Science (FOCS 1999).

XVII International Conference of the Chilean Computer Science Society (SCCC 1997).

Fifteenth annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 1995).

Annual IEEE Structure in Complexity Theory Conference (1989 and 1993).

Workshop (Co-)organizer:

DIMACS Workshop on Meta-Complexity, Barriers, and Derandomization (2022).

Clay Mathematics Institute workshop on Complexity Theory, Oxford University (2018).

Clay Mathematics Institute workshop on "New Insights into Computational Intractability", Oxford University (2013).

DIMACS-DIMATIA workshop: "Algebraic Methods and Arithmetic Circuits" (1999).

DIMACS workshop: "Special Year on Logic and Algorithms – One Year Later" (1997).

1996 Workshop on Structure and Complexity Theory, Schloß Dagstuhl, Germany.

DIMACS Complexity Day, February 1995.

DIMACS Workshop on Structural Complexity and Cryptography (1990).

Steering Committee, IEEE Structure in Complexity Theory Conference (1994-1995).

REVIEWING ACTIVITIES:

Review of *Parallel RAMs with Owned Global Memory and Deterministic Context-Free Languages*, Computing Reviews 41, 2000, pp. 278–279. Reprinted in SIGACT News 31, December, 2000, p. 27.

Review of *Succinct Representation, Leaf Languages, and Projection Reductions*, Computing Reviews 40, 1999, p. 401.

Review of *Space-efficient deterministic simulation of probabilistic automata*, Computing Reviews 40, 1998, pp. 162–163.

Review of Complexity Theory Retrospective II, SIGACT News 29:1, March, 1998, pp. 2–5.

Review of *The Isomorphism Conjecture Fails Relative to a Random Oracle*, Computing Reviews 37, 1996, p. 532.

Review of Limits to Parallel Computation: P-Completeness Theory, Computing Reviews 37, 1996, p. 335.

Review of Structural Complexity I and Structural Complexity II, Journal of Symbolic Logic 59, December, 1994, pp. 1436–1437.

Review of *Hard Promise Problems and Nonuniform Complexity*, Computing Reviews 35, November, 1994, p. 580.

Review of *Extensions to Barrington's M-program model*, Computing Reviews 35, May, 1994, p. 262.

Review of *Separating the eraser Turing machine classes* L_e, NL_e *and* P_e, Computing Reviews 33, July 1992, p. 387.

Review of *PP is closed under intersection*, Computing Reviews 32, October 1991, p. 520–521. Reprinted in SIGACT News 23, Winter, 1992, p. 10.

Review of *Inversion in finite fields using logarithmic depth*, Computing Reviews 32, July 1991, p. 374.

Review of *On the decomposability of NC and AC*, Computing Reviews 32, June 1991, p. 316.

Review of *Optimal bounds for decision problems on the CRCW PRAM*, Computing Reviews 31, May 1990, pp. 265–266. Reprinted in SIGACT News 21, Summer, 1990, p. 21.

Review of *On the power of one-way communication*, Computing Reviews 29, December 1988, p. 657.

Review of *Minimal degrees for polynomial reducibilities*, Computing Reviews 28, November 1987, p. 592.

Review of *Minimal coverings for incompletely-specified sequential machines*, Computing Reviews 27, December 1986, pp. 621-622.

SELECTED INVITED LECTURES AND COLLOQUIA:

2023: *How complex is complexity? Or what's a 'Meta' for?* Richard M. Karp Distinguished Lecture Series, Simons Institute, University of California, Berkeley, February 8.

2021: *The New Complexity Landscape around Circuit Minimization*, Keynote lecture, 14th/15th International Conference on Language and Automata Theory and Applications (LATA 2020/2021), Milan, September 20. (2020 conference Canceled due to COVID-19 outbreak. Re-scheduled to Sept. 20, 2021.)

How much information is in the title of this lecture?, Invited lecture, 36th Computational Complexity Conference (CCC), Online, July 20-22.

2019: *Time-Bounded Kolmogorov Complexity and Circuit Lower Bounds*, Keynote lecture, Randomness, Information, and Computation (in honor of Alexander Shen and Nikolay Vereshchagin's 60th birthdays), Moscow, Russia, June 12.

2017: Series of invited lectures (a minicourse): *New Progress on the (Parameterized?) Circuit Size Problem*, at Aspects of Computation, a conference held at the Institute for Mathematical Sciences, National University of Singapore, August 21-24.

2014: *27 and Still Counting: Iterated Product, Inductive Counting, and the Structure of P*, invited address, Logic and Computational Complexity/ImmermanFest, Vienna Summer of Logic, July 13.

2013: *Strengthening the Link between Complexity Classes and Kolmogorov Complexity*, Invited address, ELC Tokyo Complexity Workshop, Tokyo, March 17.

2012: *The Strange Link between Incompressibility and Computational Complexity*, Keynote lecture, China Theory Week, Aarhus, Denmark, August 13.

Curiouser and Curiouser: The Link between Incompressibility and Complexity, Invited Lecture, Computability in Europe (CiE 2012), Special Session on Cryptography, Complexity, and Randomness, Cambridge, UK June 18–23.

2010: *Circuit Complexity Meets the Theory of Randomness*, Distinguished Lecture, SUNY Buffalo, November 11.

New Surprises from Self-Reducibility, Plenary address, Computability in Europe (CiE 2010), Azores, June 30.

Avoiding Simplicity is Complex, Invited Lecture, Special Session on Computational Complexity, Computability in Europe (CiE 2010), Azores, June 30 - July 4.

2009: Invited address, short course on probabilistic computation (four lectures), Summer Workshop on "Algorithmic Information Theory, Computability, and Complexity," organized by the New Zealand Mathematical Research Institute (NZMRI) and the New Zealand Institute of Mathematics and its Applications (NZIMA), Napier, New Zealand, January 4-9.

2008: *Circuit Complexity, Kolmogorov Complexity, and Prospects for Lower Bounds*, Invited address, 10th International Workshop on Descriptional Complexity of Formal Systems (DCFS 2008), Prince Edward Island, July 16-18.

Cracks in the Defenses: Scouting Out Approaches on Circuit Lower Bounds, invited address, 3rd International Computer Science Symposium in Russia (CSR 2008), Moscow, June 7-12.

Chipping Away at P vs NP: How Far Are We from Proving Circuit Size Lower Bounds?, Keynote Lecture, Computing: the Australasian Theory Symposium (CATS 2008), University of Wollongong, Australia, January 22-25.

2007: Tutorial on Derandomization Techniques and Kolmogorov Complexity; series of three lectures, FRG Workshop on Effective Randomness, University of Chicago, Sept. 16, 18, 19.

Reachability Problems: An Update, Invited Lecture, Special Session on Complexity of Algorithms and Proofs, Computability in Europe (CiE 2007), Siena, Italy, June 18-23.

Arithmetic Circuits, Real Numbers, and the Counting Hierarchy, Invited Plenary Lecture, Conference on Logic, Computability, and Randomness, Buenos Aires, Argentina, January 10-13.

2006: *Some Recent and Not-So-Recent Upper and Lower Bounds in Arithmetic Circuit Complexity*, Invited survey lecture, Workshop on Circuits, Logic, and Games, Schloß Dagstuhl, November 8.

2005: *On the Complexity of Numerical Analysis*, Invited lecture, special session on "Randomness in Computation", at the American Mathematical Society Sectional Meeting, University of Nebraska, Lincoln, Oct 20.

2004: *Algorithmic Randomness and Derandomization*, Atlantic Theory Seminar (ATS), sponsored by Iowa State University and the University of Nebraska, Atlantic, Iowa, November 9.

The Audacity of Computational Complexity Theory, Symposium on Computational Complexity, Honoring Dr. Richard M. Karp, Drexel University, Philadelphia, April 28.

Derandomization and Kolmogorov Complexity, Invited Talk, Special Session on Computational Complexity, Victoria International Conference, Victoria University, Wellington, NZ, February 12.

2003: *Algorithmic Randomness and Derandomization*, series of invited tutorial lectures, 10th Workshop on Logic, Language, Information and Computation (WoLLIC 2003), Ouro Preto, Brazil, July 27-August 1.

2002: *Complexity Classes and Linear Algebra*, invited address (semi-plenary speaker), workshop on Complexity at the Conference of the Society for Foundations of Computational Mathematics (FoCM), Minneapolis, August 12.

2001: *When worlds collide: derandomization, lower bounds, and Kolmogorov complexity*, Keynote address, 21st annual Conference on Foundations of Software Technology and Theoretical Computer Science, Bangalore, India, December 13.

2000: Invited address, short course on complexity theory at the Summer Workshop on "Computability, Complexity, and Computational Algebra," organized by the New Zealand Mathematical Research Institute (University of Wellington), Kaikoura, New Zealand, January 7-14.

1997: *Arithmetic Circuits and Boolean Complexity*, Invited address, 17th International Conference of the Chilean Computer Science Society (SCCC '97), Viña del Mar, Chile, November 11.

1996: *Circuit Complexity before the Dawn of the New Millennium*, Invited address, sixteenth annual Conference on Foundations of Software Technology and Theoretical Computer Science (FST&TCS), Hyderabad, India, December 18.

1991: *On strong separations from* AC^0, Invited address, 8th International Conference on Fundamentals of Computation Theory, Gosen, Germany, September 11.

1990: *Oracles vs Proof techniques that do not relativize*, invited address, SIGAL International Symposium on Algorithms, August 16, Tokyo, Japan.

PUBLICATIONS

REFEREED JOURNAL PUBLICATIONS:

1. *On the Complexity of Algebraic Numbers, and the Bit-Complexity of Straight-Line Programs* (with Nikhil Balaji, Samir Datta, and Rameshwar Pratap) Computability (The Journal of the Association Computability in Europe), to appear.

2. *Cryptographic Hardness under Projections for Time-Bounded Kolmogorov Complexity*, (with John Gouwar, Shuichi Hirahara, and Caleb Robelle), Theoretical Computer Science 940(B) (2023) 206–224. (Special issue for Péter Gács.)

3. *Depth-First Search in Directed Graphs, Revisited*, (with Archit Chauhan and Samir Datta), Acta Informatica, 59 (2022), 289-319. (Special issue for Klaus-Jörn Lange.)

4. *Vaughan Jones, Kolmogorov Complexity, and the New Complexity Landscape around Circuit Minimization*, New Zealand Journal of Mathematics, 52 (2021), 585-604. (Special issue on Vaughan Jones.)

5. *The Non-Hardness of Approximating Circuit Size,* (with Rahul Ilango and Neekon Vafa), Theory of Computing Systems, 65,3 (2021) 559-578. (**Special issue** containing selected papers from the 14th International Computer Science Symposium in Russia (CSR 2019))

6. *New Insights on the (Non-)Hardness of Circuit Minimization and Related Problems*, (with Shuichi Hirahara), ACM Transactions on Computation Theory 11(4) (2019) 27:1–27:27.

7. *Better Complexity Bounds for Cost Register Automata,* (with Andreas Krebs and Pierre McKenzie), Theory of Computing Systems 63(3) (2019) 367-385.

8. *Complexity of Regular Functions*, (with Ian Mertz), J. Computer and System Sciences 104 (2019) 5–16. (**Special issue** containing selected papers from 9th International Conference on Language and Automata Theory and Applications (LATA'15).

9. *Minimum Circuit Size, Graph Isomorphism and Related Problems*, (with Joshua A. Grochow, Dieter van Melkebeek, Cristopher Moore, and Andrew Morgan), SIAM Journal on Computing, 47(4) (2018) 1339-1372.

10. *Zero Knowledge and Circuit Minimization*, (with Bireswar Das), Information and Computation, 256, 2017, 2-8. (**Special issue** containing selected papers from 39th International Symposium on Mathematical Foundations of Computer Science (MFCS'14).

11. *Dual VP Classes*, (with Anna Gál and Ian Mertz), Computational Complexity, 26 (2017) 583–625.

12. *The Minimum Oracle Circuit Size Problem*, (with Dhiraj Holden and Valentine Kabanets), Computational Complexity, 26 (2017) 469–496.

13. *On the Power of Algebraic Branching Programs of Width Two* (with Fengming Wang), Computational Complexity, 25 (2016) 217–253.

14. *Width-parameterized SAT: Time-space tradeoffs*, (with Shiteng Chen, Tiancheng Lou, Periklis Papakonstantinou, and Bangsheng Tang), Theory of Computing, 10(12), 2014, 297-339.

15. *Symmetry Coincides with Nondeterminism for Time-Bounded Auxiliary Pushdown Automata*, (with Klaus-Jörn Lange), Theory of Computing 10(8), 2014, 199-215.

16. *Reductions to the set of random strings: The resource-bounded case*, (with Harry Buhrman, Luke Friedman, and Bruno Loff) Logical Methods in Computer Science 10 (3:5) 2014, pp. 1-18. (**Special issue** on The Turing Centenary Conference: CiE 2012).

17. *Kolmogorov Complexity, Circuits, and the Strength of Formal Theories of Arithmetic*, (with George Davie, Luke Friedman, Samuel B. Hopkins, and Iddo Tzameret), Chicago Journal of Theoretical Computer Science (2013) article 5.

18. *Comments on Arithmetic Complexity, Kleene Closure, and Formal Power Series* (with V Arvind and Meena Mahajan), Theory of Computing Systems 53 (2013) 503-506.

19. *Uniform Derandomization from Pathetic Lower Bounds* (with V. Arvind, Rahul Santhanam, and Fengming Wang), Philosophical Transactions of the Royal Society, Series A, 370 (2012) 3512-3535. (**Special issue** for the Turing Centenary.)

20. *Limits on the Computational Power of Random Strings* (with Luke Friedman and William Gasarch), Information and Computation 222 (2013) 80-92. (**Special issue** containing selected papers from 38th International Colloquium on Automata, Languages, and Programming (ICALP).)

21. *Avoiding Simplicity is Complex*, (with Holger Spakowski), Theory of Computing Systems 51 (2012) 282-296. (**Special issue** containing selected papers from 6th Conference of Computability in Europe, (CiE 2010).)

22. *The Pervasive Reach of Resource-Bounded Kolmogorov Complexity in Computational Complexity Theory*, (with Michal Koucký, Detlef Ronneburger, and Sambuddha Roy), Journal of Computer and System Sciences 77 (2011) 14–40.

23. *Amplifying Lower Bounds by Means of Self-Reducibility*, (with Michal Koucký), J. ACM. 57 (2010) 14:1–14:36.

24. *Planar and Grid Graph Reachability Problems* (with David A. Mix Barrington, Tanmoy Chakraborty, Samir Datta and Sambuddha Roy), Theory of Computing Systems 45 (2009) 675-723. (**Special issue** containing selected papers from 3rd Conference of Computability in Europe, (CiE 2007).)

25. *The Complexity of Satisfiability Problems: Refining Schaefer's Theorem* (with Michael Bauland, Neil Immerman, Henning Schnoor, and Heribert Vollmer), J. Computer and System Sciences 75 (2009) 245-254.

26. *On the Complexity of Numerical Analysis*, (with Peter Bürgisser, Johan Kjeldgaard-Pedersen, and Peter Bro Miltersen), SIAM Journal on Computing, 38 (2009) 1987-2006.

27. *Minimizing Disjunctive Normal Form Formulas and AC^0 Circuits Given a Truth Table*, (with Lisa Hellerstein, Paul M. McCabe, Toniann Pitassi, and Michael Saks), SIAM Journal on Computing, 38 (2008) 63-84.

28. *Power from Random Strings* (with Harry Buhrman, Michal Kouckỳ, Dieter van Melkebeek, and Detlef Ronneburger), SIAM Journal on Computing 35 (2006) 1467-1493.

29. *NL-printable sets and Nondeterministic Kolmogorov Complexity*, Theoretical Computer Science 355 (2006) 127–138. (**Special issue** containing selected papers from 10th Workshop on Logic, Language, Information and Computation (WOLLIC).)

30. *What Can be Efficiently Reduced to the Kolmogorov-Random Strings?* (with Harry Buhrman and Michal Koucký), Annals of Pure and Applied Logic 138 (2006) 2–19.

31. *The complexity of planarity testing* (with Meena Mahajan), Information and Computation 189 (2004) 117–134.

32. *Complexity of some Arithmetic Problems for Binary Polynomials* (with Anna Bernasconi, Carsten Damm, Joachim von zur Gathen, Michael Saks, and Igor Shparlinski), Computational Complexity 12 (2003) 23–47.

33. *Arithmetic Complexity, Kleene Closure, and Formal Power Series* (with V Arvind and Meena Mahajan), Theory of Computing Systems 36 (2003) 303–328.

34. *Uniform Constant-Depth Threshold Circuits for Division and Iterated Multiplication* (with David A. Mix Barrington and William Hesse), J. Computer and System Sciences 65 (2002) 695–716. (**Special issue** containing selected papers from the 16th IEEE Conference on Computational Complexity (CCC).)

35. *Reducing the Complexity of Reductions* (with Manindra Agrawal, Russell Impagliazzo, Toniann Pitassi, and Steven Rudich), Computational Complexity 10 (2001) 117–138.

36. *A Lower Bound for Primality* (with Michael Saks and Igor Shparlinski), J. Computer and System Sciences 62 (2001) 356–366. (**Special issue** containing selected papers from the 14th IEEE Conference on Computational Complexity (CCC).)

37. *Characterizing Small Depth and Small Space Classes by Operators of Higher Types* (with Manindra Agrawal, Samir Datta, Heribert Vollmer, and Klaus W. Wagner) Chicago Journal of Theoretical Computer Science (2000) article 2.

38. *Complexity of Finite-Horizon Markov Decision Process Problems* (with Martin Mundhenk, Judy Goldsmith, and Christopher Lusena), J. ACM 47 (2000) 681–720.

39. *Making nondeterminism unambiguous* (with Klaus Reinhardt), SIAM Journal on Computing 29 (2000) 1118–1131.

40. *On TC^0, AC^0, and Arithmetic Circuits* (with Manindra Agrawal and Samir Datta), J. Computer and System Sciences 60 (2000) 395–421. (**Special issue** containing selected papers from the 12th IEEE Conference on Computational Complexity (CCC).)

41. *Isolation, Matching, and Counting: Uniform and Nonuniform Upper Bounds* (with Klaus Reinhardt and Shiyu Zhou), J. Computer and System Sciences 59 (1999) 164–181. (**Special issue** containing selected papers from the 13th IEEE Conference on Computational Complexity (CCC).)

42. *The complexity of matrix rank and feasible systems of linear equations* (with Robert Beals and Mitsunori Ogihara), Computational Complexity 8 (1999) 99–126.

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