

TRAVIS GAGIE
Associate Professor
Faculty of Computer Science
Dalhousie University, Halifax, Canada
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Personal information

Full name: Travis Alan Gagie
Citizenships: Canadian and British
Languages: native English, functional Italian and Spanish

Employment

2019–present	associate professor	Dalhousie University, Canada
2021–present	member	Institute for Comparative Genomics, Canada
Feb. 2020	visiting researcher	Czech Technical University, Czech Republic
2016–2019	associate professor	Diego Portales University, Chile
2016–2019	collaborator	Centre for Biotechnology and Bioengineering, Chile
July 2018	visiting professor	University of A Coruña, Spain
2013–16	post-doctoral researcher	University of Helsinki, Finland
winter 2015	visiting researcher	University of A Coruña, Spain
June 2015	visiting researcher	Illumina Inc, UK
2010–12	post-doctoral researcher	Aalto University, Finland
2009–10	post-doctoral researcher	University of Chile, Chile
2007–08	research assistant	University of Eastern Piedmont, Italy
2001–05	teaching assistant	University of Toronto, Canada
summer 2000	research assistant	University of Waterloo, Canada
summer 1999	research assistant	Queen’s University, Canada
spring 1999	teaching assistant	Queen’s University, Canada

Education

2018–24	habilitation (09/H1, fascia I)	Italy
2018–24	habilitation (01/B1, fascia II)	Italy
2015	docentship	University of Helsinki, Finland
2014	docentship	Aalto University, Finland
2014–20	habilitation (01/B1, fascia II)	Italy
2009	Dr rer. nat. in Bioinformatics (PhD equivalent)	Bielefeld University, Germany
2005–06	exchange student	National Research Council, Italy
2003–06	PhD student	University of Toronto, Canada
2000–03	MSc in Computer Science	University of Toronto, Canada
1996–00	BSc in Cognitive Science	Queen’s University, Canada

Funding and awards

- NSERC Discovery Grant \$182 500 CAD total, 2020–25.
 - co-investigator on NSF IIBR to Christina Boucher, \$44 013 USD subaward, 2020–23.
 - co-investigator on NIH R01 to Ben Langmead, \$138 703 USD subaward, 2020–25.
 - Fondecyt Regular grant
\$51 600 000 CLP, 2017–20.
 - Marie Skłodowska-Curie RISE project BIRDS
(initial University of Helsinki local coordinator)
€189 000 (€648 000 total between 8 organizations), 2016–19.
 - Academy of Finland Post-Doctoral grant
€254 450 total, 2013–16.
 - Miscellaneous scholarships and research assistantships
approximately \$130 000 CAD total, 1996–2009.
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- highlight talk at CPM 2021.
 - Award for Teaching Excellence, Dalhousie Faculty of Computer Science, 2019.
 - Renato Capocelli Award (best paper with student principal coauthor), DCC 2018 and 2019.
 - Alberto Apostolico Award (best paper), CPM 2017.
 - Best student paper award, IWOCA 2009.

Editing, committees and reviewing

- Editor of special issues of the *Journal of Discrete Algorithms* (Elsevier; volume 43, March 2017), *Algorithmica* (Springer; volume 80, number 7, July 2017, with Gonzalo Navarro) and *Information and Computation* (Elsevier; volume 273, August 2020, with Gonzalo Navarro; volume 285, May 2022).
- Co-chair of special sessions on compressed data structures at the IEEE Data Compression Conference (DCC) 2016, 2018, 2020 and 2022; Dagstuhl seminar 19241, “25 Years of the Burrows-Wheeler Transform”, 2019; the program committee of the 25th Symposium on String Processing and Information Retrieval (SPIRE) 2018 in Lima, LNCS volume 11147.
- Member of the program or organizing committees of the Symposium on Combinatorial Pattern Matching (CPM) 2011–13, 2015, 2018 and 2022; IEEE Data Compression Conference (DCC) 2014–22; International Conference on Research in Computational Molecular Biology (RECOMB) 2022; Symposium on String Processing and Information Retrieval (SPIRE) 2015–22 (steering committee 2019–22); Workshop on Algorithms in Bioinformatics (WABI) 2022; Symposium on Algorithm Engineering and Experiments (ALENEX) 2021; International Computing and Combinatorics Conference (COCOON) 2021; International Symposium on Algorithms and Computation (ISAAC) 2021; International Workshop on Combinatorial Algorithms (IWOCA) 2016, 2018, 2019, 2021;

Satellite Workshop on Massively Parallel Sequencing (RECOMB-Seq) 2019–21; Symposium on Algorithms and Data Structures (WADS) 2017 and 2021; European Symposium on Algorithms (ESA) 2020; Scandinavian Symposium and Workshops on Algorithm Theory (SWAT) 2018 and 2020; Symposium on Experimental Algorithms (SEA) 2020; etc.

- Reviewer for many journals and conferences (e.g., *Journal of the ACM*, *ACM Transactions on Algorithms*, *Bioinformatics*, *Journal of Computer and System Sciences*, FOCS, STOC, SODA, ICALP, ESA), the Canada Foundation for Innovation, the Chilean National Fund for Scientific and Technological Development (FONDECYT), the Israel Science Foundation (ISF), the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Polish National Science Center (NCN).

Teaching and supervising

- Introductory Algorithms
Dalhousie University, 2019, 2020, 2021, 2022; Diego Portales University, 2017 (twice), 2018 (twice), 2019.
- Introductory Data Structures
Dalhousie University, 2022; Diego Portales University, 2016, 2017, 2019.
- Compact Data Structures
Dalhousie University, 2021; University of A Coruña, 2015, 2018.
- Directed Studies
Dalhousie University, 2020.
- Bioinformatics
Diego Portales University, 2017.
- Data Compression
Diego Portales University, 2016; University of Helsinki, 2015 (with Simon Puglisi); Aalto University, 2011.
- Data Compression Project
University of Helsinki, 2015 (with Simon Puglisi).
- String Algorithms
Aalto University, 2012 (with Jorma Tarhio), 2014.
- Seminar on Advanced Data Structures
University of Helsinki, 2013 (with Juha Kärkkäinen and Simon Puglisi); Aalto University, 2012.

- Completed Practical Teaching Skills
University of Helsinki, 2015.
- Completed Introduction to University Pedagogy
Aalto University, 2011.

- Supervising MCS students Nathaniel Brown and Sana Kashgouli at Dalhousie; co-supervising post-doctoral researcher Jarno Alanko (University of Helsinki) with Veli Mäkinen, Keijo Heljanko and Simon Puglisi, MCS student Yansong Li (Dalhousie) with Norbert Zeh, and PhD student Nicola Cotumaccio (GSSI) with Nicola Prezza and Catia Trubiani
- Supervised BCS students Nathaniel Brown and Yansong Li (Dalhousie, 2021); co-supervised PhD student Diego Díaz (University of Chile, 2021) with Gonzalo Navarro and MSc student Sophie Sverdlov (University of Helsinki, 2018) with Leena Salmela and Esko Ukkonen.
- PhD committees of Uwe Baier (Ulm University), Michał Gańczorz (University of Wrocław, 2020), Serikzhan Kazi (Dalhousie University), Carlos Ochoa (University of Chile, 2019) and Michal Vasinek (Technical University of Ostrava, 2019).
- MSc committees of Younan Gao (Dalhousie University, 2020), Tukka Norri (University of Helsinki, 2016) and Rodrigo Rivera (University of Concepción, 2018).
- BSc committee of Chenxin Shu (Dalhousie University, 2019).
- Co-supervised research visits by students Jarno Alanko (University of Helsinki), Andrea Farruggia (University of Pisa), Héctor Ferrada (University of Chile), Garance Gourdel (ENS Paris-Saclay), Tsung-Han Ku (National Tsing Hua University, Taiwan), Alberto Ordóñez (University of A Coruña), Marco Previtali (University of Milano-Bicocca) and Louisa Seelbach Benkner (University of Seigen).

References

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 Department of Computer Science, University of Helsinki
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Professor Giovanni Manzini
 Department of Computer Science, University of Eastern Piedmont
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Professor Gonzalo Navarro
 Department of Computer Science, University of Chile
gnavarro@dcc.uchile.cl

Professor Jens Stoye
 Faculty of Technology, Bielefeld University
jens.stoye@uni-bielefeld.de

Publications

Proceedings and special issues

- [1] T. Gagie (ed.). Special issue of *Information and Computation* on Computation over Compressed Data, 285, 2022.
- [2] T. Gagie and G. Navarro (eds.). Special issue of *Information and Computation* on Computation over Compressed Data, 273, 2020.
- [3] T. Gagie, A. Moffat, G. Navarro and E. Cuadros-Vargas (eds.). *Proceedings of the 25th International Symposium on String Processing and Information Retrieval (SPIRE)*, volume 11147 of *LNCS*, 2018.
- [4] T. Gagie and G. Navarro (eds.). Special issue of *Algorithmica* on Compact Data Structures, 80(7), 2018.
- [5] T. Gagie (ed.). Special issue of *Journal of Discrete Algorithms* on Compact Data Structures, 43, 2017.

Peer-reviewed journal articles

- [6] J. N. Alanko, I. B. Slizovskiy, D. Lokshtanov, T. Gagie, N. R. Noyes, C. Boucher. Syotti: Scalable Bait Design for DNA Enrichment. *Bioinformatics*, 38 (Supplement_1), i177-i184, 2022. Special issue for ISMB 2022.
- [7] M. Rossi, M. Oliva, B. Langmead, T. Gagie, C. Boucher. MONI: A Pangenomic Index for Finding Maximal Exact Matches. *Journal of Computational Biology*, 29(2):169–187, 2022. Special issue for RECOMB 2022.
- [8] M. Rossi, M. Oliva, P. Bonizzoni, B. Langmead, T. Gagie, C. Boucher. Finding Maximal Exact Matches Using the r-Index. *Journal of Computational Biology*, 29(2):188-0194, 2022.
- [9] A. P. Francisco, T. Gagie, D. Köppl, S. Ladra, G. Navarro. Graph Compression for Adjacency-Matrix Multiplication. *SN Computer Science*, 3(3):193, 2022.
- [10] A. Fariña, T. Gagie, Sz. Grabowski, G. Manzini, G. Navarro and A. Ordóñez. Efficient and compact representations of some non-canonical prefix-free codes. *Theoretical Computer Science*, 907:11–25, 2022.
- [11] J. Alanko, B. Alipanahi, J. Settle, C. Boucher and T. Gagie. Buffering updates enables efficient dynamic de Bruijn graphs. *Computational and Structural Biotechnology Journal*, 19:4067-4078, 2021.

- [12] O. Ahmed, M. Rossi, S. Kovaka, M. C. Schatz, T. Gagie, C. Boucher and B. Langmead. Pan-genomic matching statistics for targeted nanopore sequencing. *iScience*, 24(6):102696, 2021. Special issue for RECOMB-Seq 2021.
- [13] D. Belazzougui, T. Gagie, J. I. Munro, G. Navarro, Y. Nekrich. Range majorities and minorities in arrays. *Algorithmica*, 83(6):1707–1733, 2021.
- [14] D. Belazzougui, M. Cáceres, T. Gagie, P. Gawrychowski, J. Kärkkäinen, G. Navarro, A. Ordóñez Pereira, S. J. Puglisi and Y. Tabei. Block trees. *Journal of Computer and System Sciences*, 117:1–22, 2021.
- [15] N. R. Brisaboa, T. Gagie, A. Gómez-Brandón, G. Navarro, J. R. Paramá. An index for moving objects with constant-time access to their compressed trajectories. *International Journal of Geographical Information Science*, 35(7):1392–1424, 2021.
- [16] P. H. Cording, T. Gagie, M. B. T. Knudsen and T. Kociumaka. Maximal unbordered factors of random strings. *Theoretical Computer Science*, 852:78–83, 2021.
- [17] T. Gagie, M. He, G. Navarro and C. Ochoa. Tree path majority data structures. *Theoretical Computer Science*, 833:107–119, 2020.
- [18] T. Gagie, M. He and G. Navarro. Compressed dynamic range majority and minority data structures. *Algorithmica*, 82(7):2063–2086, 2020.
- [19] A. Kuhnle, T. Mun, C. Boucher, T. Gagie, B. Langmead, G. Manzini. Efficient construction of a complete index for pan-genomics read alignment. *Journal of Computational Biology*, 27(4):500–513, 2020. Special issue for RECOMB 2019.
- [20] T. Mun, A. Kuhnle, C. Boucher, T. Gagie, B. Langmead, G. Manzini. Matching reads to many genomes with the r -index. *Journal of Computational Biology*, 27(4):514–518, 2020. Special issue for RECOMB 2019.
- [21] H. Bannai, T. Gagie and T. I. Refining the r -index. *Theoretical Computer Science*, 812:96–108, 2020.
- [22] H. Bannai, T. Gagie, G. Hoppenworth, S. J. Puglisi, L. M. S. Russo. More time-space tradeoffs for finding a shortest unique substring. *Algorithms*, 13(9):234, 2020.
- [23] L. Ferres, J. Fuentes, T. Gagie, M. He and G. Navarro. Fast and compact planar embeddings. *Computational Geometry: Theory and Applications*, 89:101630, 2020. Special issue for WADS 2017.
- [24] T. Gagie, G. Navarro and N. Prezza. Fully functional suffix trees and optimal text searching in BWT-runs bounded space. *Journal of the ACM*, 67(1):2:1–2:54, 2020.
- [25] A. Kuhnle, T. Mun, C. Boucher, T. Gagie, B. Langmead and G. Manzini. Prefix-free parsing for building big BWTs. *Algorithms in Molecular Biology*, 14(1):13:1–13:15, 2019. Special issue for WABI 2018.

- [26] V. Mäkinen, A. Tomescu, A. Kuosmanen, T. Paavilainen, T. Gagie and R. Chikhi. Sparse dynamic programming on DAGs with small width. *ACM Transactions on Algorithms*, 15(2):29:1–29:21, 2019.
- [27] T. Gagie, M. He and G. Navarro. Path queries on functions. *Theoretical Computer Science*, 770:34–50, 2019.
- [28] G. Decaroli, T. Gagie and G. Manzini. A compact index for order-preserving pattern matching. *Software: Practice and Experience*, 49(6):1041–1051, 2019.
- [29] V. Crawford, A. Kuhnle, C. Boucher, R. Chikhi and T. Gagie. Practical dynamic de Bruijn graphs. *Bioinformatics*, 34(24):4189–4195, 2018.
- [30] P. Bille, T. Gagie, I. L. Gørtz and N. Prezza. A Separation Between RLSLPs and LZ77. *Journal of Discrete Algorithms*, 50:36–39, 2018.
- [31] D. Belazzougui, T. Gagie, V. Mäkinen, M. Previtali and S. J. Puglisi. Bidirectional variable-order de Bruijn graphs. *International Journal of Foundations of Computer Science*, 29(8):1279–1295, 2018.
- [32] A. Farruggia, T. Gagie, G. Navarro, S. J. Puglisi and J. Sirén. Relative suffix trees. *The Computer Journal*, 61(5):773–788, 2018.
- [33] H. Bannai, T. Gagie, S. Inenaga, J. Kärkkäinen, D. Kempa, M. Piątkowski and S. Sugimoto. Diverse palindromic factorization is NP-complete. *International Journal of Foundations of Computer Science*, 29(2):143–164, 2018. Special issue for DLT 2015.
- [34] A. Amir, A. Aposolico, T. Gagie and G. M. Landau. String cadences. *Theoretical Computer Science*, 698:4–8, 2017.
- [35] T. Gagie, G. Manzini and J. Sirén. Wheeler graphs: A framework for BWT-based data structures. *Theoretical Computer Science*, 698:67–78, 2017.
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- [38] T. Gagie, G. Manzini and D. Valenzuela. Compressed spaced suffix arrays. *Mathematics in Computer Science*, 11(2):151–157, 2017. Special issue for ICABD 2014.
- [39] T. Gagie, C. Hoobin and S. J. Puglisi. Block graphs in practice. *Mathematics in Computer Science*, 11(2):191–196, 2017. Special issue for ICABD 2014.

- [40] F. A. Louza, T. Gagie and G. P. Telles. Burrows-Wheeler transform and LCP array construction in constant space. *Journal of Discrete Algorithms*, 42:14–22, 2017.
- [41] A. I. Tomescu, T. Gagie, A. Popa, R. Rizzi, A. Kuosmanen and V. Mäkinen. Explaining a weighted DAG with few paths for solving genome-guided multi-assembly. *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, 12(6):1345–1354, 2015.
- [42] T. Gagie, D. Hermelin, G. M. Landau and O. Weimann. Binary jumbled pattern matching on trees and tree-like structures. *Algorithmica*, 73(3):571–588, 2015. Special issue for ESA 2013.
- [43] T. Gagie, G. Navarro, Y. Nekrich and A. Ordóñez. Efficient and compact representations of prefix codes. *IEEE Transactions on Information Theory*, 61(9):4999–5011, 2015.
- [44] T. Gagie and S. J. Puglisi. Searching and indexing genomics databases via kernelization. *Frontiers in Bioengineering and Biotechnology*, 3:12, 2015.
- [45] T. Gagie, P. Gawrychowski and S. J. Puglisi. Approximate pattern matching in LZ77-compressed texts. *Journal of Discrete Algorithms*, 32:64–68, 2015.
- [46] G. Fici, T. Gagie, J. Kärkkäinen and D. Kempa. A subquadratic algorithm for minimum palindromic factorization. *Journal of Discrete Algorithms*, 28:41–48, 2014.
- [47] H. Ferrada, T. Gagie, T. Hirvola and S. J. Puglisi. Hybrid indexes for repetitive datasets. *Philosophical Transactions of the Royal Society A*, 327, 2014
- [48] A. Farzan, T. Gagie and G. Navarro. Entropy-bounded representation of point grids. *Computational Geometry: Theory and Applications*, 47(1):1–14, 2014.
- [49] J. Barbay, F. Claude, T. Gagie, G. Navarro and Y. Nekrich. Efficient fully-compressed sequence representations. *Algorithmica*, 69(1):232–268, 2014.
- [50] T. Gagie, J. Kärkkäinen, G. Navarro and S. J. Puglisi. Colored range queries and document retrieval. *Theoretical Computer Science*, 483: 36–50, 2013. Special issue for CPM 2011.
- [51] P. Gawrychowski and T. Gagie. Minimax trees in linear time with applications. *European Journal of Combinatorics*, 34(1):82–90, 2013. Special issue for IWCCA 2009.
- [52] H. Bannai, T. Gagie, T. I, S. Inenaga, G. M. Landau and M. Lewenstein. An efficient algorithm to test square-freeness of strings compressed by straight-line programs. *Information Processing Letters*, 112(9):711–714, 2012.
- [53] T. Gagie, G. Navarro and S. J. Puglisi. New algorithms on wavelet trees and applications to information retrieval. *Theoretical Computer Science*, 426–427:25–41, 2012.

- [54] P. Ferragina, T. Gagie and G. Manzini. Lightweight data indexing and compression in external memory. *Algorithmica*, 63(3):707–730, 2012. Special issue for LATIN 2010.
- [55] T. Gagie. A note on sequence prediction over large alphabets. *Algorithms*, 5(1):50–55, 2012. Special issue for CCP 2011.
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- [57] F. Cicalese, T. Gagie, M. Milanič and E. Laber. Competitive boolean function evaluation: Beyond monotonicity, and the symmetric case. *Discrete Applied Mathematics*, 159(11):1070–1078, 2011.
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- [59] T. Gagie and G. Manzini. Move-to-front, distance coding, and inversion frequencies revisited. *Theoretical Computer Science*, 411(31-33):2925–2944, 2010.
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- [63] T. Gagie. Dynamic asymmetric communication. *Information Processing Letters*, 108(6):352–355, 2008.
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- [65] T. Gagie. Large alphabets and incompressibility. *Information Processing Letters*, 99(6):246–251, 2006.
- [66] T. Gagie. Compressing probability distributions. *Information Processing Letters*, 97(4):133–137, 2006.
- [67] T. Gagie. Restructuring binary search trees revisited. *Information Processing Letters*, 95(3):418–421, 2005.

Peer-reviewed conference papers

- [68] T. Gagie. Simple Worst-Case Optimal Adaptive Prefix-Free Coding. In *Proceedings of the 30th European Symposium on Algorithms (ESA)*, to appear.
- [69] P. Ferragina, G. Manzini, T. Gagie, D. Köppl, G. Navarro, M. Striani and F. Tosoni. Improving Matrix-Vector Multiplication via Lossless Grammar-Compressed Matrices. In *Proceedings of the VLDB Endowment 15*, to appear.
- [70] M. Rossi, M. Oliva, B. Langmead, T. Gagie and C. Boucher. MONI: A pangenomics index for finding MEMs. In *Proceedings of the 25th Conference on Research in Computational Molecular Biology (RECOMB)*, to appear.
- [71] O. Ahmed, M. Rossi, S. Kovaka, M. Schatz, T. Gagie, C. Boucher and B. Langmead. Pan-genomic matching statistics for targeted nanopore sequencing. In *Proceedings of the 11th RECOMB Satellite Workshop on Massively Parallel Sequencing (RECOMB-Seq)*, to appear.
- [72] N. K. Brown, T. Gagie and M. Rossi. RLBWT Tricks. In *Proceedings of the 20th Symposium on Experimental Algorithms (SEA)*, pages 16:1–16:16, 2022.
- [73] J. N. Alanko, I. B. Slizovskiy, D. Lokshtanov, T. Gagie, N. R. Noyes, C. Boucher. Syotti: Scalable Bait Design for DNA Enrichment. In *Proceedings of the 30th Conference on Intelligent Systems for Molecular Biology (ISMB)*, published as [6], 2022.
- [74] M. Oliva, D. Cenzato, M. Rossi, Z. Lipták, T. Gagie, C. Boucher. CSTs for Terabyte-Sized Data. In *Proceedings of the Data Compression Conference (DCC)*, pages 93–102, 2022.
- [75] T. Gagie and S. Wild. Succinct Euler-tour trees. In *Proceedings of the 33rd Canadian Conference on Computational Geometry (CCCG)*, pages 368–376, 2021.
- [76] T. Gagie, G. Gourdel and G. Manzini. Compressing and indexing aligned readsets. In *Proceedings of the 21st Workshop on Algorithms in Bioinformatics (WABI)*, 13:1–13:21, 2021.
- [77] D. Cobas, T. Gagie and G. Navarro. A fast and small subsampled r-index. In *Proceedings of the 32nd Symposium on Combinatorial Pattern Matching (CPM)*, 13:1–13:16, 2021.
- [78] C. Boucher, T. Gagie, T. I, D. Köppl, B. Langmead, G. Manzini, G. Navarro, A. Pacheco and M. Rossi. PHONI: Streamed matching statistics with multi-genome references. In *Proceedings of the IEEE Data Compression Conference (DCC)*, pages 193–202, 2021.

- [79] M. Oliva, M. Rossi, J. Sirén, G. Manzini, T. Kahveci, T. Gagie and C. Boucher. Efficiently merging r-indexes. In *Proceedings of the IEEE Data Compression Conference (DCC)*, pages 203–212, 2021.
- [80] C. Boucher, O. Cvacho, T. Gagie, J. Holub, G. Manzini, G. Navarro and M. Rossi. PFP compressed suffix trees. In *Proceedings of the Symposium on Algorithm Engineering and Experiments (ALENEX)*, pages 60–72, 2021.
- [81] T. Gagie, T. I, G. Manzini, G. Navarro, H. Sakamoto, L. Seelbach Benkner, Y. Takabatake. Practical random access to SLP-compressed texts. In *Proceedings of the 27th Symposium on String Processing and Information Retrieval (SPIRE)*, pages 221–231, 2020.
- [82] P. Bille, M. B. Ettienne, T. Gagie, I. L. Gørtz and N. Prezza. Decompressing Lempel-Ziv compressed text. In *Proceedings of the Data Compression Conference (DCC)*, pages 143–152, 2020.
- [83] D. Arroyuelo, G. De Bernardo, T. Gagie and G. Navarro. Faster dynamic compressed d -ary relations. In *Proceedings of the 26th Symposium on String Processing and Information Retrieval (SPIRE)*, pages 419–433, 2019.
- [84] T. Gagie, T. I, G. Manzini, G. Navarro, H. Sakamoto and Y. Takabatake. Rpair: Scaling up RePair with Rsync. In *Proceedings of the 26th Symposium on String Processing and Information Retrieval (SPIRE)*, pages 35–44, 2019.
- [85] J. N. Alanko, T. Gagie, G. Navarro and L. Seelbach Benkner. Tunneling on Wheeler graphs. In *Proceedings of the Data Compression Conference (DCC)*, pages 122–131, 2019. Renato Capocelli Prize.
- [86] D. Díaz-Domínguez, T. Gagie and G. Navarro. Simulating the DNA string graph in succinct space. In *Proceedings of the 30th Symposium on Combinatorial Pattern Matching (CPM)*, pages 26:1–26:20, 2019.
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- [88] T. Gagie, M. He and G. Navarro. Tree path majority data structures. In *Proceedings of the 29th International Symposium on Algorithms and Computation (ISAAC)*, pages 68:1–68:12, 2018.
- [89] C. Boucher, T. Gagie, A. Kuhnle and G. Manzini. Prefix-free parsing for building big BWTs. In *Proceedings of the 18th Workshop on Algorithms in Bioinformatics (WABI)*, pages 2:1–2:16, 2018.

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- [91] A. Francisco, T. Gagie, S. Ladra and G. Navarro. Exploiting computation-friendly graph compression methods for adjacency-matrix multiplication. In *Proceedings of the Data Compression Conference (DCC)*, pages 307–314, 2018.
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