

Curriculum Vitae

A. Personal details:

Name: Robert George Mercas

Current position: Lecturer

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Address: Loughborough University

Department of Computer Science

Theory and Applications of Formal Systems

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B. Research interest

Stringology, Combinatorics on Words, Bioinformatics (Algorithms), Formal Languages and Automata, Trace Monoids, Learning Theory (Pattern Inference)

C. Previous positions and mobility

2016: King's College London. Newton International Fellowship. Researcher: 6 months.

2014: Kiel University and King's College London. DAAD – P.R.I.M.E. Researcher: 18 months.

2013: Kiel University, Germany. Researcher: 9 months.

2011: Otto-von-Guericke-University of Magdeburg, Germany. Alexander von Humboldt Fellow: 2 years.

2011: Kyoto Sangyo University, Japan. Research on combinatorics on words (Researcher): 1 month.

2010: LIAFA Research Group, CNRS and Paris Diderot (Paris 7), France. Research on plactic monoids and Young tableaux (Researcher): 3 months.

2009: University of North Carolina at Greensboro, USA. Research on algorithms and combinatorics on partial words (Research assistant and Researcher): 6 months.

2009: LIAFA Research Group, France. Research on contextual trace monoids (Researcher): 3 weeks.

2008: University of North Carolina at Greensboro, USA. Research on algorithms and combinatorics on partial words (Research assistant and Researcher): 6 months.

2007: University of Debrecen, Hungary. Research on primitive words (Researcher): 5 weeks.

2007: University of North Carolina at Greensboro, USA. Research on algorithms and combinatorics on partial words (Research assistant): 3 months.

D. Education

2006 - 2010 July: **PhD** - University Rovira i Virgili, International PhD School in Formal Languages and Applications, Tarragona, Spain

PhD Thesis: *Repetitions in Partial Words*

2004 - 2006: **Master Degree in Theoretical Computer Science** - University of Bucharest, Faculty of Mathematics and Computer Science, Department of Computer Science, Romania

Thesis: *A JAVA interpreter for interactive programs with registers and voices*

2000 - 2004: **Bachelor degree** - University of Bucharest, Faculty of Mathematics and Computer Science, Department of Computer Science, Romania

Graduation paper: *Oracle Databases tuning*

Language Skills

Romanian (native), **English** (fluent), **Spanish** (medium), **German** (medium), **French**(beginner).

E. Professional activities and achievements

Teaching and academic supervision (start academic year)

2016: *Mathematics for Computer Science*, Loughborough University

2015/14: *Text Searching and Processing* (M. Crochemore), King's College London - TA

2009/08/07: *Algorithmic Combinatorics on words REU* (F. Blanchet-Sadri), UNC at Greensboro - RA

2005/04: *Programming using C* (M. Cherciu), U. Bucharest - TA

Data Structures (R. Ceterchi), U. Bucharest - TA

Computer Networks and Distributed Calculus (A. Baranga), U. Bucharest - TA

Reviewer for

Acta Cybernetica, Algorithms, Elect. J. Comb., Fund. Informaticae, Inf. Comp., Inf. Proc. Lett., Int. J. Comp. Math., Int. J. Found. Comp. Sci., J. Automata Lang. Comb., J. Discrete Algo., J. Discrete Appl. Math., J. Discrete Math., Math. Comput., Rom JIST, Sci. Annals Comp. Sci., Theor. Comp. Sci..

AFL, CiE, CIAA, CPM, CSR, DCFS, DLT, FCT, ICAART, ISAAC, IWOCA, JM, LATA, MACIS, MFCS, NCMA, PAAMS, SPIRE, SYNASC, STACS, UCNC, WORDS.

Invited Talks

2017 (Aug.): On the number of factors with maximal-exponent in words, DLT 2017, Belgium

2016 (March): Algorithms on Sequences (invited lecture), Goldsmiths, University of London, UK

2014 (Sept.): On the k -Abelian Equivalence Relation, DACS workshop of ICTAC 2014, Romania

2013 (Aug.): Repetitions in Partial Words, 150 years Anniversary, University of Bucharest, Romania

2012 (Nov.): Connections between regular and partial words languages, Turku University, Finland

2012 (Nov.): Cross-sections and equivalences of the plactic monoid, Kiel University, Germany,

2011 (Dec.): Pseudorepetitions in words, Kyoto Sangyo University, Japan

2011 (Dec.): Cross-sections of the plactic monoid, Kyoto Sangyo University, Japan

2010 (June): Avoidable Patterns in Partial Words, University of Magdeburg, Germany

2009 (June): Abelian Squares in Partial Words, UNC at Greensboro, USA

2009 (June): Counting Squares in Partial Words, UNC at Greensboro, USA

2008 (June): Freeness of Partial Words, UNC at Greensboro, USA

2008 (June): Squares in Partial Words, UNC at Greensboro, USA

2007 (Oct.): Freeness of Partial Words, University of Debrecen, Hungary

2007 (Sept.): Repetitions in partial words, Rovira i Virgili University, Spain

2007 (June): Cube Freeness in Partial Words, UNC at Greensboro, USA

Organising committee

2016 (Feb.): 24th LSD&LAW, London, UK (**co-chair**)

2015 (Sept.): 22nd SPIRE, London, UK

2015 (Feb.): 23rd LSD&LAW, London, UK

2008 (March): 2nd LATA, Tarragona, Spain

2007 (March): 1st LATA, Tarragona, Spain

Program committee

2017 (Sept.): 24th SPIRE, Palermo, Italy

2015 (June): 2nd DACS, Bucharest, Romania

2014 (Sept.): 16th SYNASC, Timișoara, Romania

2011 (March) 1st Interplays, Tarragona, Spain

2011 (Jan.): 1st BILC (in conjunction with ICAART), Rome, Italy

Grants, Projects and Scholar activities

2016 (Jan.) - 24 months funding for the project *Big data: New Algorithmical Challenges* as a Newton International Fellowship¹ from the Royal Society.

2014 (Sept.) - 18 months funding for the project *Algorithms and Data Structures on Faulty Sequences* by the P.R.I.M.E.² programme of DAAD with funds provided by the Federal Ministry of Education and Research and the EU's Seventh Framework Programme (grant agreement no. 605728).

2013 (June) - 9 months position as an active researcher in the project *Algorithmic Combinatorics on Sequences* from the Deutsche Forschungsgemeinschaft

2011 (June) - 2 years funding for the project *Partial words with restrictions on the unknown symbols* from the Alexander von Humboldt Foundation³

2010 (Sept.) - 6 months position as an active researcher in a Rovira i Virgili University project, ref: 1355 U07 E30 N-2010PFR-URV-B2-02

2010 (March) - 3 months *mobility for European Doctorate* from the Spanish Government

2009 (Sept) - 1 year position as an active researcher in a Rovira i Virgili University project, ref: 1323 U07 E30 N-2008/InvAct/Bel, G./BJ01

2009 (Jan.) - 2 weeks mobility grant from the European Science Foundation (ESF) for the activity *AutoMatha: from Mathematics to Applications*

2009/8/7 (June - July) - research assistant for the Research Education for Undergraduates: *Algorithmic Combinatorics on Words*, program from the US National Science Foundation (Teaching and supervising undergraduate students in their research work).

2006 (June) - *mobility grant* by the Spanish Ministry of Education and Science

Professional training

2014: Participant at the Workshop on Combinatorics and Algorithmics of Strings (Schloss Dagstuhl - Leibniz Center for Informatics, Wadern, Germany).

2013: Participant at the Workshop on Challenges in Combinatorics on Words (Fields Institute, Toronto, Canada).

2012: Participant at the Workshop Outstanding Challenges in Combinatorics on Words (Banff International Research Station for Mathematical Innovation and Discovery, Vancouver, Canada).

¹Acceptance rate of 8%

²Acceptance rate of 10%

³Acceptance rate of 30%

Publications⁴

A. Journal papers

1. H. Fernau, F. Manea, R. Mercas, M.L. Schmid: Revisiting Shinohara's Algorithm for Computing Descriptive Patterns. *Theoretical Computer Science*, Vol. XXX, pp XXX–XXX.
2. R. Mercas: On the aperiodic avoidability of binary patterns with variables and reversals. *Theoretical Computer Science*, Vol. 682, pp 180–189. (<http://dx.doi.org/10.1016/j.tcs.2016.12.022>).
3. R. Mercas, D. Nowotka: A note on Thue games. *Information Processing Letters*, Vol. 118, pp 75–77. (<http://dx.doi.org/10.1016/j.ipl.2016.10.004>).
4. G. Badkobeh, M. Crochemore, R. Mercas. Counting maximal-exponent factors in words. *Theoretical Computer Science*, Vol. 658, Part A, pp 27–35 (<http://dx.doi.org/10.1016/j.tcs.2016.02.035>).
5. M. Crochemore, R. Mercas. On the density of Lyndon roots in factors. *Theoretical Computer Science*, Vol. 656, Part B, pp 234–240. (<http://dx.doi.org/10.1016/j.tcs.2016.02.015>).
6. R. Grossi, C. Iliopoulos, R. Mercas, N. Pisanti, S. Pissis, A. Retha and F. Vayani. Circular Sequence Comparison: Algorithms and Applications. *Algorithms for Molecular Biology*, Vol. 11, a. 12. (<http://dx.doi.org/10.1186/s13015-016-0076-6>).
7. T. Ehlers, F. Manea, R. Mercas, D. Nowotka: k -Abelian Pattern Matching, *Journal of Discrete Algorithms*, Vol. 34, September 2015, pp 37–48 (<http://dx.doi.org/10.1016/j.jda.2015.05.004>).
8. J. Dassow, F. Manea, R. Mercas, M. Müller: Inner palindromic closure, *International Journal of Foundations of Computer Science*, Vol. 25(8), December 2014, pp 1049–1064 (<http://dx.doi.org/10.1142/S0129054114400231>).
9. F. Manea, R. Mercas, C. Tisceanu: An Algorithmic Toolbox for Periodic Partial Words, *Discrete Applied Mathematics*, Vol. 179, December 2014, pp 174–192 (<http://dx.doi.org/10.1016/j.dam.2014.07.017>).
10. S.Z. Fazekas, F. Manea, R. Mercas, K. Shikishima-Tsuji: The pseudopalindromic completion of regular languages, *Information and Computation*, Vol. 239, December 2014, pp 222–236 (<http://dx.doi.org/10.1016/j.ic.2014.09.001>).
11. R. Mercas, A. Saarela: 5-Abelian Cubes Are Avoidable on Binary Alphabets. *RAIRO - Theoretical Informatics and Applications*, Vol. 48(4), October 2014, pp 467–478 (<http://dx.doi.org/10.1051/ita/2014020>).
12. R. Mercas, P. Ochem, A. Samsonov, A. Shur: Binary patterns in binary cube-free words: avoidability and growth. *RAIRO - Theoretical Informatics and Applications*, Vol. 48(4), October 2014, pp 369–389 (<http://dx.doi.org/10.1051/ita/2014015>).
13. J. Dassow, F. Manea, R. Mercas: Regular Languages of Partial Words. *Information Sciences*, Vol. 268, June 2014, pp 290–304 (<http://dx.doi.org/10.1016/j.ins.2013.12.032>).
14. S.Z. Fazekas, R. Mercas: A note on the decidability of subword inequalities. *International Journal of Foundations of Computer Science*, Vol. 24(4), June 2013, pp 445–452 (<http://dx.doi.org/10.1142/S0129054113500135>).
15. F. Manea, R. Mercas, V. Mitrana: Hairpin Lengthening and Shortening of Regular Languages. In H. Bordihn, M. Kutrib, B. Truthe (Eds.): *Languages Alive (Essays Dedicated to Jürgen Dassow on the Occasion of His 65th Birthday)*, LNCS 7300, 2012, pp 145–159 (http://dx.doi.org/10.1007/978-3-642-31644-9_10).

⁴In theoretical computer science and in mathematics it is customary for the authors to be listed in alphabetical order, with no differences between the FIRST and LAST author in the order, considering that every author has the same contribution in the paper.

16. F. Blanchet-Sadri, R. Mercas, A. Rashin, E. Willett: Periodicity algorithms and a conjecture on overlaps in partial words. *Theoretical Computer Science*, Vol. 443, July 2012, pp 35–45 (<http://dx.doi.org/10.1016/j.tcs.2012.03.034>).
17. F. Blanchet-Sadri, R. Mercas: The three-squares lemma for partial words with one hole. *Theoretical Computer Science*, Vol. 428, April 2012, pp 1–9 (<http://dx.doi.org/10.1016/j.tcs.2012.01.012>).
18. F. Blanchet-Sadri, J. Kim, R. Mercas, W. Severa, S. Simmons, D. Xu: Avoiding abelian squares in partial words. *Journal of Combinatorial Theory, Series A*, Vol. 119(1), January 2012, pp 257–270 (<http://dx.doi.org/10.1016/j.jcta.2011.08.008>).
19. F. Blanchet-Sadri, I. Choi, R. Mercas: Avoiding large squares in partial words. *Theoretical Computer Science*, Vol. 412(29), July 2011, pp 3752–3758 (<http://dx.doi.org/10.1016/j.tcs.2011.04.009>).
20. E. Allen, F. Blanchet-Sadri, C. Byrum, M. Cucuringu, R. Mercas: Counting Bordered Partial Words by Critical Positions. *The electronic journal of combinatorics*, Vol. 18, July 2011, p 138 (<http://www.combinatorics.org/ojs/index.php/eljc/article/view/v18i1p138>).
21. F. Blanchet-Sadri, R. Mercas, S. Simmons, E. Weissenstein: Avoidable binary patterns in partial words. *Acta Informatica*, Vol. 48(1), February 2011, pp 25–41 (<http://dx.doi.org/10.1007/s00236-010-0129-0>).
22. C. Choffrut, R. Mercas: Contextual partial commutations. *Discrete Mathematics and Theoretical Computer Science*, Vol. 12(4), October 2010, pp 59–72 (<http://www.dmtcs.org/dmtcs-ojs/index.php/dmtcs/article/viewArticle/1368>).
23. F. Blanchet-Sadri, R. Mercas, G. Scott: Counting distinct squares in partial words. *Acta Cybernetica*, Vol. 19(2), December 2009, pp 465–477 (http://www.inf.u-szeged.hu/actacybernetica/edb/vol19n2/pdf/BlanchetSadri_2009_ActaCybernetica.pdf).
24. F. Blanchet-Sadri, R. Mercas: A note on the number of squares in a partial word with one hole. *RAIRO - Theoretical Informatics and Applications*, Vol. 43, November 2009, pp 767–774 (<http://dx.doi.org/10.1051/ita/2009019>).
25. F. Blanchet-Sadri, R. Mercas, G. Scott: A generalization of Thue freeness for partial words. *Theoretical Computer Science*, Vol. 410(8-10), March 2009, pp 793–800 (<http://dx.doi.org/10.1016/j.tcs.2008.11.006>).
26. F. Blanchet-Sadri, C.D. Davis, J. Dodge, R. Mercas, M. Moorefield: Unbordered Partial Words. *Discrete Applied Mathematics*, Vol. 157(5), March 2009, pp 890–900 (<http://dx.doi.org/10.1016/j.dam.2008.04.004>).
27. F. Manea, R. Mercas: Freeness of partial words. *Theoretical Computer Science*, Vol. 389, December 2007, pp 265–277 (<http://dx.doi.org/10.1016/j.tcs.2007.09.028>).

B. Proceedings of reviewed international conferences

1. M. Crochemore, G. Fici, R. Mercas, S. Pissis. Linear-Time Sequence Comparison Using Minimal Absent Words & Applications. *LATIN 2016*, LNCS 9644, pp 334–346. (http://dx.doi.org/10.1007/978-3-662-49529-2_25).
2. R. Grossi, C. Iliopoulos, R. Mercas, N. Pisanti, S. Pissis, A. Retha and F. Vayani. Circular Sequence Comparison with q -grams. *WABI 2015*, LNBI 9829, pp 203–216. (http://dx.doi.org/10.1007/978-3-662-48221-6_15).
3. H. Fernau, F. Manea, R. Mercas, M.L. Schmid: Pattern Matching with Variables: Fast Algorithms and New Hardness Results. *STACS 2015*, LIPIcs 30, pp 302–315 (<http://drops.dagstuhl.de/opus/volltexte/2015/4922>).
4. T. Ehlers, F. Manea, R. Mercas, D. Nowotka: k -abelian pattern matching, In: *DLT 2014*, LNCS 8633, pp 178–190 (http://dx.doi.org/10.1007/978-3-319-09698-8_16).

5. C. Choffrut, R. Mercas: The lexicographic cross-section of the plactic monoid is regular, WORDS 2013, LNCS 8079, pp 83–94 (http://dx.doi.org/10.1007/978-3-642-40579-2_11).
6. J. Dassow, F. Manea, R. Mercas, M. Müller: Inner palindromic closure. In: DLT 2013, LNCS 7907, pp 155–166 (http://dx.doi.org/10.1007/978-3-642-38771-5_15).
7. R. Mercas, A. Saarela: 3-Abelian Cubes Are Avoidable on Binary Alphabets. In: DLT 2013, LNCS 7907, pp 374–383 (http://dx.doi.org/10.1007/978-3-642-38771-5_33).
8. P. Gawrychowski, F. Manea, R. Mercas, D. Nowotka, C. Tisceanu: Finding Pseudo-repetitions. STACS 2013, LIPIcs 20, pp 257–268 (<http://drops.dagstuhl.de/opus/volltexte/2013/3939>).
9. J. Dassow, F. Manea, R. Mercas: Connecting Partial Words and Regular Languages. In: CiE 2012, LNCS 7318, pp 151–161 (http://dx.doi.org/10.1007/978-3-642-30870-3_16).
10. S.Z. Fazekas, R. Mercas, K. Shikishima-Tsuji: Hairpin Completion with Bounded Stem-Loop. In: DLT 2012, LNCS 7410, pp 428–439 (http://dx.doi.org/10.1007/978-3-642-31653-1_38).
11. F. Manea, R. Mercas, D. Nowotka: Fine and Wilf’s Theorem and Pseudo-repetitions. In: MFCS 2012, LNCS 7464, pp 668–680 (http://dx.doi.org/10.1007/978-3-642-32589-2_58).
12. F. Manea, R. Mercas, C. Tisceanu: Periodicity Algorithms for Partial Words. In: MFCS 2011, LNCS 6907, pp 472–484 (http://dx.doi.org/10.1007/978-3-642-22993-0_43).
13. F. Blanchet-Sadri, J. Kim, R. Mercas, W. Severa, S. Simmons: Abelian square-free partial words. In: LATA 2010, LNCS 6031, pp 94–105 (http://dx.doi.org/10.1007/978-3-642-13089-2_8).
14. F. Blanchet-Sadri, R. Mercas, S. Simmons, E. Weissenstein: Avoidable binary patterns on partial words. In: LATA 2010, LNCS 6031, pp 106–117 (http://dx.doi.org/10.1007/978-3-642-13089-2_9).
15. F. Blanchet-Sadri, R. Mercas, K. Wetzler: The three-squares lemma for partial words with one hole. 7th International Conference on Words (2009).
16. C. Choffrut, R. Mercas: Contextual partial commutations. Automata: from Mathematics to Applications (AutoMathA 2009, Liège, Belgium).
17. A. Ortega, E. del Rosal, D. Pérez, R. Mercas, A. Perekrestenko, M. Alfonseca: PNEPs, NEPs for Context Free Parsing: Application to Natural Language Processing. In: IWANN 2009, LNCS 5517, pp 472–479 (http://dx.doi.org/10.1007/978-3-642-02478-8_59).
18. F. Blanchet-Sadri, E. Allen, C. Byrum, R. Mercas: How many holes can an unbordered partial word contain. In: LATA 2009, LNCS 5457, pp 176–187 (http://dx.doi.org/10.1007/978-3-642-00982-2_15).
19. F. Blanchet-Sadri, R. Mercas, A. Rashin, E. Willett: An Answer to a Conjecture on Overlaps in Partial Words Using Periodicity Algorithms. In: LATA 2009, LNCS 5457, pp 188–199 (http://dx.doi.org/10.1007/978-3-642-00982-2_16).
20. G. Bel Enguix, M. D. Jimenez-Lopez, R. Mercas, A. Perekrestenko: Networks of Evolutionary Processors as Natural Language Parsers. In: ICAART 2009 Proceedings, pp 626–631
21. F. Blanchet-Sadri, R. Mercas, G. Scott: Counting Distinct Squares in Partial Words. In: AFL 2008 Proceedings, pp 122–133.

C. Editing (specify co-authors)

1. R. Mercas, N. Pisanti. Special Issue LSD & LAW 2016 (Journal of Discrete Algorithms, Vol. 42, Issue 4, p 1). (<http://dx.doi.org/10.1016/j.jda.2016.12.002>).