
CURRICULUM VITAE

LIBOR BARTO

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- Born: January 15, 1980, Prague, Czech Republic
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Education

- 1998 - 2006 Charles University in Prague, Czech Republic
 - 2003 Master's degree in Mathematics (supervisor Prof. Věra Trnková)
 - 2006 Ph.D. in Mathematics (supervisor Prof. Věra Trnková)

Jobs

- 2007-present Assistant professor, Department of Algebra, Charles University in Prague, Czech Republic
- part of 2007 and 2008 Research assistant, Academy of Sciences of the Czech Republic
- July 2010 - June 2012 Postdoctoral fellow, McMaster University, Hamilton, Canada

Research interests

universal algebra, constraint satisfaction, computational complexity, combinatorics, category theory

Publications

Published papers

1. L. Barto, M. Kozik, R. Willard, *Near unanimity constraints have bounded pathwidth duality*, Proceedings of the 27th ACM/IEEE Symposium on Logic in Computer Science, LICS'12, 125-134
2. L. Barto, M. Kozik, *Robust satisfiability of constraint satisfaction problems*, Proceedings of the 44th symposium on Theory of Computing, STOC'12 (2012), 931-940. Also published in ECCC, Report No. 163 (2011)
3. L. Barto, M. Kozik, *Absorbing subalgebras, cyclic terms and the constraint satisfaction problem*, Logical Methods in Computer Science 8/1:07 (2012), 1-26
4. L. Barto, *The dichotomy for conservative constraint satisfaction problems revisited*, Proceedings of the 26th IEEE Symposium on Logic in Computer Science, LICS'11, 301-310
5. L. Barto, D. Stanovský, *Polymorphisms of small digraphs*, Novi Sad J. Math. 40/2 (2010), 95-109
6. L. Barto, M. Kozik, *Cyclic terms for $SD(v)$ varieties - revisited*, Algebra Universalis 64/1-2 (2010), 137-142
7. L. Barto, M. Kozik, *New conditions for Taylor varieties and CSP*, Proceedings of the 25th IEEE Symposium on Logic in Computer Science, LICS'10, 100-109
8. L. Barto, M. Kozik, *Congruence distributivity implies bounded width*, SIAM Journal on Computing 39/4 (2009), 1531-1542
9. L. Barto, M. Kozik, M. Maróti, R. McKenzie, T. Niven, *Congruence modularity implies cyclic terms for finite algebras*, Algebra Universalis 61/3 (2009), 365-380
10. L. Barto, M. Kozik, *Constraint Satisfaction Problems of Bounded Width*, Proceedings of the 50th Annual IEEE Symposium on Foundations of Computer Science, FOCS'09 (2009), 595-603
11. L. Barto, M. Kozik, M. Maróti, T. Niven, *CSP dichotomy for special triads*, Proc. Amer. Math. Soc. 137 (2009), 2921-2934
12. L. Barto, *Slices of essentially algebraic categories*, Applied Categorical Structures 17/2 (2009), 119-152
13. L. Barto, M. Kozik, T. Niven, *The CSP dichotomy holds for digraphs with no sources and no sinks (a positive answer to a conjecture of Bang-Jensen and Hell)*, SIAM Journal on Computing 38/5 (2009), 1782-1802
14. L. Barto, M. Kozik, T. Niven, *Graphs, Polymorphisms and the Complexity of Homomorphism Problems*, Proceedings of the 40th ACM Symposium on Theory of Computing, STOC'08 (2008), 789-796
15. L. Barto, *The category of varieties and interpretations is alg-universal*, Journal of Pure and Applied Algebra 211/3 (2007), 721-731

16. L. Barto, *Finitary set endofunctors are alg-universal*, Algebra Universalis 57/1 (2007), 15-26
17. L. Barto, P. Zima, *Every group is representable by all natural transformations of some set-functor*, Theory and Applications of Categories 14/13 (2005), 294-308
18. L. Barto, *Weakly terminal objects in quasicategories of set endofunctors*, Applied Categorical Structures 13 (2005), 257-264

Textbook

1. D. Stanovský, L. Barto, *Computer Algebra*, in Czech (Počítačová algebra), Matfyzpress, 2011

Accepted papers

1. L. Barto, *Finitely related algebras in congruence distributive varieties have near unanimity terms*, Canadian Journal of Mathematics, published electronically on December 24, 2011

Submitted papers

1. L. Barto, M. Kozik, *Constraint satisfaction problems solvable by local consistency methods*, submitted
2. L. Barto, J. Bulín, *CSP dichotomy for special polyads*, submitted

Papers in preparation (titles not final)

1. L. Barto, *A proof of the Valeriote conjecture*
2. L. Barto, *The collapse of the bounded width hierarchy*
3. L. Barto, M. Kozik, *Absorbing subuniverses and Mal'cev conditions*
4. L. Barto, *Accessible set endofunctors are universal*

Theses:

1. L. Barto, *Full embeddings and their modifications*, Ph.D. thesis, Charles University in Prague, 2006
2. L. Barto, *Functors close to full embeddings*, in Czech (Funktory blízké úplným vnořením), Master's thesis, Charles University in Prague, 2003

Talks

Invited plenary talks at conferences

- June 2012: *The Valeriote conjecture* at the Conference on Universal Algebra and Lattice Theory, Szeged, Hungary

- March 2012: *Robust algorithms for CSPs* at the 83rd Arbeitstagung Allgemeine Algebra, Novi Sad, Serbia
- June 2011: *Instances of the Constraint Satisfaction Problem in Universal Algebra* at the Second International Conference on Order, Algebra and Logics, Krakow, Poland
- June 2010: *An Application of CSP to Universal Algebra: A Proof of "The Crazy Zádori's Conjecture"* at the Workshop on Universal Algebra, Complexity and Constraint Satisfaction Problems, Lisbon, Portugal
- August 2009: *Prague strategies* at the Novi Sad Algebraic Conference, Novi Sad, Serbia
- November 2008: *Constraint satisfaction problems of bounded width* at the Annual Meeting of the Eduard Čech Center, Třešť, Czech Republic
- 2 invitations pending (the 4th Novi Sad Algebraic Conference, Novi Sad, Serbia, and the Conference on General algebra and Applications, Melbourne, Australia)

Other talks at conferences

- November 2012: *Robust Satisfiability of CSPs* at the workshop The Constraint Satisfaction Problem: Complexity and Approximability, Schloss Dagstuhl, Germany
- September 2012: *Decidability of absorption for relational structures* at the 50th Summer School on Algebra and Ordered Sets, Nový Smokovec, Slovakia
- August 2011: *Robust approximation of CSPs* at the Workshop on Approximability of CSPs, Toronto, Canada
- August 2011: *A welcome conservative talk* at the Workshop on Algebras and CSPs (a part of Summer Thematic Program on the Mathematics of Constraint Satisfaction at the Fields Institute), Toronto, Canada
- June 2011: *The Dichotomy for Conservative Constraint Satisfaction Problems Revisited* at LICS 2011, Toronto, ON, Canada
- March 2011: *Applications of the Constraint Satisfaction Problem to Universal Algebra* at the AMS Spring Central Section Meeting, Iowa City, IA, USA
- June 2010: *Rectangularity Theorem for Conservative Algebras* at the 80th Arbeitstagung Allgemeine Algebra, Bedlewo, Poland
- October 2009: *Constraint satisfaction problems of bounded width* at FOCS 2009, Atlanta, USA
- September 2009: *Congruence distributivity and near unanimity* at the Summer School on Algebra and Ordered Sets 2009, Stará Lesná, Slovakia
- June 2009: *Cyclic terms for join semi-distributive varieties I* at the 78th Arbeitstagung Allgemeine Algebra, Bern, Switzerland
- June 2009: *On the complexity of H-coloring*, In Czech (O složitosti H-barvení digrafu) at STTI 2009, Prague, Czech Republic

- May 2009: *CSPs of bounded width II* at CanaDAM 2009, Montreal, Canada
- September 2008: *The algebraic approach to CSP* at the Fall School of Logic & Complexity, Prague, Czech Republic
- May 2008: *CSP and $NU(4)$* at the 76th Workshop on General Algebra, Linz, Austria
- September 2007: *Modularity and coloring of terms by variables* at the 45th Summer School on General Algebra and Ordered Sets, Tale, Slovakia
- July 2007: *Jónsson terms imply cyclic terms for finite algebras* at the Conference on Algorithmic Complexity and Universal Algebra, Szeged, Hungary
- June 2007: *Set functors determined by values on objects* at the International Conference on Order, Algebra, and Logics, Nashville, USA
- February 2007: *Baskets of essentially algebraic categories* at the 73rd Arbeitstagung Allgemeine Algebra, Klagenfurt, Austria
- November 2006: *Clones are comprehensive* at the ECC meeting, Telč, Czech Republic
- September 2006: *The category of varieties is alg-universal* at the Summer School on General Algebra and Ordered Sets, Radějov, Czech Republic
- February 2006: *Algebraic universality of set endofunctors* at the 71st Arbeitstagung Allgemeine Algebra, Bedlewo, Poland
- June 2004: *Axioms for Concrete Categories* at the Week of Doctoral students, Prague

Seminar talks at foreign institutions

- November 2012: *Constraint satisfaction problem, decision and optimisation* at Paris 7, France
- May 2012: *Robust algorithms for CSPs* at University of Denver, CO, USA
- February 2012: *The complexity of CSPs* at McMaster University, Hamilton, ON, Canada
- October 2011: *Robust approximation of constraint satisfaction problems* at McMaster University, Hamilton, ON, Canada
- July 2011: *Categories and Magic Taylor* at Fields Institute, Toronto, ON, Canada
- October 2010: *The complexity of constraint satisfaction problems* at McMaster University, Hamilton, ON, Canada
- February 2010: *Absorption* at Vanderbilt University, Nashville, TN, USA
- September 2009: *Finitely related algebras generating a congruence distributive variety* at University of Szeged, Hungary
- December 2008: *Constraint satisfaction problems of bounded width* at Jagiellonian University in Krakow, Poland
- November 2008: *Meet semidistributivity has bounded width* at University of Szeged, Hungary

- December 2007: *The algebraic approach to CSP, recent progress* at Jagiellonian University in Krakow, Poland
- November 2007: *The algebraic approach to the constraint satisfaction problem, recent progress* at University of Linz, Austria

Grant participation

All grants listed are funded by the Czech government.

- 2002 - 2004: GAČR 201/02/0148 *Categorical methods in informatics and structural mathematics*
- 2006 - 2008: GAČR 201/06/0664 *Categorical methods in structural mathematics*
- 2007: LC 505 Eduard Čech Center (a project within the scheme “Centers of Excellence in Basic Research”)
- 2008 - 2009: MEB 050817 *An Algebraic Approach to the Constraint Satisfaction Problem*, Czech-Polish cooperation project
- 2009 - 2010: MEB 040915 *Graph, Grupoids and Algorithms*, Czech-Hungarian cooperation project
- 2009 - 2011: GAČR 201/09/P223 *Constraint Satisfaction Problem and Universal Algebra*, postdoctoral project

Teaching Experience

Tutorials

- 2003/04 fall Linear Algebra and Geometry
- 2003/04 spring Linear Algebra and Geometry
- 2004/05 fall Linear Algebra and Geometry
- 2004/05 spring Linear Algebra and Geometry
- 2005/06 fall Linear Algebra and Geometry
- 2005/06 spring Linear Algebra and Geometry
- 2006/07 fall Linear Algebra and Geometry
- 2006/07 spring Computer Algebra, Linear Algebra and Optimization
- 2007/08 fall Algebra
- 2008/09 fall Linear Algebra and Geometry, Algebra
- 2008/09 spring Linear Algebra and Geometry
- 2009/10 fall Tame Congruence Theory Seminar, Linear Algebra and Geometry

- 2009/10 spring CSP Seminar, Tame Congruence Theory Seminar

Lectures

- 2006/07 spring Computer Algebra
- 2007/08 spring Finite Fields
- 2008/09 spring Finite Fields
- 2009/10 fall Introduction to the Complexity of the CSP
- 2009/10 spring Linear Algebra and Geometry, Computer Algebra
- 2010/11 fall Calculus for Science I (at McMaster University)
- 2010/11 spring Calculus for Science II (at McMaster University)
- 2011/12 fall Calculus for Science I (at McMaster University)
- 2011/12 spring Graph Theory (at McMaster University)

Other

- Awards
 - 2012: The Neuron prize for young mathematicians given by Karel Janeček Foundation
 - 2012: Honorable mention of the president of the Czech Science Foundation for the results in the postdoctoral GAČR project Constraint Satisfaction Problem and Universal Algebra
 - successful participation in many mathematical competitions for high school students and university students, best results:
 - * 1997: Silver medal at International Mathematical Olympiad, Argentina
 - * 1998: Silver medal at International Mathematical Olympiad, Taiwan
 - * 2000: First prize at International Mathematical Competition for University Students, United Kingdom
 - 1998: Grammar School Student Award of the Learned Society of the Czech Republic
- Advising
 - extensive advising of bachelor and master students
 - currently advising 3 graduate students (J. Bulín, A. Kazda, J. Opršal)
- Organization of conferences, workshops, etc.

- July 2011: Workshop on Algebra and CSPs, part of Summer Thematic Program on the Mathematics of Constraint Satisfaction at the Fields Institute, Toronto (chair of the program committee)
 - June 2010: International Conference on Algebras and Lattices, Prague, Czech Republic (a member of the organizing triumvirate)
 - August 2009: CSP workshop, Prague, Czech Republic (organizer)
 - September 2008: 46th Summer School on Algebra and Ordered Sets, Třešť, Czech Republic (a member of the organizing quadrumvirate)
 - 1998-2006: Correspondence Seminar for high school students, mathematical camps
- Refereeing and reviewing
 - Algebra Universalis, Contributions to General Algebra, Czech. Math. Journal, Discrete Mathematics, EMS newsletter, FOCS, Journal of the ACM, SIAM Journal on Discrete Mathematics, SODA, Transactions of Computational Logic, STACS
- Languages
 - active knowledge of English
 - passive knowledge of German
- Extracurricular activities
 - flute, recorder, piano
 - hiking, soccer, floorball, downhill skiing, ...