

# Jan Hubička

## Work Address

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## Permanent Address

Dukelských bojovníků 1944  
390 03 Tábor  
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Born April 1, 1978 in Tábor, Czech Republic

## Education

*PhD Degree in Computer Science* 2002–2010

Faculty of Mathematics and Physics, Charles University in Prague  
Thesis: *Combinatorial Properties of Finite Models*, advisor Jaroslav Nešetřil

*Master Degree in Computer Science* 1997–2002

Faculty of Mathematics and Physics, Charles University in Prague  
Thesis: *Ramsey Properties of Universal Sets*, advisor Jaroslav Nešetřil

## Employment history

*Computer Science Institute, Charles University, Prague* since 2012  
Researcher

*SUSE ČR s.r.o, Prague* since 2016  
Senior manager

*University of Calgary, Calgary* 2014–2015  
PIMS Postdoctoral Fellow

*SUSE ČR s.r.o, Prague* 2000–2013  
Senior software developer

*Institute of Theoretical Computer Science, Charles University, Prague* 2003–2013 and since 2016  
Researcher

## Publications

*Papers published in refereed international journals*

1. J. Hubička, J. Nešetřil: Homomorphism and embedding universal structures for restricted classes, *Journal of Multiple-Valued Logic and Soft Computing* 27 (2–3) (2016), 229–253.  
0 citations by WoS, 12 by Google Scholar.
2. D. Hartman, J. Hubička, J. Nešetřil: Complexities of relational structures, *Mathematica Slovaca* 65 (2) (2015), 229–246.  
2 citations by WoS, 8 by Google Scholar.
3. D. Hartman, J. Hubička, D. Mašulovič: Homomorphism-homogeneous  $L$ -colored graphs, *European Journal of Combinatorics* 35 (2014), 313–323.  
1 citation by WoS and Google Scholar.
4. J. Fiala, J. Hubička, Y. Long: Universality of intervals of line graph order, *European Journal of Combinatorics* 41 (2014), 221–231.  
0 citations by WoS, 5 by Google Scholar.

5. J. Hubička, J. Jost, Y. Long, P. F. Stadler, L. Yang: Relations between graphs, *Ars Mathematica Contemporanea* 6 (2) (2012), 323–250.  
0 citations by WoS, 1 by Goole Scholar.
6. J. Hubička, J. Nešetřil: A Finite Presentation of the rational Urysohn Space, *Topology and its Applications* 155 (14) (2008), 1483–1492.  
5 citations by WoS, 13 by Google Scholear.
7. J. Hubička, J. Nešetřil: On universal posets represented by means of trees and other simple graphs, *European Journal of Combinatorics* 26 (2005), 765–778.  
20 citations by WoS, 45 by Google Scholar.
8. J. Hubička, J. Nešetřil: Finite presentation of homogeneous graphs, posets and Ramsey classes, *Israel Journal of Mathematics* 149 (2005), 21–44.  
13 citations by WoS, 37 by Google Scholar.
9. J. Hubička, J. Nešetřil: Finite Paths are Universal, *Order* 21 (2004), 181–200, and, *Order* 22 (2005), 21–40.  
11 citations by WoS, 30 by Google Scholar.

*Book Chapters (refereed)*

10. J. Hubička, J. Nešetřil: Universal structures with forbidden homomorphisms, *Logic Without Borders: Essays on Set Theory, Model Theory, Philosophical Logic and Philosophy of Mathematics* (2015), 241–264.  
11 citations by Google Scholar.
11. J. Hubička, J. Nešetřil: Some examples of universal and generic partial orders, *Model Theoretic Methods in Finite Combinatorics: AMS-ASL Special Session, 2009*, 293–318.  
1 citation by WoS, 4 by Google Scholar.

*Papers accepted to refereed international journals*

12. J. Fiala, J. Hubička, J. Nešetřil, Y. Long: Fractal property of the graph homomorphism order, Accepted to Eurocomb 2015 volume of *European Journal of Combinatorics*, arXiv:1606.07881, 10 pages.

*Papers accepted to international conferences*

13. J. Hubička, J. Nešetřil: Ramsey classes with forbidden homomorphisms and a closure (extended abstract), Eurocomb 2015, *Electronic Notes in Discrete Mathematics* 49(2015), 737–745.  
2 citations by Google Scholar.
14. J. Fiala, J. Nešetřil, Y. Long: An universality argument for graph homomorphisms (extended abstract), Eurocomb 2015, *Electronic Notes in Discrete Mathematics* 49(2015), 643–649.  
1 citation by Google Scholar.
15. D. Hartman, J. Hubička, J. Nešetřil: Towards bounds of relational complexity (extended abstract), *Bordeaux Graph Workshop, 2014*, 17–18.
16. D. Hartman, J. Hubička, J. Nešetřil: Combinatorial bounds on relational complexity (extended abstract), Eurocomb 2014, *The Seventh European Conference on Combinatorics, Graph Theory and Applications, CRM Series 16* (2013), 573–578.
17. J. Hubička, T. Glek: Optimizing real world applications with GCC Link-Time Optimization. *GCC Developers’ Summit Proceedings 2010*, 25–46.  
11 citations by Google Scholar.
18. J. Hubička: Interprocedural optimization framework in GCC. *GCC Developers’ Summit Proceedings 2007*, 59–68.  
8 citations by Google Scholar.
19. J. Hubička: Interprocedural optimization on function local SSA form. *GCC Developers’ Summit Proceedings 2006*, 75–84.  
6 citations by Google Scholar.

20. J. Hubička: Profile driven optimizations in GCC. GCC Developers' Summit Proceedings 2005, 107–124.  
22 citations by Google Scholar.
21. J. Hubička, Z. Kovács, Z. Kovács: Visualizations on the complex plane, Computer algebra systems and dynamic geometry systems in mathematics teaching, Proceedings of “Sprout-Selecting” Conference, 12-27, 2004.
22. J. Hubička: Call graph module in GCC. GCC Developers' Summit Proceedings 2004, 64–78.  
12 citations by Google Scholar.
23. J. Hubička: Porting GCC to the AMD64 architecture. GCC Developers' Summit Proceedings 2003, 79–106.  
9 citations by Google Scholar.

*Other publications (selected)*

24. J. Hubička, Odhad kvality fotografických materiálů a metody jejich digitalizace (in Czech), Zprávy památkové péče, National Heritage Institute, 1/2016.
25. J. Hubička, Combinatorial Properties of Finite Models, dissertation thesis, 2010.  
1 citation by Google Scholar.
26. J. Hubička, Digitizing historical photographs at Šechtl and Voseček Musuem of Photography (in Czech), Digitalizace aneb konec oslích uší, National Library, Prague, 2010.
27. J. Hubička, Šechtl and Voseček Studios (in Czech), Historická fotografie, 2007.
28. Z. Dvořák, J. Hubička, P. Nejedlý and J. Zlomek: Infrastructure for Profile Driven Optimizations in GCC Compiler, project report, 2003.
29. J. Hubička, Ramsey Properties of Universal Sets (in Czech), diploma thesis, Charles University 2002.  
3 citations by Google Scholar.
30. H.J. Lu, M. Matz, J. Hubička, A. Jaeger, M. Mitchel (ed.): System V Application Binary Interface. x86-64 Architecture Processor Supplement, 2000–2007. (Original author of specification of low-level datastructure layout and function call conventions.)  
52 citations by Google Scholar.
31. H.J. Lu, M. Matz, J. Hubička, A. Jaeger, M. Mitchel (ed.): System V Application Binary Interface K10M Architecture Processor  
2 citations by Google Scholar.

*Submitted*

32. J. Hubička, J. Nešetřil: Bowtie-free graphs have a Ramsey lift, submitted to Advances in Applied Mathematics, arXiv:1402.2700, 2015, 22 pages.  
2 citations by Google Scholar.
33. J. Hubička, J. Nešetřil: All those Ramsey classes: Ramsey classes with closures and forbidden homomorphisms, submitted to Advances in Mathematics, arXiv:1606.07979, 2016, 59 pages.  
3 citations by Goole Scholar.

*In final stages of preparation*

34. D. Evans, J. Hubička, J. Nešetřil: Automorphism groups and Ramsey properties of sparse graphs, 56 pages.
35. D. Evans, J. Hubička, J. Nešetřil: On Ramsey property, ordering property and extension property for partial automorphisms of free amalgamation classes with functions and relations, 22 pages.
36. J. Hubička, J. Nešetřil: Ramsey classes with closure operations (selected combinatorial applications), 15 pages.
37. J. Fiala, J. Hubička, Y. Long: Constrained homomorphism orders, 30 pages.

38. M. Novák, J. Hubička, P. Šemíková, B. Martínková: Možnosti restaurování a digitalizace historických fotografických a kinematografických materiálů, nasnímaných v letech 1930 – 2000 na barevné inverzní originály Kodachrome (in Czech), 67 pages.
39. J. Hubička, M. Jambor: Optimization of polymorphic calls in modern C++ programs, 12 pages.

### **Teaching experience**

1. Co-lecturer of Selected topics in Combinatorics I,II (with J. Nešetřil), Charles University, Prague, 2015–2016
2. Lecturer of Math 311 — Linear Methods II, University of Calgary, 2015
3. Lecturer of Math 211 — Linear Methods I, University of Calgary, 2014
4. Lecturer of Advanced code optimization techniques used in industrial strength compilers, Charles University, Prague, 2008–2013
5. Lecturer of seminar Advanced code optimization techniques used in industrial strength compilers, Charles University, Prague, 2003–2008
6. Lecturer of workshop Digitalizace fotografií, National Technical Museum, Prague, 2009
7. Teaching assistant of Algorithms, Charles University, Prague, 2004–2007, 2009
8. Teaching assistant of Discrete Mathematics, Charles University, Prague, 2002–2004

### **Master degree students**

1. Martin Jambor: Optimizations in the GNU Compiler Collection targeted at scientific computing, 2005–2007
2. Ondřej Bílka: Pattern Matching in Compilers, 2011–2012
3. Martin Liška: Optimizing large applications, 2012–2013
4. Ladislav Láška: Scalable link-time optimization, 2015–2017

### **Current students**

1. Ondřej Bílka: Optimizing dynamic and functional languages, doctoral student, 2013–present

### **Organization of conferences and service to community**

1. Main organizer of workshops “GNU Tools Cauldron”, Charles University, Prague, 2012, 2015, 2017
2. Ramsey DocCourse Prague 2016 (co-organized with J. Nešetřil), Charles University, Prague, 2016
3. Co-organizer of workshops “GNU Tools Cauldron”, 2013 (Google Headquarters, Mountain View), 2014 (Cambridge), 2016 (Hedben Bridge)
4. Workshop “Space, Color”, Motion, National Technical Museum Prague, 2013
5. Main organizer of workshop “GNU Tools Cauldron”, Charles University, Prague, 2012
6. Workshop “Legacy of three color photography”, National Technical Museum, Prague, 2008

### Membership in program committees

1. Workshop “GNU Tools Cauldron”, Charles University, Prague, 2012-2017
2. Ramsey DocCourse Prague 2016, Charles University, Prague, 2016
3. Workshop “Space, Color, Motion”, National Technical Museum, Prague, 2013
4. Workshop “GROW 2011: 3rd International Workshop on GCC Research Opportunities”, CGO, Chamonix 2011
5. Workshop “2nd International Workshop on GCC Research Opportunities”, HiPEAC 2010, Pisa, 2010
6. Workshop “GCC Research Opportunities, 4th International Conference on High-Performance Embedded Architectures and Compilers”, HiPEAC, Paphos, 2009
7. Workshop “Legacy of three color photography”, National Technical Museum, Prague, 2008
8. Workshop “GREPS: International Workshop on GCC for Research in Embedded and Parallel Systems, 16th International Conference on Parallel Architectures and Compilation Techniques”, PACT, Brasov, 2007

### Awards and grants

1. IBM Faculty Award 2015
2. PIMS Postdoctoral Fellowship, 2014–2015

### Participation in research networks

1. STRUCO (Structures in Combinatorics), associated International Laboratory of CNRS between DIMATIA, Prague, and LIAFA, Paris, since 2012
2. HiPEAC (European Network on High Performance and Embedded Architecture and Compilation), since 2009
3. COMBSTRU (Combinatorial Structure of Intractable Problems), 2002–2006

### Lectures (selected, invited lectures emphasized)

1. *Ramsey properties of Hrushovski construction*. The British Postgraduate Model Theory Conference, Leeds 2017
2. Series of 5 lectures at Ramsey DocCourse Prague 2016, Charles University, Prague, September 15 – December 31, 2016
3. *All those Ramsey classes (Ramsey classes with closures and forbidden homomorphisms)*. Logic Colloquium, Leeds 2016.
4. Porting GCC to AMD GCN microarchitecture. GNU Tools Cauldron, Hedben Bridge, 2016
5. *Porting GCC to AMD GCN microarchitecture*. SUSElabs conference, Mikulov, 2016
6. *Ramsey Classes by Partite Construction*. 2 lectures. Permutation Groups and Transformation Semigroups, EPSRC Durham Symposium, 2015
7. *An universality argument for graph homomorphisms*. Eurocomb, 2015
8. *Ramsey classes with forbidden homomorphisms and a closure*. Eurocomb, 2015
9. *Ramsey classes with forbidden homomorphisms and a closure*. Shanghai Jiao Tong University, 2015
10. Ramsey lifts of classes of intersection graphs. CanaDAM, 2015
11. *Ramsey classes with algebraic closure and forbidden homomorphisms*. Logic Seminar, University of Illinois at Urbana-Champaign, 2015
12. *Examples of Ramsey lifts*. Combinatorial Seminar, University of Illinois at Urbana-Champaign, 2015
13. Types and type based optimizations in GCC. GNU Tools Cauldron, Charles University, Prague 2015
14. *Multiamalgamation classes are Ramsey*. Homogeneous Structures, Banff 2015

15. *Ramsey classes—properties, examples and constructions*. Combinatorial seminar, Iowa State University 2015
16. Devirtualization in GCC, GNU Tools Cauldron, Cambridge, 2014
17. *Interprocedural and link-time optimization in GCC*. IBM Colloquia, New York, 2014
18. *Ramsey classes with algebraical closure and forbidden homomorphisms*. Algebraic and Model Theoretical Methods in Constraint Satisfaction, Banff, 2014
19. Collection of Finlay-Color negatives from the American Colony in Jerusalem. Space, Color, Motion, National Technical Museum, Prague, 2013
20. *Combinatorial bounds on relational complexity*. Eurocomb, Pisa, 2013
21. *Ramsey expansions of classes with non-trivial algebraic closure*, Descriptive Set Theory Seminar, Rutgers, 2014
22. *Bowtie-free graphs have Ramsey lift*. Universality and Homogeneity Hausdorff Trimester Program, Bonn, 2013
23. Constrained homomorphism orders. ČS Grafy, Litomyšl, 2012
24. Constrained homomorphism orders. Shanghai Conference on Algebraic Combinatorics, Shanghai, 2012
25. *Locally injective homomorphisms are universal*. 2nd Workshop on Homogeneous Structures, Charles University, Prague, 2012
26. Constrained homomorphism orders. Bordeaux Graph Workshop, Bordeaux, 2012
27. Link time optimization in GCC. OpenSUSE conference, Nuernberg, 2011
28. *Explicit construction of universal structures as shadows of ultrahomogeneous structures*. LMS Northern Regional Meeting and Workshop on Homogeneous Structures, Leeds 2011
29. Digital processing of early color photography. OpenSUSE conference, Nuernberg, 2011
30. *Digitální zpracování Ranné barvné fotografie*. Archivy, knihovny a muzea v digitálním světě, 2011
31. Optimizing real world applications with GCC Link Time Optimization. GCC Summit, Ottawa, 2010
32. Some examples of universal and generic partial orders. Young Researchers Forum, MFCS, 2010
33. Universal structures as shadows of ultrahomogeneous structures. Fete of Combinatorics and Computer Science 2009, Keszthely, Hungary
34. *Digitizing Historical Negatives*. 9. konference Archivy, knihovny, muzea v digitálním světě. Selected as the best presentation of the conference, National Archive, Prague, 2008
35. *Digitalizace fotografických předloh*, digitalizace fotografií, National Technical Museum, Prague 2008
36. *Interprocedural Optimization Framework*. Gelato ICE Conference & Expo, San Jose, California , 2007
37. Interprocedural optimization framework in GCC. GCC Summit, Ottawa, 2007
38. Interprocedural optimization on function local SSA form in GCC. GCC Summit, Ottawa, 2006
39. *Profile Driven Optimizations in GCC*. Gelato GCC on Itanium Improvement Workshop, Russian Academy of Sciences, Moscow, 2006
40. *Finite Paths are Universal*. COMBSTRU final workshop, Barcelona, 2006
41. Preparing of Albumen Paper. Historické fotografické techniky/Edeldrucke, Jindřichův Hradec, 2006
42. Profile driven optimizations in GCC. GCC Summit, Ottawa, 2005
43. Call graph module in GCC (framework for intraprocedural optimization). GCC Summit, Ottawa, 2004
44. x86-64 support in GCC. GCC Summit, Ottawa, 2003

### Software projects (selected)

1. Port of AMD GCN architecture, since 2016
2. Incremental scalable link time optimization framework in GCC, since 2009
3. Interprocedural optimization framework in GCC, since 2004
4. Port of GCC to x86-64 architecture, Architecture Binary Interface design, since 2000
5. Profile driven optimizations in GCC, 1998–2003
6. GNU Compiler Collection (GCC) i386 backend improvements, 1997–2000
7. AA-project (ASCII art library and tools), 1997–2000
8. XaoS (realtime fractal zoomer), 1995–1999
9. Koules (game), 1993–1995

### Other activities

*Digitization of archive Šechtl and Voseček* since 2004  
Software, web pages, historical research, co-authoring texts for exhibitions, preparing digital prints from historical negatives and cooperating on preparing the exhibitions

*Co-maintainer of GNU Compiler Collection* since 2001  
Maintainer of inter-procedural optimization framework, profile feedback optimization framework and x86 backend