

Viktor Kunčak

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School of Computer & Communications Sciences, INR 318
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Research Interests: Automated Software Synthesis, Verification, Automated Reasoning

Work Experience Summary

- 2012- **Associate Professor**
School of Computer and Communication Sciences
EPFL (École Polytechnique Fédérale de Lausanne), Switzerland
- 2007-2012 **Tenure-Track Assistant Professor**
School of Computer and Communication Sciences
EPFL (École Polytechnique Fédérale de Lausanne), Switzerland
- 2000-2007 **Research Assistant**
MIT Computer Science and Artificial Intelligence Laboratory, Cambridge, MA, USA
- Summer 2002 **Research Intern**, Microsoft Research, Redmond, WA

Education

- 2001-2007 **Massachusetts Institute of Technology, Cambridge, USA**
Ph.D. in Computer Science (degree date February 2007), GPA 5.0/5.0
Thesis: Modular Data Structure Verification Advisor: Prof. Martin Rinard
- 2000-2001 **Massachusetts Institute of Technology, Cambridge, USA**
M.Sc. in Computer Science, Minor in Physics, September 2001, GPA 5.0/5.0
Thesis: Designing an Algorithm for Role Analysis Advisor: Prof. Martin Rinard
- 1996-2000 **University of Novi Sad, Serbia**
B.Sc. in Computer Science, GPA 10.0/10.0, Best Student of the University Award
Thesis: Modular Interpreters in Haskell Advisor: Prof. Mirjana Ivanović

Five Recent Publications

- **Synthesizing Java expressions from free-form queries.**
Tihomir Gvero and Viktor Kuncak.
In *ACM SIGPLAN SPLASH Conference on Programming (OOPSLA Research Paper)*, 2015.
- **Deductive program repair.**
Etienne Kneuss, Manos Koukoutos, and Viktor Kuncak.
In *Computer-Aided Verification (CAV)*, 2015.
- **Sound compilation for reals.**
Eva Darulova and Viktor Kuncak.
In *ACM SIGACT-SIGPLAN Symposium on Principles of Programming Languages (POPL)*, 2014.
- **Symbolic resource bound inference for functional programs.**
Ravichandhran Madhavan and Viktor Kuncak.
In *Computer Aided Verification (CAV)*, 2014.
- **Complete completion using types and weights.**
Tihomir Gvero, Viktor Kuncak, Ivan Kuraj, and Ruzica Piskac.
In *ACM SIGPLAN Conf. Programming Language Design and Implementation (PLDI)*, 2013.

Keynotes at Conferences and Invited Presentations

- Keynote: 7th NASA Formal Methods Symposium (NFM), April 2015
- Keynote: 24th International Symposium on Logic-Based Program Synthesis and Transformation (LOPSTR), September 2014
- Invited Talk: 3rd Workshop on Synthesis (SYNT), July 2014
- Keynote: International Colloquium on Automata, Languages, and Programming (ICALP), 8-11 July 2014, Copenhagen, Denmark
- Distinguished Lecture, Max-Planck Institute for Software Systems, February 2014
- Keynote: Runtime Verification (RV), 2013
- Keynote: Satisfiability Modulo Theories (SMT), with CAV, July 2011, USA, <http://lara.epfl.ch/~kuncak/talks/smt11-keynote.pdf>
- Keynote: Intermediate Verification Languages, with CADE, August 2011, PL
- Keynote: Interactions, Games and Protocols (iWIGP), with ETAPS, March 2011, DE
- Practical Synthesis (PSY), with CAV, July 2011, USA
- Keynote: 19th Annual Conference on Computer Science Logic (CSL), August 2010, Brno, CZ
- Invited Tutorial: Verification, Model Checking and Abstract Interpretation (VMCAI), 2010
- Symposium “Reactive Modeling in Science and Engineering”, May 2010, IST Austria
- Keynote: Aliasing, Confinement and Ownership in Object-Oriented Programming, July 2009
- Keynote: KeY Symposium, May 2009, Speyer, DE
- Automated Deduction: Decidability, Complexity, Tractability (ADDCT), July 2007, Bremen, DE
- Dagstuhl Seminars (including seminars 03101, 05431, 07401, 09301, 09411, 09501) and COST Action meetings
- The above does not include conference talks or talks given at the occasion of visiting universities and research labs, such as: Caltech, CMU, Cornell, IBM T.J. Watson Research Center, LIAFA (Paris VII), LSV (ENS Cachan), Microsoft Research (Redmond, Cambridge), MIT, MPI for Software Systems and MPI for Computer Science (Saarbrücken), New York University, Northeastern University, Stanford University, Toyota Technological Institute at Chicago, TU München, UC Berkeley, University of Illinois (Urbana-Champaign), University of Maryland, University of Novi Sad, UT Austin, Verimag (Grenoble).

PC Co-Chair:

- SYNT 2015: 4th Workshop on Synthesis
- FMCAD 2014: 14th Conference on Formal Methods in Computer-Aided Design
- VMCAI 2012: 13th International Conference on Verification, Model Checking, and Abstract Interpretation, <http://lara.epfl.ch/vmcai2012/>

Workshop initiator and co-organizer: Workshop on Synthesis, Verification, and Analysis of Rich Models (SVARM), <http://RichModels.org>, 2010, 2011, 2012

Co-organized Summer School: Software Synthesis, Dagstuhl, August 2011

Publication chair: FMCAD 2011 (Formal Methods in Computer-Aided Design)

Conference program committee member for 30+ conferences: ACM Conf. Principles of Programming Languages (POPL 2016, POPL 2012 ERC, POPL 2011), ACM Conf. Programming Language Design and Implementation (PLDI 2014 ERC, PLDI 2013 ERC, PLDI 2011, PLDI 2010 ERC, PLDI 2007), Computer Science Logic and Logic in Computer Science (CSL-LICS 2014), Static Analysis Symposium (SAS 2014, SAS 2011), Conference on Automated Deduction / International Joint Conference on Automated Reasoning (CADE/IJCAR 2014, 2011, 2010, 2008), 40th International Colloquium on Automata, Languages, and Programming (ICALP 2013), Computer Aided Verification (CAV 2012), Conference on Computer Science Logic (CSL 2012, 2011), OOPSLA

2012 ERC, European Symposium on Programming (**ESOP 2011**), Conf. Verification, Model Checking, and Abstract Interpretation (**VMCAI 2011**), Runtime Verification (**RV 2011**), Formal Methods in Computer-Aided Design (**FMCAD 2011**), ASM, Alloy, B and Z Conference (**ABZ 2010**), Frontiers of Combining Systems (**FroCoS 2009**), European Conference on Object-Oriented Programming (**ECOOP 2009**), International Conference on Compiler Construction (**CC 2009**), 35th International Conference on Current Trends in Theory and Practice of Computer Science (**SOFSEM 2009**), Int. Conf. on Logic for Programming, Artificial Intelligence and Reasoning (**LPAR 2006**, **LPAR 2007**),

Extended review committee member, PC member of workshops and newer conferences: Scala Workshop 2013, Partial Evaluation and Program Manipulation (**PEPM 2010**), Bytecode Semantics, Verification, Analysis and Transformation (**BYTECODE 2010**), Java Technology for Real-time and Embedded Systems (**JTRES 2010**), Heap Analysis and Verification (**HAV 2007**), Automated Deduction: Decidability, Complexity, Tractability (**ADDCT 2007**), Automatic Program Verification (**APV 2009**), Int. Conf. Formal Verification of Object-Oriented Software (**FoVeOOS**).

Additionally refereed for ACM Conf. on Programming Language Design and Implementation, *PLDI* 2001–2004, 2007–2009, 2012; ACM Symposium on the Principles of Programming Languages, *POPL* 2001, 2005, 2006, 2008, 2009, 2010; *SAS* 2004; *VMCAI* 2006; *OOPSLA* 2002; ACM Transactions on Software Engineering and Methodology, *TOSEM*; IEEE Transactions on Software Engineering, *TSE*; *LICS* 2004; ACM Transactions on Computational Logic, *TOCL*; *PODC* 2004; *TACAS* 2004; *FSTTCS* 2002, 2003; *IFIP* World Computer Congress 2004; *IWACO* 2003.

Graduated doctoral students:

1. Ruzica Piskac (2007-2011), tenure-track assistant professor at Yale University, USA
2. Philippe Suter (2008-2012), Researcher at IBM T.J. Watson Research Center, USA
3. Hossein Hojjat (2009-2013), post-doctoral researcher at Cornell University, USA
4. Giuliano Losa (2009-2013), co-supervised with Rachid Guerraoui
5. Tihomir Gvero (2010-2014)
6. Eva Darulova (2010-2014), tenure-track assistant professor at the Max-Planck Institute for Software Systems, Germany

Current doctoral students: Etienne Kneuss, since 2012, Regis Blanc, since 2013, Ravichandhran Kandhadai Madhavan, since 2013, Mikaël Mayer, since 2013, Emmanouil Koukoutos, since 2014.

Funding awarded (updated in 2012):

period	amount	co-PI	source	topic
2008–2012	185'000 CHF	none, sole PI	Swiss NSF	Prog. Analysis (2 gr.)
2011–2012	190'000 CHF	none, sole PI	Swiss NSF	Software Synthesis
2010–2013	173'000 CHF	R.Guerraoui	Swiss NSF	Dist. Computing (2 gr.)
2008–2012	1'086'000 CHF	M.Odersky T.Henzinger	Microsoft	Software Quality Tools
2010–2013	100'000 CHF	Predrag Janičić Serbia	Swiss NSF Cooperation	Decision Procedures
2009–2013	~ 400'000 CHF for 30 countries	many	COST Office www.cost.eu	Rich Model Toolkit
2012-2017	~ 1'739'200 CHF	none, sole PI	ERC	Implicit Programming
2013-2016	~ 350'000 CHF	sole PI	Swiss NSF	Constr. Solving (2 gr.)
2015-2018	105'000 CHF	Srdjan Škrbić Serbia	Swiss NSF Cooperation	Capacity Development

Reviewed proposals for major funding agencies in Switzerland, USA, France, and the Netherlands.

Doctoral thesis committee member for Ph.D. theses:

1. Victor Bushkov (director: Rachid Guerraoui), EPFL, 2015
2. Heather Miller (director: Martin Odersky), EPFL, 2015

3. Hubert Plociniczak (director: Martin Odersky), EPFL, 2015
4. Aleksandar Prokopec (director: Martin Odersky), EPFL, 2014
5. Dejan Nemanja Novaković, 2014
6. Lukas Rytz (director: Martin Odersky), EPFL, 2013
7. Ingo Maier, “Reactive Programming Abstractions for Complex Event Logic and Dynamic Data Dependencies”, EPFL (director: Martin Odersky), 2013
8. Tiark Ropff, “Lightweight Modular Staging and Embedded Compilers: Abstraction without Regret for High-Level High-Performance Programming”, EPFL (director: Martin Odersky), 2012
9. Cezara Drăgoi, “Automated verification of heap-manipulating programs with infinite data”, Universite Paris Diderot—Paris 7, 2011 (directors: Ahmed Bouajjani and Mihaela Sighireanu)
10. Gilles Dubochet, “Embedded domain-specific languages using libraries and dynamic metaprogramming”, EPFL 2011 (director: Martin Odersky)
11. Philipp Haler, “Isolated Actors for Race-Free Concurrent Programming”, EPFL 2010 (director: Martin Odersky)
12. Iulian Dragos, “High-level Optimizations in the Scala Compiler”, EPFL 2010 (director: Martin Odersky)
13. Maysam Yabandeh, “Model Checking of Distributed Algorithm Implementations”, EPFL 2010
14. Gregory Théoduloz, “Software Verification by Combining Program Analyses of Adjustable Precision”, EPFL 2010 (director: Thomas A. Henzinger)
15. Jean-Loup Carré, “Static Analysis of Embedded Multithreaded Programs”, ENS Cachan and EADS, 2010 (directors: Jean Goubault-Larecq, Charles Hymans)
16. Michal Kapalka, “Transactional Memory: The Theory”, EPFL, 2010 (director: Rachid Guerraoui)
17. Swen Jacobs, “Hierarchic Decision Procedures for Verification”, Saarland University, 2009 (director: Viorica Sofronie-Stokkermans)
18. Michał Moskal, “Satisfiability Modulo Software”, U. of Wrocław, 2009 (director: Leszek Pacholski)
19. Jesper Honig Spring, “Reflexes: Programming Abstractions for Highly Responsive Computing in Java”, EPFL, 2008 (directors: Rachid Guerroui, Jan Vitek)
20. Irina Rychkova, “Formal Semantics for Refinement Verification of Enterprise Models”, EPFL, 2008 (director: Alain Wegmann)
21. Johannes Borgström, “Equivalences and Calculi for Formal Verification of Cryptographic Protocols”, EPFL, 2008 (directors: Uwe Nestmann, Thomas Henzinger)
22. Sébastien Briaies, “Theory and Tool Support for Formal Verification of Cryptographic Protocols”, EPFL, 2007 (directors: Uwe Nestmann, Martin Odersky)
23. Burak Emir, “Object-Oriented Pattern-Matching”, EPFL, 2007 (director: Martin Odersky)

Courses taught or co-taught:

- Compiler Construction: undergraduate level (3rd year, 5th semester), 2008–
 - 2 hours of lectures (given by me)
 - 2 hours of exercises (given by a teaching assistant), and
 - 2 classes of laboratory work (building a compiler in stages, run by a teaching assistant)
- Software Analysis and Verification: master’s level (7th semester), 2007–
 - 2-3 hours of lectures (given by me)
 - 1-2 hours of exercises (given by a teaching assistant), and
 - two classes of laboratory work (building a compiler in stages, run by a teaching assistant)
- Functional Programming (with Martin Odersky) 2014–

- Parallel Programming (with Martin Odersky and Aleksandar Prokopec) 2015–
- Doctoral Seminar on Automated Reasoning, Fall 2010.
 - attended by doctoral and M.Sc. students
 - background presentation by teaching staff
 - paper and book chapter presentations by students

EPFL Committee Service:

- EPFL Commission de recherche, February 2013–
- Commission d’enseignement SIN, Fall 2012–
- EPFL Human Research Ethics Committee, 10.2013-01.2014
- IC Ph.D. committee (EDIC) (admissions process, student progress, doctoral curriculum), 2009–2014
- IC M.Sc. committee, 2010-2011 (help with admissions)
- Co-organized IC Summer Research Institute (SuRI) 2011, with Rüdiger Urbanke
<http://suri.epfl.ch/past/2011>
 - coordinated three-week seminar involving prominent invited speakers from all areas of computer and communication sciences
 - within these three weeks organized a focused week “Models and Tools for Reliable Systems”, with invited speakers including C.A.R. Hoare, Aarti Gupta, Sharad Malik, Predrag Janičić, Rupak Majumdar, Darko Marinov, David Monniaux, Radu Iosif, Barbara Jobstmann, and J Strother Moore.

Swiss National Science Foundation and European Research Council: reviewer of proposals

Publication List

Statistics: Google scholar reports at least 29 papers cited at least 29 times each.

See <http://scholar.google.com/citations?user=kmoklesAAAAJ> for statistics.

- [1] **An update on deductive synthesis and repair in the leon tool.**
Manos Koukoutos, Etienne Kneuss, and Viktor Kuncak.
In *5th Workshop on Synthesis*, 2016.
- [2] **Translating scala programs to isabelle/hol (system description).**
Lars Hupel and Viktor Kuncak.
In *International Joint Conference on Automated Reasoning (IJCAR)*, 2016.
- [3] **Programming with enumerable sets of structures.**
Ivan Kuraj, Viktor Kuncak, and Daniel Jackson.
In *ACM SIGPLAN SPLASH Conference on Programming (OOPSLA Research Paper)*, 2015.
- [4] **Synthesizing Java expressions from free-form queries.**
Tihomir Gvero and Viktor Kuncak.
In *ACM SIGPLAN SPLASH Conference on Programming (OOPSLA Research Paper)*, 2015.
- [5] **Automating grammar comparison.**
Ravichandhran Madhavan, Mikael Mayer, Sumit Gulwani, and Viktor Kuncak.
In *ACM SIGPLAN SPLASH Conference on Programming (OOPSLA Research Paper)*, 2015.
- [6] **Deductive program repair.**
Etienne Kneuss, Manos Koukoutos, and Viktor Kuncak.
In *Computer-Aided Verification (CAV)*, 2015.
- [7] **Counterexample guided quantifier instantiation for synthesis in SMT.**
Andrew Reynolds, Morgan Deters, Viktor Kuncak, Cesare Tinelli, and Clark Barrett.
In *Computer-Aided Verification (CAV)*, 2015.

- [8] **Counter-example complete verification for higher-order functions.**
Nicolas Voirol, Etienne Kneuss, and Viktor Kuncak.
In *Scala Symposium*, 2015.
- [9] **Sound reasoning about integral data types with a reusable SMT solver interface.**
Régis Blanc and Viktor Kuncak.
In *Scala Symposium*, 2015.
- [10] **Interactive synthesis using free-form queries (tool demonstration).**
Tihomir Gvero and Viktor Kuncak.
In *International Conference on Software Engineering (ICSE)*, 2015.
- [11] **Developing verified software using Leon (invited contribution).**
Viktor Kuncak.
In *NASA Formal Methods (NFM)*, 2015.
- [12] **Induction for SMT solvers.**
Andrew Reynolds and Viktor Kuncak.
In *Verification, Model Checking, and Abstract Interpretation (VMCAI)*, 2015.
- [13] **Synthesizing functions from relations in Leon (invited contribution).**
Viktor Kuncak, Etienne Kneuss, and Emmanouil Koukoutos.
In *Logic-Based Program Synthesis and Transformation (LOPSTR)*, 2014.
- [14] **Scife: Scala framework for efficient enumeration of data structures with invariants.**
Ivan Kuraj and Viktor Kuncak.
In *Scala Workshop*, 2014.
- [15] **Checking data structure properties orders of magnitude faster.**
Emmanouil Koukoutos and Viktor Kuncak.
In *Runtime Verification (RV)*, 2014.
- [16] **Verifying and synthesizing software with recursive functions (invited contribution).**
Viktor Kuncak.
In *41st International Colloquium on Automata, Languages, and Programming (ICALP)*, 2014.
- [17] **Symbolic resource bound inference for functional programs.**
Ravichandhran Madhavan and Viktor Kuncak.
In *Computer Aided Verification (CAV)*, 2014.
- [18] **Sound compilation for reals.**
Eva Darulova and Viktor Kuncak.
In *ACM SIGACT-SIGPLAN Symposium on Principles of Programming Languages (POPL)*, 2014.
- [19] **Synthesis modulo recursive functions.**
Etienne Kneuss, Viktor Kuncak, Ivan Kuraj, and Philippe Suter.
In *Systems, Programming, Languages and Applications: Software for Humanity (SPLASH)*, 2013.
- [20] **Game programming by demonstration.**
Mikaël Mayer and Viktor Kuncak.
In *SPLASH Onward!*, 2013.
- [21] **Interpolation for synthesis on unbounded domains.**
Viktor Kuncak and Régis Blanc.
In *Formal Methods in Computer-Aided Design (FMCAD)*, 2013.
- [22] **Synthesis of fixed-point programs.**
Eva Darulova, Viktor Kuncak, Rupak Majumdar, and Indranil Saha.
In *Embedded Software (EMSOFT)*, 2013.
- [23] **Effect analysis for programs with callbacks.**
Etienne Kneuss, Viktor Kuncak, and Philippe Suter.
In *Fifth Working Conference on Verified Software: Theories, Tools and Experiments*, 2013.
- [24] **Classifying and solving Horn clauses for verification.**

- Philipp Rümmer, Hossein Hojjat, and Viktor Kuncak.
In *Fifth Working Conference on Verified Software: Theories, Tools and Experiments*, 2013.
- [25] **Executing specifications using synthesis and constraint solving (invited talk).**
Viktor Kuncak, Etienne Kneuss, and Philippe Suter.
In *Runtime Verification (RV)*, 2013.
- [26] **An overview of the Leon verification system: Verification by translation to recursive functions.**
Régis William Blanc, Etienne Kneuss, Viktor Kuncak, and Philippe Suter.
In *Scala Workshop*, 2013.
- [27] **Automatic synthesis of out-of-core algorithms.**
Andrej Spielmann, Andres Nötzli, Christoph Koch, Viktor Kuncak, and Yannis Klonatos.
In *SIGMOD*, 2013.
- [28] **Disjunctive interpolants for Horn-clause verification.**
Philipp Rümmer, Hossein Hojjat, and Viktor Kuncak.
In *Computer Aided Verification (CAV)*, 2013.
- [29] **Complete completion using types and weights.**
Tihomir Gvero, Viktor Kuncak, Ivan Kuraj, and Ruzica Piskac.
In *ACM SIGPLAN Conf. Programming Language Design and Implementation (PLDI)*, 2013.
- [30] **Software verification and graph similarity for automated evaluation of students' assignments.**
Milena Vujošević-Janičić, Mladen Nikolić, Dušan Tošić, and Viktor Kuncak.
In *Information and Software Technology*, 2013.
- [31] **Reductions for synthesis procedures.**
Swen Jacobs, Viktor Kuncak, and Phillippe Suter.
In *Verification, Model Checking, and Abstract Interpretation (VMCAI)*, 2013.
- [32] **Certifying solutions for numerical constraints.**
Eva Darulova and Viktor Kuncak.
In *Runtime Verification (RV)*, 2012.
- [33] **Accelerating interpolants.**
Hossein Hojjat, Radu Iosif, Filip Konečný, Viktor Kuncak, and Philipp Rümmer.
In *Automated Technology for Verification and Analysis (ATVA)*, 2012.
- [34] **A verification toolkit for numerical transition systems (tool paper).**
Hossein Hojjat, Filip Konecny, Florent Garnier, Radu Iosif, Viktor Kuncak, and Philipp Ruemmer.
In *16th Int. Symp. Formal Methods (FM)*, 2012.
- [35] **Synthesis for unbounded bitvector arithmetic.**
Andrej Spielmann and Viktor Kuncak.
In *International Joint Conference on Automated Reasoning (IJCAR)*, LNAI. Springer, 2012.
- [36] **Speculative linearizability.**
Rachid Guerraoui, Viktor Kuncak, and Giuliano Losa.
In *ACM SIGPLAN Conf. Programming Language Design and Implementation (PLDI)*, 2012.
- [37] **Software synthesis procedures.**
Viktor Kuncak, Mikaël Mayer, Ruzica Piskac, and Philippe Suter.
Communications of the ACM, 2012.
- [38] **Functional synthesis for linear arithmetic and sets.**
Viktor Kuncak, Mikael Mayer, Ruzica Piskac, and Philippe Suter.
Software Tools for Technology Transfer (STTT), 2012.
- [39] **Deciding functional lists with sublist sets.**
Thomas Wies, Marco Munnich, and Viktor Kuncak.
In *Verified Software: Theories, Tools and Experiments (VSTTE)*, LNCS, 2012.

- [40] **Development and evaluation of LAV: an SMT-based error-finding platform.**
Milena Vujošević-Janičić and Viktor Kuncak.
In *Verified Software: Theories, Tools and Experiments (VSTTE)*, LNCS, 2012.
- [41] **Constraints as control.**
Ali Sinan Köksal, Viktor Kuncak, and Philippe Suter.
In *38th ACM SIGACT-SIGPLAN Symp. Principles of Programming Languages (POPL)*, 2012.
- [42] **Trustworthy numerical computation in Scala.**
Eva Darulová and Viktor Kuncak.
In *ACM SIGPLAN SPLASH Conference on Programming (OOPSLA Research Paper)*, 2011.
- [43] **Satisfiability modulo recursive programs.**
Philippe Suter, Ali Sinan Köksal, and Viktor Kuncak.
In *Static Analysis Symposium (SAS)*, 2011.
- [44] **An efficient decision procedure for imperative tree data structures.**
Thomas Wies, Marco Muñoz, and Viktor Kuncak.
In *Computer-Aideded Deduction (CADE)*, 2011.
- [45] **Scala to the power of Z3: Integrating SMT and programming.**
Ali Sinan Köksal, Viktor Kuncak, and Philippe Suter.
In *Computer-Aideded Deduction (CADE) Tool Demo*, 2011.
- [46] **Interactive synthesis of code snippets.**
Tihomir Gvero, Viktor Kuncak, and Ruzica Piskac.
In *Computer Aided Verification (CAV) Tool Demo*, 2011.
- [47] **Sets with cardinality constraints in satisfiability modulo theories.**
Philippe Suter, Robin Steiger, and Viktor Kuncak.
In *Verification, Model Checking, and Abstract Interpretation (VMCAI)*, 2011.
- [48] **Towards complete reasoning about axiomatic specifications.**
Sven Jacobs and Viktor Kuncak.
In *Verification, Model Checking, and Abstract Interpretation (VMCAI)*, 2011.
- [49] **Phantom: PHP analyzer for type mismatch (research demonstration).**
Etienne Kneuss, Philippe Suter, and Viktor Kuncak.
In *ACM SIGSOFT Conference on Foundations of Software Engineering (FSE)*, 2010.
- [50] **Runtime instrumentation for precise flow-sensitive type analysis.**
Etienne Kneuss, Philippe Suter, and Viktor Kuncak.
In *International Conference on Runtime Verification (RV)*, 2010.
- [51] **Synthesis for regular specifications over unbounded domains.**
Jad Hamza, Barbara Jobstmann, and Viktor Kuncak.
In *Formal Methods in Computer-Aided Design (FMCAD)*, 2010.
- [52] **Ordered sets in the calculus of data structures (invited paper).**
Viktor Kuncak, Ruzica Piskac, and Philippe Suter.
In *Computer Science Logic (CSL)*, 2010.
- [53] **Munch - automated reasoner for sets and multisets (system description).**
Ruzica Piskac and Viktor Kuncak.
In *Int.Joint Conf. Automated Reasoning (IJCAR)*, 2010.
- [54] **Comfusy: Complete functional synthesis (tool presentation).**
Viktor Kuncak, Mikael Mayer, Ruzica Piskac, and Philippe Suter.
In *Computer-Aided Verification (CAV)*, 2010.
- [55] **Complete functional synthesis (selected for ACM Communications Research Highlights).**
Viktor Kuncak, Mikael Mayer, Ruzica Piskac, and Philippe Suter.
In *ACM Conf. Programming Language Design and Implementation (PLDI)*, 2010.
- [56] **Test generation through programming in UDITA (ACM Distinguished Paper Award).**

- Milos Gligoric, Tihomir Gvero, Vilas Jagannath, Sarfraz Khurshid, Viktor Kuncak, and Darko Marinov.
In *ACM/IEEE International Conference on Software Engineering (ICSE)*, 2010.
- [57] **Predicting and preventing inconsistencies in deployed distributed systems.**
Maysam Yabandeh, Nikola Knežević, Dejan Kostić, and Viktor Kuncak.
ACM Transactions on Computer Systems (TOCS), 2010.
- [58] **Building a calculus of data structures.**
Viktor Kuncak, Ruzica Piskac, Philippe Suter, and Thomas Wies.
In *Verification, Model Checking, and Abstract Interpretation (VMCAI)*, 2010.
- [59] **Collections, cardinalities, and relations.**
Kuat Yessenov, Viktor Kuncak, and Ruzica Piskac.
In *Verification, Model Checking, and Abstract Interpretation (VMCAI)*, 2010.
- [60] **Decision procedures for algebraic data types with abstractions.**
Philippe Suter, Mirco Dotta, and Viktor Kuncak.
In *37th ACM SIGACT-SIGPLAN Symposium on Principles of Programming Languages (POPL)*, 2010.
- [61] **Combining theories with shared set operations.**
Thomas Wies, Ruzica Piskac, and Viktor Kuncak.
In *Frontiers in Combining Systems (FRODOS)*, 2009.
- [62] **Simplifying distributed system development.**
Maysam Yabandeh, Nedeljko Vasić, Dejan Kostić, and Viktor Kuncak.
In *12th Workshop on Hot Topics in Operating Systems (HOTOS)*, 2009.
- [63] **An integrated proof language for imperative programs.**
Karen Zee, Viktor Kuncak, and Martin Rinard.
In *ACM Conf. Programming Language Design and Implementation (PLDI)*, 2009.
- [64] **CrystalBall: Predicting and preventing inconsistencies in deployed distributed systems.**
Maysam Yabandeh, Nikola Knežević, Dejan Kostić, and Viktor Kuncak.
In *6th USENIX Symp. Networked Systems Design and Implementation (NSDI)*, 2009.
- [65] **Opis: Reliable distributed systems in OCaml.**
Pierre-Évariste Dagand, Dejan Kostić, and Viktor Kuncak.
In *ACM Workshop on Types in Language Design and Implementation (TLDI)*, 2009.
- [66] **Fractional collections with cardinality bounds, and mixed integer linear arithmetic with stars.**
Ruzica Piskac and Viktor Kuncak.
In *Computer Science Logic (CSL)*, 2008.
- [67] **Linear arithmetic with stars.**
Ruzica Piskac and Viktor Kuncak.
In *Computed-Aided Verification (CAV)*, volume 5123 of *LNCS*, 2008.
- [68] **Full functional verification of linked data structures.**
Karen Zee, Viktor Kuncak, and Martin Rinard.
In *ACM Conf. Programming Language Design and Implementation (PLDI)*, 2008.
- [69] **Decision procedures for multisets with cardinality constraints.**
Ruzica Piskac and Viktor Kuncak.
In *9th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI)*, LNCS, 2008.
- [70] **Runtime checking for separation logic.**
Huu Hai Nguyen, Viktor Kuncak, and Wei Ngan Chin.
In *9th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI)*, LNCS, 2008.
- [71] **Towards efficient satisfiability checking for Boolean Algebra with Presburger Arithmetic.**

- Viktor Kuncak and Martin Rinard.
In *Conference on Automated Deduction (CADE-21)*, volume 4603 of *LNCS*, 2007.
- [72] **Polynomial constraints for sets with cardinality bounds.**
Bruno Marnette, Viktor Kuncak, and Martin Rinard.
In *Foundations of Software Science and Computation Structures (FOSSACS)*, volume 4423 of *LNCS*, March 2007.
- [73] **Verifying complex properties using symbolic shape analysis.**
Thomas Wies, Viktor Kuncak, Karen Zee, Andreas Podelski, and Martin Rinard.
In *Workshop on Heap Abstraction and Verification (collocated with ETAPS)*, 2007.
- [74] **Runtime checking for program verification.**
Karen Zee, Viktor Kuncak, Michael Taylor, and Martin Rinard.
In *Workshop on Runtime Verification (RV)*, volume 4839 of *LNCS*, 2007.
- [75] *Modular Data Structure Verification.*
Viktor Kuncak.
PhD thesis, EECS Department, Massachusetts Institute of Technology, February 2007.
- [76] **Using first-order theorem provers in the Jahob data structure verification system.**
Charles Bouillaguet, Viktor Kuncak, Thomas Wies, Karen Zee, and Martin Rinard.
In *Verification, Model Checking and Abstract Interpretation (VMCAI)*, volume 4349 of *LNCS*, November 2007.
- [77] **Modular pluggable analyses for data structure consistency.**
Viktor Kuncak, Patrick Lam, Karen Zee, and Martin Rinard.
IEEE Transactions on Software Engineering (TSE), December 2006.
- [78] **Deciding Boolean Algebra with Presburger Arithmetic.**
Viktor Kuncak, Huu Hai Nguyen, and Martin Rinard.
Journal of Automated Reasoning (JAR), 2006.
- [79] **An overview of the Jahob analysis system: Project goals and current status.**
Viktor Kuncak and Martin Rinard.
In *NSF Next Generation Software Workshop*, 2006.
- [80] **Field constraint analysis.**
Thomas Wies, Viktor Kuncak, Patrick Lam, Andreas Podelski, and Martin Rinard.
In *Verification, Model Checking, and Abstract Interpretation (VMCAI)*, volume 3855 of *LNCS*, 2006.
- [81] **Implications of a data structure consistency checking system.**
Viktor Kuncak, Patrick Lam, Karen Zee, and Martin Rinard.
In *International conference on Verified Software: Theories, Tools, Experiments (VSTTE, IFIP Working Group 2.3 Conference)*, Zürich, Switzerland, 10–13th October 2005.
- [82] **Relational analysis of algebraic datatypes.**
Viktor Kuncak and Daniel Jackson.
In *10th European Soft. Eng. Conf. (ESEC) and 13th Symp. Foundations of Software Engineering (FSE)*, 2005.
- [83] **An algorithm for deciding BAPA: Boolean Algebra with Presburger Arithmetic.**
Viktor Kuncak, Huu Hai Nguyen, and Martin Rinard.
In *20th International Conference on Automated Deduction, CADE-20*, volume 3632 of *LNCS*, Tallinn, Estonia, July 2005.
- [84] **Hob: A tool for verifying data structure consistency.**
Patrick Lam, Viktor Kuncak, and Martin Rinard.
In *14th International Conference on Compiler Construction (tool demo)*, volume 3443 of *LNCS*, April 2005.
- [85] **Cross-cutting techniques in program specification and analysis.**
Patrick Lam, Viktor Kuncak, and Martin Rinard.
In *4th International Conference on Aspect-Oriented Software Development*. ACM, March 2005.

- [86] **Decision procedures for set-valued fields.**
Viktor Kuncak and Martin C. Rinard.
Electr. Notes Theor. Comput. Sci.; Proc. Abstract Interpretation of Object-Oriented Languages, 2005.
- [87] **Generalized tpestate checking for data structure consistency.**
Patrick Lam, Viktor Kuncak, and Martin Rinard.
In *Verification, Model Checking and Abstract Interpretation (VMCAI)*, volume 3385 of *LNCS*, 2005.
- [88] **Combining theorem proving with static analysis for data structure consistency.**
Karen Zee, Patrick Lam, Viktor Kuncak, and Martin Rinard.
In *International Workshop on Software Verification and Validation*, Seattle, November 2004.
- [89] **Verifying a file system implementation.**
Konstantine Arkoudas, Karen Zee, Viktor Kuncak, and Martin Rinard.
In *Sixth International Conference on Formal Engineering Methods*, volume 3308 of *LNCS*, Seattle, 2004.
- [90] **Generalized records and spatial conjunction in role logic.**
Viktor Kuncak and Martin Rinard.
In *International Static Analysis Symposium*, volume 3148 of *LNCS*, Verona, Italy, August 26–28 2004.
- [91] **Boolean algebra of shape analysis constraints.**
Viktor Kuncak and Martin Rinard.
In *Verification, Model Checking and Abstract Interpretation (VMCAI)*, volume 2937 of *LNCS*, 2004.
- [92] **Generalized tpestate checking using set interfaces and pluggable analyses.**
Patrick Lam, Viktor Kuncak, and Martin Rinard.
SIGPLAN Notices, March 2004.
- [93] **Structural subtyping of non-recursive types is decidable.**
Viktor Kuncak and Martin Rinard.
In *Eighteenth Annual IEEE Symposium on Logic in Computer Science (LICS)*. IEEE, 2003.
- [94] **Existential heap abstraction entailment is undecidable.**
Viktor Kuncak and Martin Rinard.
In *10th Annual International Static Analysis Symposium*, volume 2694 of *LNCS*, San Diego, California, June 11-13 2003.
- [95] **In-place refinement for effect checking.**
Viktor Kuncak and Rustan Leino.
In *Workshop on Automated Verification of Infinite-State Systems*, April 2003.
- [96] **Role analysis.**
Viktor Kuncak, Patrick Lam, and Martin Rinard.
In *ACM Symp. Principles of Programming Languages (POPL)*, 2002.
- [97] **A language for role specifications.**
Viktor Kuncak, Patrick Lam, and Martin Rinard.
In *Workshop on Languages and Compilers for Parallel Computing*, volume 2624 of *LNCS*, 2001.
- [98] **Numerical representations as purely functional data structures: A new approach.**
Mirjana Ivanović and Viktor Kuncak.
INFORMATICA, Institute of Mathematics and Informatics, Vilnius, 2002.
- [99] **Types and confluence in lambda calculus.**
Silvia Ghilezan and Viktor Kuncak.
In *3rd Panhellenic Logic Symposium*, Anogia, Greece, 2001.
- [100] **Confluence of untyped lambda calculus via simple types.**
Silvia Ghilezan and Viktor Kuncak.

In *Proceedings of the 7th Italian Conference on Theoretical Computer Science, ICTCS 2001*, volume 2202 of *LNCS*, Torino, Italy, October 2001.

- [101] **Reducibility method for termination properties of typed lambda terms.**
Silvia Ghilezan, Viktor Kuncak, and Silvia Likavec.
In *Fifth International Workshop on Termination*, Utrecht, The Netherlands, May 2001.
- [102] **Modular language specifications in Haskell.**
Mirjana Ivanović and Viktor Kuncak.
In *Theoretical Aspects of Computer Science with practical application*, September 2000.
- [103] **Numerical representations as purely functional data structures.**
Mirjana Ivanović and Viktor Kuncak.
In *XIV Conference on Applied Mathematics (PRIM)*, June 2000.
- [104] **Reducibility method in simply typed lambda calculus.**
Silvia Ghilezan and Viktor Kuncak.
In *XIV Conference on Applied Mathematics (PRIM)*, June 2000.

Awards and Fellowships

- Communications of ACM Research Highlight, based on [55]
- ACM SIGSOFT Distinguished Paper, 2010, for [56]
- Best Student of University of Novi Sad in Class of 2000.
- Aleksandar Popović Award for Best Science Project (*Modular Interpreters in Haskell*, Advisor: Prof. Mirjana Ivanović), University of Novi Sad, 2000.
- Student of the Year of Faculty of Science, University of Novi Sad, 2000.
- Mileva Marić-Einstein Award for accomplishments in Computer Science, University of Novi Sad, 1999
- Awards of Excellence for Student Projects (*Early Deadlock Prevention*, Advisor: Prof. Zoran Budimac), University of Novi Sad, 1999; (*Herbrand's Theorem and the Resolution Method*, Advisor: Prof. Gradimir Vojvodić), University of Novi Sad, 1998
- Fellowship of the Serbian Foundation for Scientific Youth Development, 1995-1998
- University of Novi Sad Fellowship, 1998-2000