

Aleksandar Zeljić

Computer Scientist

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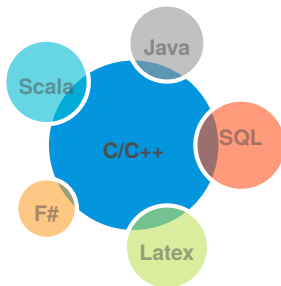
Education

- 2012-2018 **PhD in Computer Science** [Uppsala University](#)
*From Machine Arithmetic to Approximations and back again:
Improved SMT Methods for Numeric Data Types*
Opponent: Prof. Armin Biere, Johannes Kepler University, Linz, Austria
Supervisors: Philipp Rümmer, Wang Yi and Christoph M. Wintersteiger
- 2012-2016 **Licentiate in Computer Science** [Uppsala University](#)
Approximations and Abstractions for Machine Arithmetic
Discussion leader: Pascal Fontaine, University of Lorraine, Nancy, France.
Supervisors: Philipp Rümmer, Wang Yi and Christoph M. Wintersteiger
- 2009-2011 **MSc in Information Science** [Belgrade University](#)
GPA: 9,93 (on a scale from 6,00 to 10,00).
Analysis of Solving NP-Complete Problems Using Reduction
Advisor: prof. Predrag Janičić
- 2006-2009 **BSc in Information Science** [Belgrade University](#)
GPA: 9,40 (on a scale from 6,00 to 10,00)

Work Experience

- 04-06/2017 **Research intern** [SGT, Inc at NASA Ames](#)
Scalable support for Floating-Point Arithmetic in SeaHorn solver
- 07-09/2014 **Research intern** [Microsoft Research, Cambridge UK](#)
Worked on instantiation of the Model Constructing Satisfiability Calculus for the theory of bit-vectors. Advisor: Christoph M. Wintersteiger
- 2012-2018 **PhD Student** [Uppsala University](#)
Research 80% and Teaching duties 20%, see Education, Publications and Teaching for more details.
- 2011 - 2012 **Researcher trainee** [Mathematical Institute, Serbian Academy of Sciences and Arts](#)
Project: Formalization and verification of the Chord network protocol in the Isabelle proof assistant. (6 months)
- 2008 -2010 **Software tester** [Pexim Solutions, Asseco SEE, Belgrade](#)
Development of automated functional tests (UI automation), integration testing, writing and maintenance of test plans and procedures (2,5 years)

Programming



Personal Skills



Research Interests

Automated Reasoning (SAT, SMT)

Machine Arithmetic (esp. Floating-Point Arithmetic)

Formal Verification and Testing

Machine Learning

OS Preference

GNU/Linux ★★★★★

Unix ★★★★★

Windows ★★★★★

Languages

Serbian ★★★★★

English ★★★★★

Swedish ★★★★★

French ★★★★★

Interests

Yoga

Origami

Games

Sci-fi and Fantasy

Arts

Projects

SmallFloats

An approximation framework for the quantifier-free theory of floating-point arithmetic implemented within the Z3 SMT solver. Implemented in C++.

UppSAT

An abstract approximating SMT solver. Scala implementation available from <https://github.com/uuverifiers/uppsat>.

mcBV

A lazy model-constructing bit-vector SMT solver. Implementation in F# and available on <https://github.com/Microsoft/mcBV>.

Teaching

2018	Machine Learning	TA
	Taught and supervised projects in supervised, unsupervised, reinforcement learning and natural computation	
2017	Algorithms and Data Structures 1	TA
	Taught the basics of algorithms and data structures	
2015	Real-Time Systems	TA
	Taught programming in Ada, temporal logic and modelling in Uppaal	
2014	Automata and Logic in IT System Modelling	TA
	Taught basics of automata and modelling.	
2012-2016	Programming Theory	TA & Course responsible (2016)
	Taught propositional and first-order logic, weakest pre-condition calculus, supervised labs in Dafny and Spec#	
2012-2016	Programming Embedded Systems	TA
	Taught C programming in FreeRTOS, supervised projects, labs and assignments.	

Publications

A. Zeljić, P. Backeman, C. Wintersteiger, P. Rümmer

Exploring Approximations for Floating-Point Arithmetic using UppSAT

in *Proceedings of the 9th International Joint Conference on Automated Reasoning (IJCAR 2018)*, Springer, July 2018.

A. Zeljić, C. Wintersteiger and P. Rümmer

An Approximation Framework for Solvers and Decision Procedures

in *Journal of Automated Reasoning*, Springer, November 2016.

A. Zeljić, C. Wintersteiger and P. Rümmer

Deciding Bit-Vector Formulas Using MCSAT

in *Proceedings of the 19th International Conference on Theory and Applications of Satisfiability Testing (SAT 2016)*.

A. Zeljić, C. Wintersteiger and P. Rümmer

Approximations for Model Construction

in *Proceedings of the 7th International Joint Conference on Automated Reasoning (IJCAR 2014)*, Springer, July 2014. **Best Paper Award**

Honors & Awards

2014	Best Paper Award	IJCAR'14
2012	Woody Bledsoe Student Travel Award	IJCAR'12
2009-2011	Scholarship of the Foundation for the Development of Youth in Science and Arts	Republic of Serbia
2006-2009	Scholarship of the Serbian Ministry of Education	Republic of Serbia

Summer Schools

06/2016	SAT/SMT/AR Summer School	Lisbon, Portugal
08/2015	Marktoberdorf Summer School	Marktoberdorf, Germany
06/2015	MSR PhD Summer School	Cambridge, UK
06/2012	2nd SAT/SMT Summer School	Trento, Italy
06/2012	UPMARC Multicore Computing Summer School	Uppsala, Sweden

Talks, Presentations and Conferences

07/2018	"Exploring Approximations of Floating-Point Arithmetic in UppSAT" — talk given at IJCAR as part of FLOC'18, Oxford, UK
04/2018	"Approximations and Abstractions For Reasoning About Machine Arithmetic" — talk given at KTH, Stockholm, Sweden
01/2018	"From Machine Arithmetic to Approximations and back again" – PhD thesis defense, Uppsala University, Uppsala, Sweden
07/2017	"Approximations and Abstractions For Reasoning About Machine Arithmetic" — talk given at MIT, Cambridge, MA, USA.
06/2017	"Approximations For Reasoning About Machine Arithmetic" — talk given at Northeastern University, Boston, MA, USA.
06/2017	"Approximations For Reasoning About Machine Arithmetic" — talk given at SRI International, Menlo Park, CA, USA.
06/2017	"Approximations For Reasoning About Machine Arithmetic" — talk given at Stanford University, Stanford, CA, USA.
05/2017	"Approximations and Abstractions For Reasoning About Machine Arithmetic" — talk given at Intelligent Systems Division at NASA Ames, CA, USA.

- 10/2016 "Approximations and Abstractions For Reasoning About Machine Arithmetic" — talk given as part of a licentiate seminar, Uppsala, Sweden.
- 07/2016 "Deciding Bit-Vector Formulas Using MCSAT" — talk given at the 19th International Conference on Theory and Applications of Satisfiability Testing (SAT 2016), Bordeaux, France
- 07/2016 "Deciding Bit-Vector Formulas Using MCSAT" — talk given at the 14th International Workshop on Satisfiability Modulo Theories (affiliated with IJCAR 2016), Coimbra, Portugal
- 06/2016 "Deciding Bit-Vector Formulas Using MCSAT" — poster presented at the SAT/SMT/AR Summer School, Lisbon, Portugal
- 09/2015 "Approximations for Deciding Quantified Floating-Point Constraints" — poster presented at the Student Forum of the 15th Formal Methods in Computer-Aided Design (FMCAD 2015), Austin, Texas, USA (<http://www.cs.utexas.edu/users/hunt/FMCAD/FMCAD15/student-forum.shtml>)
- 07/2014 "Approximations for Model Construction" — talk given at the 7th International Joint Conference on Automated Reasoning, Vienna Summer of Logic, Vienna, Austria (<http://cs.nyu.edu/ijcar2014/>).
- 03/2013 "Towards SMT Style Reasoning about Floating-Point Arithmetic" — talk given at Workshop on Progress in Decision Procedures: "From Formalizations to Applications", Belgrade, Serbia (<http://argo.matf.bg.ac.rs/events/2013/pdp2013/pdp2013.html>).
- 07/2012 "Experiments with Automated Strategy Selection in a Theorem Prover" — talk given at Swarm/Verify 2012 Workshop, Manchester, UK (<http://baldur.iti.kit.edu/SVARM-VERIFY-2012/>).
- 02/2012 "Instance Features for Non-CNF Solver Portfolios" — talk given at the Fifth Workshop on Formal and Automated Theorem Proving and Applications, Belgrade, Serbia (<http://argo.matf.bg.ac.rs/events/2012/fatpa2012/>).
- 10/2011 "Solving NP-Complete Problems using Reductions" — talk given at the Seminar of the Department of Computer Science, University of Belgrade.
- 06/2011 The Sixth Edition of the International Conference on Rewriting, Deduction, and Programming, (RDP'11), Novi Sad, Serbia. Attended and served as a member of the local organization team.
- 02/2011 "Solving Some NP-Complete Problems Instances by Reduction" — talk given at the Fourth Workshop on Formal and Automated Theorem Proving and Applications, Belgrade, Serbia (<http://argo.matf.bg.ac.rs/fatpa2011>).
- 10/2010 "Reduction from SAT Problem to Clique Problem and vice versa" — talk given at the ARGO seminar (<http://argo.matf.bg.ac.rs/?content=seminar>).

July 26th, 2018

Aleksandar Zeljić