

GRIGORY FEDYUKOVICH

Current Position	Postdoctoral Researcher (a.k.a. Research Associate) in University of Washington Computer Science & Engineering
Research interests	<p>Software Formal Verification: Horn-based Symbolic Model Checking, Verifying Safety of Functional Programs</p> <p>Automated Regression / Incremental Verification: Simulation Synthesis; Lifting Inductive Invariants via Abstraction; Interpolation-based Function Summarization</p> <p>Program Synthesis: Automatic Parallelization; Synthesis from Skolemized Proofs of Realizability</p>
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AFFILIATION HISTORY

Jan 2016 - ...	<p>PostDoc: Computer Science & Engineering, University of Washington (UW), Seattle, USA;</p> <p>Supervised by: Prof. Rastislav Bodík;</p> <p>Projects: Automatic Parallelization; Synthesis of Simulation Relations; Horn-based Symbolic Model Checking</p>
Oct 2010 - Dec 2015	<p>PhD: Faculty of Informatics, Università della Svizzera italiana (USI), Lugano, Switzerland;</p> <p>Supervised by: Prof. Natasha Sharygina;</p> <p>Thesis: Automated Incremental Software Verification</p>
Apr - Oct 2010	<p>Internship: School of Computing, National University of Singapore, Singapore;</p> <p>Project: Verification of quantified list properties in Coq</p>
Jun 2009 - March 2010	<p>Internship: Logic and Semantics group at Tallinn Institute of Cybernetics, Estonia;</p> <p>Project: A Coq formalization of an analysis and optimization of While</p>
2003 - 2008	<p>Specialist Degree (Diplom): Department of Computer Science, Faculty of Mathematics and Mechanics, Saint-Petersburg State University, Russia</p>

COLLABORATION

2012 - present	<p>Topic: Horn-based Incremental Model Checking;</p> <p>Collaboration with: Prof. Arie Gurfinkel, University of Waterloo, Canada</p>
2015 - present	<p>Topic: Synthesis from Skolemized Proofs of Realizability;</p> <p>Collaboration with: Dr. Michael W. Whalen, University of Minnesota, USA</p>
2014 - 2016	<p>Topic: Partial Interpolation Framework;</p> <p>Collaboration with: Prof. Jan Kofron, Charles University, Czech Republic</p>

2016 - present	<p>Topic: SMT-based Incremental Model Checking</p> <p>Collaboration with: Dr. Hana Chockler, King's College, London, UK and Prof. Natasha Sharygina, USI, Switzerland</p>
2010 - 2013	<p>EU project PINCETTE: number 257647, supported by European Community under the call FP7-ICT-2009-5;</p> <p>Topic: "Validating Changes and Upgrades in Networked Software";</p> <p>Collaboration with: University of Oxford, IBM Israel, University of Milano Bicocca, VTT Finland, Israel Aerospace Industries Ltd., ABB Schweiz, and ABB Germany</p>

GRANTS AND FELLOWSHIPS

2016	<p>Postdoc Award, University of Washington, 23 000 USD for a side-project on Horn-based Symbolic Model Checking (salaries for interns, conference travel, equipment)</p>
2015	<p>Early Postdoc.Mobility Fellowship, Swiss National Science Foundation, ~100 000 USD for 18 months in University of Washington (salaries for myself, medical insurance, equipment, conference travel)</p>

SERVICE

2017	<p>Local Organization Chair: The 17th International Conference on Runtime Verification (RV 2017)</p> <p>Program Committee Member: The 17th International Conference on Runtime Verification (RV 2017), the 4th Workshop on Horn Clauses for Verification and Synthesis (HCVS 2017)</p> <p>Sub-reviewing: International Conference on Computer Aided Verification (CAV 2017)</p>
2016	<p>Program Chair: Workshop on Verification and Synthesis for Software Evolution (VSSE 2016)</p> <p>Program Committee Member: International Journal on Software Tools for Technology Transfer (STTT, Selected Papers at TACAS 2016), Journal of Automated Reasoning (JAR, Selected Papers at VSTTE 2016)</p> <p>Sub-reviewing: International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2017), International Symposium on Formal Methods (FM 2016), International Conference on Formal Methods in Computer-Aided Design (FMCAD 2016), Conference on Verified Software: Theories, Tools, and Experiments (VSTTE 2016), International Conference on Computer Aided Verification (CAV 2016), 3rd Workshop on Horn Clauses for Verification and Synthesis (HCVS 2016)</p>
2015	<p>Sub-reviewing: International Conference on Formal Methods in Computer-Aided Design (FMCAD 2015), Journal of Automated Reasoning (JAR, Special Issue on Interpolation Techniques for Program Verification and Synthesis), International Conference on Computer Aided Verification (CAV 2015), International Symposium on Formal Methods (FM 2015), NASA Formal Methods Symposium (NFM 2015)</p>
2014	<p>Sub-reviewing: International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2015), International Conference on Formal Methods in Computer-Aided Design (FMCAD 2014), Ershov Informatics Conference (PSI 2014), International Conference on Computer Aided Verification (CAV 2014)</p> <p>Co-organizing: Workshop on Validation Strategies for Software Evolution (VSSE 2014)</p>

2013	<p>Sub-reviewing: International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2014), International Conference on Formal Methods in Computer-Aided Design (FMCAD 2013), Workshop on Validation Strategies for Software Evolution (VSSE 2013)</p> <p>Co-organizing: International Conference on Computer Aided Verification (CAV 2013)</p>
2012	<p>Sub-reviewing: International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2013), International Conference on Formal Methods in Computer-Aided Design (FMCAD 2012), Conference on Design, Automation and Test in Europe (DATE 2012), International Symposium on Games, Automata, Logics and Formal Verification (GandALF 2012), Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE 2012), International Conference on Computer Aided Verification (CAV 2012)</p>
2011	<p>Sub-reviewing: International Conference on Formal Methods in Computer-Aided Design (FMCAD 2011), International Conference on Formal Methods and Models for System Design (MEMOCODE 2011)</p>
2010	<p>Sub-reviewing: International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2011)</p> <p>Co-organizing: International Conference on Formal Methods in Computer-Aided Design (FMCAD 2010), Alpine Verification Meeting (AVM) 2010</p>

SOFTWARE	
2016 - present	Rosette/Unbound , Constrained-Horn-Clause-based Invariant Synthesizer for functional programs in Racket
2014 - present	AE-VAL , decision procedure for solving AE-formulas and extracting Skolem functions (applied in Niagara and JSyn)
2013 - present	Niagara , Constrained-Horn-Clause-based incremental model checker for C
2010 - present	HiFrog / FunFrog / eVolCheck , incremental SAT/SMT-based bounded model checker for C with function summarization, automated detection of recursion depth, checking assertion dependencies, support for flexible interpolation, and upgrade checking capabilities

TALKS AND SEMINARS	
2017	Seminar HiFrog: SMT-based Function Summarization for Software Verification , USI, Lugano, Switzerland
2016	Seminar Automated Incremental Software Verification , Seoul National University, Seoul, Korea. Host: Prof. Chung-Kil Hur
2016	Seminar Automated Incremental Software Verification , Hong Kong University of Science and Technology, Hong Kong. Host: Prof. S.C. Cheung
2016	Seminar Witnessing Existential Quantifiers with AE-VAL , USI, Lugano, Switzerland

2016	Workshop talk Gradual Synthesis for Static Parallelization . PLSE Retreat, Leavenworth, USA
2016	Workshop talk What's Reusable in Program Analysis . TAPAS, Edinburgh, UK
2016	Conference talk Property Directed Equivalence via Abstract Simulation . CAV, Toronto, Canada
2016	Workshop talk Approaching Symbolic Parallelization by Synthesis of Recurrence Decompositions . SYNT, Toronto, Canada
2016	Seminar Property Directed Equivalence via Abstract Simulation , USI, Lugano, Switzerland
Jan 2016	Seminar Automated Incremental Software Verification , UW, Seattle, USA
2015	Conference talk Automated Discovery of Simulation Between Programs , LPAR, Suva, Fiji
2015	Workshop talk AE-VAL: Horn clause-based Skolemizer for Forall-Exists-formulas , HCVS, San Francisco, USA
2015	Workshop talk Incremental Proof-Based Verification of Compiler Optimizations , AVM, Attersee, Austria
2015	Conference talk Symbolic Detection of Assertion Dependencies for Bounded Model Checking , FASE, London, UK
2014	Conference talk Towards Completeness in Bounded Model Checking Through Automatic Recursion Depth Detection , SBMF, Maceio, Brazil
2014	Conference talk Incremental Verification of Compiler Optimizations , NASA Formal Methods, Houston, USA
2014	Invited talk Producing Effective Interpolants for SAT-based Incremental Verification and Upgrade Checking , VSSE, Grenoble, France
2013	Conference talk PeRIPLO: A Framework for Producing Effective Interpolants in SAT-based Software Verification Hardware Verification , LPAR, Stellenbosch, South Africa
2013	Workshop talk Incremental Upgrade Checking by means of Interpolation-based Function Summaries , VPT, Saint Petersburg, Russia
2013	Invited seminar Interpolation-based Model Checking for Efficient Incremental Analysis of Software at SEI/CMU, Pittsburgh, USA

2013	Conference talk eVolCheck: Incremental Upgrade Checker for C , TACAS, Rome, Italy (best student contribution award)
2013	Invited talk Incremental Model Checking for Upgrade Checks , VSSE, Rome, Italy
2013	Invited talk and demo Upgrade Checking in eVolCheck , ABB Schweiz, Baden, Switzerland
2012	Conference talk FunFrog: Bounded Model Checking with Interpolation-based Function Summarization , ATVA, Trivandrum, India
2012	Workshop talk Interpolation-based Function Summaries in Bounded Model Checking , LfSA, Berkeley, USA
2012	Invited talk Software Model Checking , IMT, Irkutsk, Russia
2012	Workshop talk Bounded Model Checking with Interpolation-based Function Summarization , AVM, Passau, Germany
2011	Poster session Function Summaries in Software Upgrade Checking , HVC, Haifa, Israel
2011	Tutorials FunFrog: Bounded Model Checking with Interpolation-based Function Summarization , VTT and Nokia, Tampere, Finland
2010	Seminar Of the verification of list properties , NUS, Singapore
2010	Seminar A Coq formalization of an analysis and optimization of While , NUS, Singapore
2010	Workshop talk A Coq formalization of an analysis and optimization of While , Estonian Computer Science Theory Days, Andu, Estonia
2009	Seminar A Coq formalization of an analysis and optimization of While , IoC, Tallinn, Estonia

TEACHING	
2015	Seminar Incremental Proof-Based Verification with Automated Discovery of Simulation Relations Between Programs at the Advances in Automated Verification course, USI, Lugano, Switzerland
2015	Teaching assistantship at the Computer Aided Verification course, USI, Lugano, Switzerland

2014	Seminar Function-Summarization-based Incremental Bounded Model Checking with Automated Detection of Recursion Depth in the Advances in Automated Verification course, USI, Lugano, Switzerland
2014	Lab Spin Model Checker at the Validation and Verification course, ALaRI, USI, Lugano, Switzerland
2013	Seminar Function-Summarization-based Incremental Bounded Model Checking and Upgrade Checking at the Automated Bug Detection course, USI, Lugano, Switzerland
2012	Teaching assistantship at the Computer Architecture course, USI, Lugano, Switzerland
2012	Seminar and Lab Function-Summarization-based Incremental Bounded Model Checking and Upgrade Checking at the Computer Aided Verification course, USI, Lugano, Switzerland
2012	Teaching assistantship at the Automata and Formal Languages course, USI, Lugano, Switzerland
2011	Teaching assistantship at the Linear Algebra course, USI, Lugano, Switzerland

SUMMER SCHOOLS AND ACADEMIC COURSES	
2015	2 nd Summer School on Software Synthesis, MIT, Cambridge, USA
2013	3 ^d Summer School on Formal Techniques , Menlo College, Atherton, CA, USA
2011	PhD course Model Theory by Prof. Ghilardi, University of Milan, Italy
2011	1 st International SAT/SMT Summer School, MIT, Cambridge, USA
2010	PhD course Computer Aided Verification by Prof. Sharygina, USI, Lugano, Switzerland
2010	40 th International Summer School Software and Systems Safety: Specification and Verification , Marktoberdorf, Germany (DAAD scholarship granted)
2010	3 ^d International School on Trends in Concurrency , Bangalore, India (student grant awarded)
2010	15 th Estonian Winter School in Computer Science, Palmse, Estonia

2009	2 nd International Summer School Verification Technology, Systems & Applications , Nancy, France
2009	1 st Microsoft Research / HPC Summer School, Moscow State University, Moscow, Russia (student grant awarded)
2009	14 th Estonian Winter School in Computer Science, Palmse, Estonia (student grant awarded)
2008	38 th International Summer School Engineering Methods and Tools for Software Safety and Security , Marktoberdorf, Germany (DAAD scholarship granted)
2008	Courses Distributed Systems, Networking, Software Testing and Software Verification by Professors of USI in Saint Petersburg, Russia

JOURNAL PUBLICATIONS AND BOOK CHAPTERS

2015	Grigory Fedyukovich, Ondrej Sery, Natasha Sharygina: Flexible Framework for Incremental Upgrade Checking . STTT: 1-18, http://dx.doi.org/10.1007/s10009-015-0405-y
2015	Hana Chockler, Daniel Kroening, Leonardo Mariani, Natasha Sharygina (editors) Validation of Evolving Software . (3 chapters) http://dx.doi.org/10.1007/978-3-319-10623-6

CONFERENCE PUBLICATIONS

2017	Grigory Fedyukovich, Maaz Bin Safeer Ahmad, Rastislav Bodík: Gradual Synthesis for Static Parallelization . PLDI, to appear
2017	Dmitry Mordvinov, Grigory Fedyukovich: Synchronizing Constraint Horn Clauses . LPAR, to appear
2017	Leonardo Alt, Sepideh Asadi, Hana Chockler, Karine Even Mendoza, Grigory Fedyukovich, Antti E. J. Hyvärinen, Natasha Sharygina: HiFrog: SMT-based Function Summarization for Software Verification . TACAS, to appear
2016	Grigory Fedyukovich, Rastislav Bodík: Approaching Symbolic Parallelization by Synthesis of Recurrence Decompositions . SYNT@CAV: 55-66
2016	Grigory Fedyukovich, Arie Gurfinkel, Natasha Sharygina: Property Directed Equivalence via Abstract Simulation . CAV (2): 433-453
2016	Pavel Jancík, Leonardo Alt, Grigory Fedyukovich, Antti E. J. Hyvärinen, Jan Kofron, Natasha Sharygina: PVAIR: Partial Variable Assignment InterpolatoR . FASE: 419-434

2015	Grigory Fedyukovich, Arie Gurfinkel, Natasha Sharygina: Automated Discovery of Simulation Between Programs. LPAR: 606-621
2015	Leonardo Alt, Grigory Fedyukovich, Antti Eero Johannes Hyvärinen, Natasha Sharygina: A Proof-Sensitive Approach for Small Propositional Interpolants. VSTTE: 1-18
2015	Grigory Fedyukovich, Andrea Callia D'Iddio, Antti Eero Johannes Hyvärinen, Natasha Sharygina: Symbolic Detection of Assertion Dependencies for Bounded Model Checking. FASE: 186-201 (student scholarship granted)
2014	Grigory Fedyukovich, Natasha Sharygina: Towards Completeness in Bounded Model Checking Through Automatic Recursion Depth Detection. SBMF: 96-112
2014	Fabrizio Pastore, Leonardo Mariani, Antti Eero Johannes Hyvärinen, Grigory Fedyukovich, Natasha Sharygina, Stephan Sehestedt, Ali Muhammad: Verification-aided Regression Testing. ISSTA: 37-48
2014	Grigory Fedyukovich, Arie Gurfinkel, Natasha Sharygina: Incremental Verification of Compiler Optimizations. NFM: 300-306
2013	Simone Fulvio Rollini, Leonardo Alt, Grigory Fedyukovich, Antti Eero Johannes Hyvärinen, Natasha Sharygina: PeRIPLO: A Framework for Producing Effective Interpolants in SAT-based Software Verification. LPAR: 683-693
2013	Grigory Fedyukovich, Antti E. J. Hyvarinen, Natasha Sharygina: Interpolation-based Model Checking for Efficient Incremental Analysis of Software. DDECS: 8-9
2013	Hana Chockler, Giovanni Denaro, Meijia Ling, Grigory Fedyukovich, Antti Eero Johannes Hyvärinen, Leonardo Mariani, Ali Muhammad, Manuel Oriol, Ajitha Rajan, Ondrej Sery, Natasha Sharygina, Michael Tautschnig: PINCETTE - Validating Changes and Upgrades in Networked Software. CSMR: 461-464
2013	Grigory Fedyukovich, Ondrej Sery and Natasha Sharygina: eVolCheck: Incremental Upgrade Checker for C. TACAS: 292-307 (best student contribution award)
2012	Ondrej Sery, Grigory Fedyukovich and Natasha Sharygina: Incremental Upgrade Checking by Means of Interpolation-based Function Summaries. FMCAD: 114-121
2012	Ondrej Sery, Grigory Fedyukovich and Natasha Sharygina: FunFrog: Bounded Model Checking with Interpolation-based Function Summarization. ATVA: 203-207
2011	Grigory Fedyukovich, Ondrej Sery and Natasha Sharygina: Function Summaries in Software Upgrade Checking (extended abstract). HVC: 257-258
2011	Ondrej Sery, Grigory Fedyukovich and Natasha Sharygina: Interpolation-Based Function Summaries in Bounded Model Checking. HVC: 160-175 (student grant awarded)
2010	Grigory Fedyukovich, Vladimir Safonov: Implementing parallel algorithms of MapReduce. PDPTA: 397-401