GRIGORY FEDYUKOVICH	
Current Position	Assistant Professor (Tenure Track): Computer Science Department at Florida State University
Research interests	<ul> <li>Automated Program Verification:         <ul> <li>Solving Constrained Horn Clauses, (Quantified) Invariant Synthesis, Specification Synthesis, Ranking Function Synthesis</li> <li>Verification of Security Properties such as Non-Interference</li> </ul> </li> <li>Regression/Incremental Verification:         <ul> <li>Program Equivalence and Program Simulation</li> <li>Function Summarization based on Craig Interpolation</li> </ul> </li> <li>Program Synthesis:         <ul> <li>Functional (Skolem) Synthesis via Lazy Quantifier Elimination</li> <li>Enumerative Synthesis for Automatic Parallelization of Loops</li> </ul> </li> </ul>
Email / Web	grigory@cs.fsu.edu www.cs.fsu.edu/~grigory

AFFILIATION HISTORY	
Aug 2019	Assistant Professor (Tenure Track): Computer Science Department at Florida State University
Oct 2017 - Aug 2019	PostDoc: Computer Science Department at Princeton University; Supervised by: Prof. Aarti Gupta; Projects: Syntax-guided Techniques in Automated Formal Verification, Verification and Synthesis for Security
Jan 2016 – Oct 2017	<ul> <li>PostDoc: Paul G. Allen School of Computer Science &amp; Engineering at University of Washington (UW), Seattle, USA;</li> <li>Supervised by: Prof. Rastislav Bodík;</li> <li>Projects: Automatic Parallelization of Single Pass Array-handling Programs; Horn-based Verification of Functional Programs, Probabilistic SyGuS-based Invariant Synthesis</li> </ul>
Oct 2010 – Dec 2015	PhD: Faculty of Informatics, Università della Svizzera italiana (USI), Lugano, Switzerland; Supervised by: Prof. Natasha Sharygina; Thesis: Automated Incremental Software Verification
Apr 2010 – Oct 2010	Internship: School of Computing, National University of Singapore, Singapore; Project: Verification of Quantified Properties over Lists in Coq
Jun 2009 – Mar 2010	Internship: Logic and Semantics group at Tallinn Institute of Cybernetics, Estonia; Project: A Coq Formalization of an Analysis and Optimization of While
2003 – 2008	<b>Specialist Degree (Diplom)</b> : Department of Computer Science, Faculty of Mathematics and Mechanics, Saint Petersburg State University, Russia

COLLABORATION	
2018 –	Topic: Solving Constrained Horn Clauses Using Syntax and Data Collaboration with: Prof Kumar Madhukar, Sumanth Prabhu, TCS Research, Pune, India Publications: FMCAD 2018, CAV 2019, PLDI 2021 Tool Development: FreqHorn, HornSpec
2019	Topic: Environment Invariants for Hardware Verification Collaboration with: Prof Aarti Gupta, Prof Sharad Malik, Princeton University, USA Publication: VMCAI 2020 Tool Development: Grain
2019	Topic: Fold/Unfold Transformations for Fixpoint Logic Collaboration with: Prof Naoki Kobayashi, University of Tokyo, Japan Publication: TACAS 2020 Tool Development: Mu2CHC
2015 – 2020	Topic: Synthesis from Skolemized Proofs of Realizability Collaboration with: Dr. Michael W. Whalen, University of Minnesota, USA Publication: TACAS 2018, ASE 2020 Tool Development: AE-VAL, JSyn
2016 –	Topic: SMT-based Incremental Bounded Model Checking Collaboration with: Dr. Hana Chockler, King's College, London, UK and Prof. Natasha Sharygina, USI, Switzerland Publications: TACAS 2017, SAT 2017, LPAR 2018, FMCAD 2020, SAS 2020 Tool Development: HiFrog, UpProver
2012 –	Topic: CHC-based Model Checking Collaboration with: Prof. Arie Gurfinkel, University of Waterloo, Canada Publications: NFM 2014, LPAR 2015, CAV 2016, ICCAD 2020 Tool Development: Niagara, Spacer
2014 – 2015	Topic: Partial Interpolation Framework Collaboration with: Prof. Jan Kofroň, Charles University, Czech Republic Publication: FASE 2016 Tool Development: eVolCheck, PVAIR
2010 – 2013	EU project <b>PINCETTE</b> : number 257647, supported by European Community under the call FP7-ICT-2009-5; <b>Topic</b> : Validating Changes and Upgrades in Networked Software; <b>Collaboration</b> with: University of Oxford, IBM Israel, University of Milano Bicocca, VTT Finland, Israel Aerospace Industries Ltd., ABB Schweiz, and ABB Germany <b>Publications</b> : FMCAD 2012, TACAS 2013, LPAR 2013, ISSTA 2014 <b>Tool Development</b> : eVolCheck, FunFrog

GRANTS AND FELLOWSHIPS	
2020	Amazon Research Award: "Applying FreqHorn to verification of AWS C Common programs", 60 000 USD
2018	University of Tokyo – Princeton Strategic Partnership Grant, 10 000 USD to support a new research collaboration with Prof Naoki Kobayashi

2016	<b>Postdoc Award</b> , University of Washington, 23 000 USD for a project on Horn-based Symbolic Model Checking
2015	<b>Early Postdoc.Mobility Fellowship</b> , Swiss National Science Foundation, ~100 000 USD for 18 months at University of Washington

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	SERVICE	
2021	<ul> <li>Program Committee Member: Conference on Formal Methods in Computer-Aided Design (FMCAD), Workshop on Horn Clauses for Verification and Synthesis (HCVS), Workshop on Verification and Program Transformation (VPT), Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE), Symposium on Model Checking of Software (SPIN), Conference on Automated Software Engineering (ASE, Tool Demonstrations track)</li> <li>Grant Proposal Reviewer: Israel Science Foundation (ISF)</li> <li>Journal Reviewer: Transactions on Software Engineering (TSE), ACM Transactions on Programming Languages and Systems (TOPLAS)</li> <li>Sub-reviewer: Conference on Computer Aided Verification (CAV), Symposium on Logic in Computer Science (LICS)</li> </ul>	
2020	<ul> <li>Program Committee Member: Conference on Formal Methods in Computer-Aided Design (FMCAD), Workshop on Horn Clauses for Verification and Synthesis (HCVS), Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE), Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI 2021)</li> <li>Grant Proposal Reviewer: National Science Foundation (NSF)</li> <li>Journal Reviewer: Journal of Logical and Algebraic Methods in Programming (JLAMP), Transactions on Software Engineering (TSE)</li> <li>Sub-reviewer: Conference on Computer Aided Verification (CAV), Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2021)</li> </ul>	
2019	<ul> <li>Program Chair: Workshop on Horn Clauses for Verification and Synthesis (HCVS), Student Forum at the Conference on Formal Methods in Computer-Aided Design (FMCAD), Competition on Satisfiability of Constrained Horn Clauses (CHC-COMP)</li> <li>Program Committee Member: Conference on Computer Aided Verification (CAV), Seventh Workshop on Verification and Program Transformation (VPT)</li> <li>Journal reviewer: ACM Transactions on Software Engineering and Methodology (TOSEM, two times), Software Quality Journal</li> <li>Sub-reviewer: NASA Formal Methods Symposium (NFM), Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2020)</li> </ul>	
2018	<ul> <li>Program Chair: Workshop on Verification and Synthesis for Software Evolution (VSSE)</li> <li>Program Committee Member: Symposium on Automated Technology for Verification and Analysis (ATVA)</li> <li>Artifact Evaluation Committee Member: Conference on Computer Aided Verification (CAV)</li> <li>Organization Committee Member: Competition on Satisfiability of Constrained Horn Clauses (CHC-COMP)</li> <li>Journal reviewer: ACM Transactions on Programming Languages and Systems (TOPLAS), ACM</li> <li>Transactions on Software Engineering and Methodology (TOSEM)</li> <li>Sub-reviewer: Conference on Formal Methods in Computer Aided Design (FMCAD), Symposium on Model Checking of Software (SPIN), Conference on Computer Aided Verification (CAV)</li> </ul>	

2017	Local Organization Chair: Conference on Runtime Verification (RV) Program Committee Member: Conference on Runtime Verification (RV), Workshop on Horn Clauses for Verification and Synthesis (HCVS) Sub-reviewer: Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2018), Haifa Verification Conference (HVC), Conference on Formal Methods in Computer- Aided Design (FMCAD), Static Analysis Symposium (SAS), Conference on Software Engineering and Formal Methods (SEFM), Conference on Computer Aided Verification (CAV)
2016	<ul> <li>Program Chair: Workshop on Verification and Synthesis for Software Evolution (VSSE)</li> <li>Program Committee Member: Journal on Software Tools for Technology Transfer (STTT, Selected</li> <li>Papers at TACAS), Journal of Automated Reasoning (JAR, Selected Papers at VSTTE)</li> <li>Sub-reviewer: Conference on Tools and Algorithms for the Construction and Analysis of Systems</li> <li>(TACAS 2017), Symposium on Formal Methods (FM), Conference on Formal Methods in Computer-</li> <li>Aided Design (FMCAD), Conference on Verified Software: Theories, Tools, and Experiments (VSTTE),</li> <li>Conference on Computer Aided Verification (CAV), Workshop on Horn Clauses for Verification and</li> <li>Synthesis (HCVS)</li> </ul>
2015	Sub-reviewer: Conference on Formal Methods in Computer-Aided Design (FMCAD), Journal of Automated Reasoning (JAR, Special Issue on Interpolation Techniques for Program Verification and Synthesis), Conference on Computer Aided Verification (CAV), Symposium on Formal Methods (FM), NASA Formal Methods Symposium (NFM)
2014	Sub-reviewer: Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2015), Conference on Formal Methods in Computer-Aided Design (FMCAD), Ershov Informatics Conference (PSI), Conference on Computer Aided Verification (CAV) Organization Committee Member: Workshop on Validation Strategies for Software Evolution (VSSE)
2013	Sub-reviewer: Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2014), Conference on Formal Methods in Computer-Aided Design (FMCAD), Workshop on Validation Strategies for Software Evolution (VSSE) Organization Committee Member: Conference on Computer Aided Verification (CAV)
2012	<b>Sub-reviewer</b> : Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2013), Conference on Formal Methods in Computer-Aided Design (FMCAD), Conference on Design, Automation and Test in Europe (DATE), Symposium on Games, Automata, Logics and Formal Verification (GandALF), Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE), Conference on Computer Aided Verification (CAV)
2011	Sub-reviewer: Conference on Formal Methods in Computer-Aided Design (FMCAD), Conference on Formal Methods and Models for System Design (MEMOCODE)
2010	Sub-reviewer: Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2011) Organization Committee Member: Conference on Formal Methods in Computer-Aided Design (FMCAD), Alpine Verification Meeting (AVM)

SOFTWARE	
2019 – 	AdtInd, SMT-based theorem prover

2017 – 	FreqHorn / FreqTerm/HornSpec, SyGuS-based Constrained-Horn-Clause solver, termination / non- termination prover, specification synthesizer
2014 – 	<b>AE-VAL</b> , Functional synthesizer for linear arithmetic (via lazy quantifier elimination and extracting Skolem functions)
2016 – 2017	Rosette/Unbound, Constrained-Horn-Clause-based Invariant Synthesizer for functional programs in Racket
2013 – 2016	Niagara, Constrained-Horn-Clause-based incremental model checker for C
2010 – 2018	<b>HiFrog / FunFrog / eVolCheck</b> , 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

JOURNAL PUBLICATIONS AND BOOK CHAPTERS	
2020	Grigory Fedyukovich, Samuel J. Kaufman, Rastislav Bodík: Learning inductive invariants by sampling from frequency distributions. Formal Methods Syst. Des. 56(1): 154-177 (2020)
2019	Pavel Jancík, Jan Kofroň, Leonardo Alt, Grigory Fedyukovich, Antti E. J. Hyvärinen, Natasha Sharygina: <b>Exploiting partial variable assignment in interpolation-based model checking</b> . FMSD 55(1): 33-71
2017	Grigory Fedyukovich, Ondrej Sery, Natasha Sharygina: Flexible Framework for Incremental Upgrade Checking. STTT, 19(5): 517-534
2015	Hana Chockler, Daniel Kroening, Leonardo Mariani, Natasha Sharygina (editors) Validation of Evolving Software. (4 chapters)

PEER REVIEWED CONFERENCE PUBLICATIONS	
2021	Yurii Kostyukov, Dmitry Mordvinov, Grigory Fedyukovich: Beyond the elementary representations of program invariants over algebraic data types. PLDI 2021: 451-465
2021	Sumanth Prabhu S, Grigory Fedyukovich, Kumar Madhukar, Deepak D'Souza: <b>Specification synthesis with constrained Horn clauses</b> . PLDI 2021 (distinguished): 1203-1217
2021	Grigory Fedyukovich, Gidon Ernst: Bridging Arrays and ADTs in Recursive Proofs. TACAS (2) 2021: 24-42
2021	Lauren Pick, Grigory Fedyukovich, Aarti Gupta: <b>Unbounded Procedure Summaries from Bounded Environments</b> . VMCAI 2021: 291-324
2020	Sepideh Asadi, Martin Blicha, Antti E. J. Hyvärinen, Grigory Fedyukovich, Natasha Sharygina: Incremental Verification by SMT-based Summary Repair. FMCAD 2020: 77-82

2020	Hari Govind V. K., Grigory Fedyukovich, Arie Gurfinkel: Word Level Property Directed Reachability. ICCAD 2020: 107:1-107:9
2020	Andreas Katis, Grigory Fedyukovich, Jeffrey Chen, David A. Greve, Sanjai Rayadurgam, Michael W. Whalen: Synthesis of Infinite-State Systems with Random Behavior. ASE 2020: 250-261
2020	Sepideh Asadi, Martin Blicha, Antti E. J. Hyvärinen, Grigory Fedyukovich, Natasha Sharygina: Farkas-Based Tree Interpolation. SAS 2020: 357-379
2020	Naoki Kobayashi, Grigory Fedyukovich and Aarti Gupta: Fold/Unfold Transformations for Fixpoint Logic, TACAS (2), 195-214
2020	Hongce Zhang, Weikun Yang, Grigory Fedyukovich, Aarti Gupta and Sharad Malik: <b>Synthesizing Environment Invariants for Modular Hardware Verification</b> , VMCAI, 202-225
2019	Dmitry Mordvinov and Grigory Fedyukovich: Property Directed Inference of Relational Invariants, FMCAD: 152-160
2019	Grigory Fedyukovich and Aarti Gupta: Functional Synthesis with Examples, CP: 547–564
2019	Weikun Yang, Grigory Fedyukovich, and Aarti Gupta Lemma Synthesis for Automating Induction over Algebraic Data Types, CP: 600-617
2019	Grigory Fedyukovich, Sumanth Prabhu, Kumar Madhukar, Aarti Gupta: Quantified Invariants via Syntax-Guided Synthesis, CAV: 259-277
2019	Grigory Fedyukovich, Arie Gurfinkel and Aarti Gupta Lazy but Effective Functional Synthesis, VMCAI: 92-113
2018	Sepideh Asadi, Martin Blicha, Grigory Fedyukovich, Antti Hyvärinen, Karine Even-Mendoza, Natasha Sharygina and Hana Chockler: <b>Function Summarization Modulo Theories</b> , LPAR: 56-75
2018	Grigory Fedyukovich, Sumanth Prabhu, Kumar Madhukar, Aarti Gupta: Solving Constrained Horn Clauses Using Syntax and Data, FMCAD: 170-178
2018	Grigory Fedyukovich, Yueling Zhang, Aarti Gupta: Syntax-Guided Termination Analysis. CAV (1): 124-143
2018	Lauren Pick, Grigory Fedyukovich, Aarti Gupta: Exploiting Synchrony and Symmetry in Relational Verification. CAV (1) 2018: 164-182
2018	Andreas Katis, Grigory Fedyukovich, Huajun Guo, Andrew Gacek, John Backes, Arie Gurfinkel, Michael Whalen: Validity-Guided Synthesis of Reactive Systems from Assume-Guarantee Contracts. TACAS (2): 176- 193

2018	Grigory Fedyukovich, Rastislav Bodík: Accelerating Syntax-Guided Invariant Synthesis. TACAS (1): 251-269
2017	Grigory Fedyukovich, Samuel Kaufman, Rastislav Bodík: Sampling Invariants from Frequency Distributions. FMCAD: 100-107
2017	Antti Eero Johannes Hyvärinen, Sepideh Asadi, Karine Even-Mendoza, Grigory Fedyukovich, Hana Chockler, Natasha Sharygina: <b>Theory Refinement for Program Verification</b> . SAT: 347-363
2017	Grigory Fedyukovich, Maaz Bin Safeer Ahmad, Rastislav Bodík: Gradual Synthesis for Static Parallelization of Single-Pass Array-Processing Programs. PLDI: 572- 585
2017	Dmitry Mordvinov, Grigory Fedyukovich: Synchronizing Constrained Horn Clauses. LPAR: 338-355
2017	Leonardo Alt, Sepideh Asadi, Hana Chockler, Karine Even-Mendoza, Grigory Fedyukovich, Antti Eero Johannes Hyvärinen, Natasha Sharygina: HiFrog: SMT-based Function Summarization for Software Verification. TACAS (2): 207-213
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 Eero Johannes Hyvärinen, Jan Kofroň, Natasha Sharygina: <b>PVAIR: Partial Variable Assignment InterpolatoR</b> . 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
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: <b>PeRIPLO: A Framework for Producing Effective Interpolants in SAT-based Software Verification</b> . LPAR: 683-693
2013	Grigory Fedyukovich, Ondrej Sery, Natasha Sharygina: eVolCheck: Incremental Upgrade Checker for C. TACAS: 292-307
2012	Ondrej Sery, Grigory Fedyukovich, Natasha Sharygina: Incremental Upgrade Checking by Means of Interpolation-based Function Summaries. FMCAD: 114-121
2012	Ondrej Sery, Grigory Fedyukovich, Natasha Sharygina: FunFrog: Bounded Model Checking with Interpolation-based Function Summarization. ATVA: 203- 207
2011	Ondrej Sery, Grigory Fedyukovich, Natasha Sharygina: Interpolation-Based Function Summaries in Bounded Model Checking. HVC: 160-175

TEACHING		
2021	FSU: Software Engineering, Compiler Construction, Special Topics (Automated Reasoning about Programs)	
2020	FSU: Compiler Construction	
2019	FSU: Special Topics (Computer Aided Verification)	

STUDENTS		
PhD	Ameer Hamza (FSU, expected graduation - 2023)	
PhD	Daniel Riley (FSU, expected graduation - 2025)	
MS	Ilia Zlatkin (FSU, expected graduation - 2022)	