Pavel Parízek

Curriculum Vitae

Contact

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Employment

Associate Professor **05/2020 –**
Dep. of Distributed and Dependable Systems, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic

Assistant Professor **09/2012 – 04/2020**
Dep. of Distributed and Dependable Systems, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic

Post-doctoral Fellow **05/2010 – 08/2012**
David R. Cheriton School of Computer Science, Faculty of Mathematics, University of Waterloo, Ontario, Canada

Assistant Professor **07/2009 – 04/2010**
Dep. of Software Engineering, Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic

Researcher **10/2008 – 06/2009**
Dep. of Software Engineering, Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic

Education

Ph.D. in Software Systems **2008**
Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic

RNDr. (similar to Ph.D. candidate) **2007**
Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic

Mgr. (MSc equivalent) in Computer Science **2005**
Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic

Research Projects

Advanced Analysis and Verification for Advanced Software
Funded by: Czech Science Foundation
Duration: January 2023 – December 2025
My role: team member

Analysis of Data Lineage in Complex Software Systems
Funded by: Manta Tools / IBM (contractual research)
Duration: October 2018 – September 2024
My role: Principal Investigator

Scalable Techniques for Analysis of Complex Properties of Computer Systems
Funded by: Czech Science Foundation
Duration: January 2020 – December 2022
My role: team member

Automated Incremental Verification and Debugging of Concurrent Systems
Funded by: Czech Science Foundation
Duration: January 2018 – December 2020
My role: Principal Investigator

Trust 4.0: Dataflow-based Privacy and Trust Modelling and Analysis in Industry 4.0 Systems
Funded by: Technology Agency of the Czech Republic
Duration: January 2018 – December 2019
My role: team member
http://trust40.ipd.kit.edu/home/

Verification and Bug Hunting for Advanced Software
Funded by: Czech Science Foundation
Duration: January 2017 – December 2019
My role: team member

Automatic Formal Analysis and Verification of Programs with Complex Unbounded Data and Control Structures
Funded by: Czech Science Foundation
Duration: January 2014 – December 2016
My role: team member

Practical Program Verification Using Combination of Static and Dynamic Analysis
Funded by: Czech Science Foundation
Duration: February 2013 – December 2015
My role: Principal Investigator

Quality Impact Prediction for Evolving Service-oriented Software (Q-ImPrESS)
Funded by: European Union under the ICT priority of the 7th Research Framework Programme
Duration: January 2008 – December 2010
My role: team member
http://www.q-impress.eu

Open Source Platform and Infrastructure for Run-time Integration of Services (OSIRIS)
Funded by: ITEA/EUREKA Programme
Duration: July 2005 – June 2008
My role: team member
http://www.itea-osiris.org

Component Reliability Extensions for the Fractal Component Model (CRE)
Funded by: France Telecom R&D
Duration: January 2005 – June 2006
My role: team member
http://d3s.mff.cuni.cz/projects/formal_methods/ft/

Publications

Journal Publications

[1] P. Parízek and O. Lhoták. Fast Detection of Concurrency Errors by State Space Traversal with Randomization and Early Backtracking. International Journal on Software Tools for Technology Transfer, vol. 21, issue 4, Springer, 2019

[2] P. Parízek and O. Lhoták. Model Checking of Concurrent Programs with Static Analysis of Field Accesses. Science of Computer Programming, vol. 98, part 4, Elsevier, 2015

[3] P. Parízek and F. Plášil. Assume-Guarantee Verification of Software Components in SOFA 2 Framework. IET Software, vol. 4, issue 3, IET, 2010

Conference/Workshop Proceedings

[4] C. Artho, P. Parízek, D. Qu, V. Galgali, and P. Yi. JPF: From 2003 to 2023. In Proceedings of the 30th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), LNCS, vol. 14571, 2024

[5] P. Parízek and F. Kliber. Checking Just Pairs of Threads for Efficient and Scalable Incremental Verification of Multithreaded Programs. In Proceedings of the Java Pathfinder Workshop 2022, ACM SIGSOFT Software Engineering Notes, vol. 48, issue 1

[6] A. Čižmárik and P. Parízek. SharpDetect: Dynamic Analysis Framework for C#/.NET Programs. In Proceedings of the 20th International Conference on Runtime Verification (RV), LNCS, vol. 12399, 2020

[7] R. Kápl and P. Parízek. Endicheck: Dynamic Analysis for Detecting Endianness Bugs. In Proceedings of the 26th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), LNCS, vol. 12079, 2020

[8] K. Storey, E. Mercer, and P. Parízek. A Sound Dynamic Partial Order Reduction Engine for Java Pathfinder. In Proceedings of the Java Pathfinder Workshop 2019, ACM SIGSOFT Software Engineering Notes, vol. 44, issue 4

[9] P. Parízek. BUBEN: Automated Library Abstractions Enabling Scalable Bug Detection for Large Programs with I/O and Complex Environment. In Proceedings of the 17th International Symposium on Automated Technology for Verification and Analysis (ATVA), LNCS, vol. 11781, 2019

[10] P. Parízek. Hybrid Partial Order Reduction with Under-Approximate Dynamic Points-to and Determinacy Information. In Proceedings of the 16th International Conference on Formal Methods in Computer Aided Design (FMCAD), IEEE, 2016

[11] P. Parízek. Fast Error Detection with Hybrid Analyses of Future Accesses. In Proceedings of the 31st ACM/SIGAPP Symposium on Applied Computing (SAC), MUSEPAT track, ACM, 2016

[12] P. Parízek. Hybrid Analysis for Partial Order Reduction of Programs with Arrays. In Proceedings of the 17th International Conference of Verification, Model Checking, and Abstract Interpretation (VMCAI), LNCS, vol. 9583, 2016

[13] J. Daniel and P. Parízek. PANDA: Simultaneous Predicate Abstraction and Concrete Execution. In Proceedings of the 11th International Haifa Verification Conference (HVC), LNCS, vol. 9434, 2015

[14] J. Daniel and P. Parízek. Predicate Abstraction in Program Verification: Survey and Current Trends. In Proceedings of 2014 Imperial College Computing Student Workshop (ICCSW), OpenAccess Series in Informatics (OASIcs), vol. 43

[15] P. Parízek and P. Jančík. Approximating Happens-Before Order: Interplay between Static Analysis and State Space Traversal. In Proceedings of the 21st International Symposium on Model Checking of Software (SPIN), ACM, 2014

[16] J. Daniel, P. Parízek, and C.S. Pasareanu. Predicate Abstraction in Java Pathfinder. In Proceedings of the Java Pathfinder Workshop 2013, ACM SIGSOFT Software Engineering Notes, vol. 39, issue 1

[17] A. Khyzha, P. Parízek, and C.S. Pasareanu. Abstract Pathfinder. In Proceedings of the Java Pathfinder Workshop 2012, ACM SIGSOFT Software Engineering Notes, vol. 37, issue 6

[18] P. Parízek and O. Lhoták. Predicate Abstraction of Java Programs with Collections. In Proceedings of the 27th ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA), ACM, 2012

[19] P. Parízek and O. Lhoták. Identifying Future Field Accesses in Exhaustive State Space Traversal. In Proceedings of the 26th International Conference on Automated Software Engineering (ASE), IEEE CS, 2011

[20] P. Parízek and O. Lhoták. Randomized Backtracking: Next Steps. Java Pathfinder Workshop 2011

[21] P. Jančík, J. Kofroň, and P. Parízek. Advanced Debugging with JPF-Inspector. Java Pathfinder Workshop 2011

[22] P. Parízek and O. Lhoták. Randomized Backtracking in State Space Traversal. In Proceedings of the 18th International Workshop on Model Checking of Software (SPIN), LNCS, vol. 6823, 2011

[23] T. Kalibera, P. Parízek, M. Malohlava, and M. Schoeberl. Exhaustive Testing of Safety Critical Java. In Proceedings of the 8th International Workshop on Java Technologies for Real-time and Embedded Systems (JTRES), ACM, 2010

[24] P. Parízek and T. Kalibera. Efficient Detection of Errors in Java Components Using Random Environment and Restarts. In Proceedings of the 16th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), LNCS, vol. 6015, 2010

[25] P. Parízek and N. Yuldashev. Extraction of Component-Environment Interaction Model Using State Space Traversal. In Proceedings of the 25th ACM Symposium on Applied Computing (SAC 2010), ACM, 2010

[26] T. Kalibera, P. Parízek, G. Haddad, G. Leavens, and J. Vitek. Challenge Benchmarks for Verification of Real-time Programs. In Proceedings of the 4th ACM SIGPLAN Workshop on Programming Languages meets Program Verification (PLPV'10), ACM, 2010

[27] J. Kofroň, P. Parízek and O. Šerý. On Teaching Formal Methods: Behavior Models and Code Analysis. In Proceedings of the 2nd International FME Conference on Teaching Formal Methods (TFM 2009), LNCS, vol. 5846, 2009

[28] P. Parízek and T. Kalibera. Platform-Specific Restrictions on Concurrency in Model Checking of Java Programs. In Proceedings of the 14th International Workshop on Formal Methods for Industrial Critical Systems (FMICS 2009), LNCS, vol. 5825, 2009

[29] P. Parízek, J. Adámek, and T. Kalibera. Automated Construction of Reasonable Environment for Java Components. In Proceedings of the 6th International Workshop on Formal Engineering Approaches to Software Components and Architectures (FESCA 2009), ENTCS, vol. 253, issue 1, 2009

[30] P. Parízek and J. Adámek. Checking Session-Oriented Interactions between Web Services. In Proceedings of 34th EUROMICRO SEAA conference, IEEE Computer Society, 2008

[31] P. Parízek and F. Plášil. Modeling of Component Environment in Presence of Callbacks and Autonomous Activities. In Proceedings of TOOLS EUROPE 2008, Springer-Verlag, LNBIP, vol. 11, 2008

[32] P. Parízek and F. Plášil. Partial Verification of Software Components: Heuristics for Environment Construction. In Proceedings of 33rd EUROMICRO SEAA conference, IEEE Computer Society, 2007

[33] P. Parízek and F. Plášil. Modeling Environment for Component Model Checking from Hierarchical Architecture. In Proceedings of Formal Aspects of Component Software (FACS'06), ENTCS, vol. 182, 2007

[34] P. Parízek and F. Plášil. Specification and Generation of Environment for Model Checking of Software Components. In Proceedings of International Workshop on Formal Foundations of Embedded Software and Component-Based Software Architectures (FESCA 2006), ENTCS, vol. 176, issue 2, 2007

[35] P. Parízek, F. Plášil, and J. Kofroň. Model Checking of Software Components: Combining Java PathFinder and Behavior Protocol Model Checker. In Proceedings of 30th NASA Software Engineering Workshop (SEW-30), IEEE Computer Society, 2007

Book Chapters

[36] L. Bulej, T. Bureš, T. Coupaye, M. Děcký, P. Ježek, P. Parízek, F. Plášil, T. Poch, N. Rivierre, O. Šerý, and P. Tůma. CoCoME in Fractal. Chapter In The Common Component Modeling Example: Comparing Software Component Models, Springer-Verlag, LNCS, vol. 5153, 2008

[37] T. Bureš, M. Děcký, P. Hnětynka, J. Kofroň, P. Parízek, F. Plášil, T. Poch, O. Šerý, and P. Tůma. CoCoME in SOFA. Chapter in The Common Component Modeling Example: Comparing Software Component Models, Springer-Verlag, LNCS, vol. 5153, 2008

Technical Reports

[38] P. Parízek and F. Kliber. Incremental Verification of Multithreaded Programs by Checking Interleavings for Pairs of Threads. Tech. Report No. D3S-TR-2022-01, Dep. of Distributed and Dependable Systems, Charles University, 2022

[39] P. Vysoký, P. Parízek, and V. Pech. INGRID: Creating Languages in MPS from ANTLR Grammars. Tech. Report No. D3S-TR-2018-01, Dep. of Distributed and Dependable Systems, Charles University, 2018

[40] P. Parízek. Hybrid Analysis of Future Accesses and Heuristics for Fast Detection of Concurrency Errors. Tech. Report No. D3S-TR-2015-03, Dep. of Distributed and Dependable Systems, Charles University, 2015

[41] P. Parízek and P. Jančík. Computing Approximate Happens-Before Order with Static and Dynamic Analysis. Tech. Report No. D3S-TR-2013-06, Dep. of Distributed and Dependable Systems, Charles University, 2013

[42] P. Parízek and J. Adámek. Modeling and Verification of Session-Oriented Interactions between Web Services: Compliance of BPEL with Session Protocols. Tech. Report No. 2008/2, Dep. of SW Engineering, Charles University, 2008

[43] P. Parízek and F. Plášil. Heuristic Reduction of Parallelism in Component Environment. Tech. Report No. 2007/2, Dep. of SW Engineering, Charles University, 2007

[44] P. Parízek, F. Plášil, and J. Kofroň. Model Checking of Software Components: Making Java PathFinder Cooperate with Behavior Protocol Checker. Tech. Report No. 2006/2, Dep. of SW Engineering, Charles University, 2006

[45] P. Parízek and F. Plášil. Specification and Generation of Environment for Model Checking of Software Components. Tech. Report No. 2005/5, Dep. of SW Engineering, Charles University, 2005

Theses

[46] P. Parízek. Formal Verification of Components in Java. Ph.D. thesis, advisor: František Plášil, 2008

[47] P. Parízek. Transactions in Peer-to-Peer Systems. Mgr. thesis, advisor: Petr Tůma, 2005

Selected Talks

1. Efficient and Scalable Incremental Verification of Multithreaded Programs By Checking Just Pairs of Threads. 14th Alpine Verification Meeting (AVM 2022)
2. Systematic Testing of Concurrent Programs Using Combination of Static and Dynamic Analysis. Imperial College London, 2014; ECOOP PC seminar, 2015
3. Practical Verification and Bug Finding with Java Pathfinder. Oxford University, 2012; Aarhus University, 2012

Software

BUBEN: Automated generator of library abstractions for scalable bug detection in large Java programs with Java Pathfinder
https://github.com/d3sformal/buben

JPF-Inspector: GDB-like debugger that allows the developer to control and inspect execution of a Java program under Java Pathfinder
https://github.com/d3sformal/jpf-inspector

PANDA: Predicate Abstraction in Dynamic Analysis
https://github.com/d3sformal/panda

JPF-static: Practical verification using static analysis and Java Pathfinder
http://d3s.mff.cuni.cz/projects/formal_methods/jpf-static

J2BP: Tool for automated construction of predicate abstraction of Java classes
http://d3s.mff.cuni.cz/~parizek/j2bp

RTEmbed: Java Pathfinder extension for exhaustive testing of Java programs for real-time and embedded platforms (RTSJ and SCJ)
http://d3s.mff.cuni.cz/~parizek/rtembed

COMBAT: Component Behavior Analysis Toolset
http://d3s.mff.cuni.cz/projects/formal_methods/combat

Teaching Experience

Courses taught at Charles University:

Program Analysis and Code Verification: 2008-2009, 2013-2024
Commercial Workshops – organization: 2018-2023
Formal Foundations of Software Engineering: 2015-2023
Advanced Tools for Software Development and Monitoring: 2014-2023
Software Development Tools: 2013-2024
NetBeans and Eclipse Platforms: 2013-2014
Recommended Programming Practices – labs: 2010, 2013
Embedded and Real-Time Systems – labs: 2010

Software Development and Monitoring Tools: 2008, 2012 (labs)
Internet – labs: 2007-2008

Students

Current Students

1. Denis Leskovar, Mgr (MSc equivalent), started in November 2023
2. Michal Kyjovský, Mgr, started in October 2023
3. Filip Kliber, PhD, started in October 2018
4. Vlastimil Dort, PhD, started in October 2016

Past Students

1. Václav Luňák, Mgr (MSc equivalent), June 2023 - February 2024
   Extending Data Lineage Analysis for Python with Runtime Types
2. Jan Kleprlík, Mgr, December 2022 - February 2024
   Performance and Usability Improvements for Data Lineage Analysis of C# Programs
3. Jan Piroutek, Bc, September 2022 – February 2024
   Fuzz testing of network subsystem in PikeOS
4. Natália Potočeková, Mgr, October 2022 – September 2023
   Data Lineage Analysis for Databricks platform
5. Michal Jurčo, Mgr, January 2022 – September 2023
   Data Lineage Analysis Service for Embedded Code
6. Andrej Jurčo, Mgr, May 2022 – June 2023
   Data Lineage Analysis for PySpark and Python ORM Libraries
7. Jakub Daniel, PhD, October 2013 – April 2023
8. Roman Firment, Mgr, June 2021 – June 2022
   Monitoring Support for Manta Flow Agent in Cloud-Based Architecture
9. Josef Kumstýř, Mgr, February 2021 – June 2022
   Precise and Efficient Incremental Update of Data Lineage Graph
10. Dalibor Zeman, Mgr, May 2020 – September 2021
    Extending Data Lineage Analysis Towards .NET Frameworks
11. Lukáš Riedel, Mgr, October 2020 – June 2021
    Extending Data Lineage Analysis Platform with Support for Dependency Injection Frameworks
12. Denis Leskovar, Bc, September 2020 – June 2021
    Automated Program Minimization With Preserving of Runtime Errors
13. Filip Havel, Mgr, May 2020 – June 2021
    Debugging Support for Static Analysis Library WALA
14. Harun Ćerim, Mgr, March 2020 – September 2020
    Extending C# with a Library of Functional Programming Concepts
15. Oskar Hýbl, Mgr, January 2020 – September 2020
    Data Lineage Analysis of Frameworks with Complex Interaction Patterns
16. Martin Wirth, Mgr, November 2019 – September 2020
    Balancing Keyword-Based Data and Queries in Distributed Storage Systems
17. Andrej Jurčo, Bc, October 2019 – September 2020
    Data Lineage Analysis for Qlik Sense

18. Andrej Čižmárik, Mgr, December 2018 – February 2020
    Dynamic Analysis Framework for C#/.NET Programs
19. Richard Eliáš, Mgr, October 2018 – September 2019
    Analyzing Data Lineage in Database Frameworks
20. Denis Drobný, Bc, October 2018 – June 2019
    Extracting Information from Database Modeling Tools
21. Filip Kliber, Mgr, January 2018 – September 2018
    Runtime Checking of Privacy and Security Contracts in Dynamic Architectures
22. István Satmári, Mgr, June 2016 – September 2018
    Frege IDE with JetBrains MPS
23. Roman Kápl, Mgr, November 2017 – June 2018
    Dynamic Analysis for Finding Endianity Bugs
24. Petr Hudeček, Mgr, October 2016 – September 2017
    Soothsharp: A C#-to-Viper Translator
25. Jakub Háva, Mgr, March 2016 – June 2017
    Monitoring Tool for Distributed Java Applications
26. Filip Kliber, Bc, May 2016 – September 2016
    Design and Implementation of a Language for Code-golf Challenge
27. Přemysl Vysoký, Mgr, April 2016 – September 2016
    Grammar to JetBrains MPS Convertor
28. Vlastimil Dort, Mgr, February 2015 – September 2016
    String Analysis for Code Contracts
29. Jan Škvařil, Mgr, September 2014 – September 2016
    Web System for Crowdfunding Based on Selling Items with Custom Imprint
30. Tomáš Šafařík, Mgr, June 2015 – June 2016
    Java Bytecode Preprocessor for Program Verification Tools
31. Jonáš Klimeš, Mgr, May 2014 – June 2016
    Domain-Specific Language for Learning Programming
32. Pavel Jančík, Mgr, April 2009 – September 2010
    Checking Compliance of Java Implementation with TBP Specification
33. Rudolf Tomori, Bc, October 2008 – June 2009
    Automatic Detection of Web Application Vulnerabilities
34. Nodir Yuldashev, Mgr, December 2006 – May 2009
    Using Java PathFinder for Construction of Abstractions of Java Programs
35. Zdeněk Bouška, Bc, October 2007 – January 2009
    Traffic Monitoring in TCP/IP Networks
36. David Brodský, Bc, November 2006 – August 2007
    Distributed Hash Table for BitTorrent Client

Professional Service

Conference/Workshop Organization

1. Alpine Verification Meeting (AVM) 2023 (main organizer)
2. JPF Online Day 2020 (co-chair)

Program Committees

1. European Conference on Object-Oriented Programming (ECOOP): 2015
2. Symposium on Applied Computing, special track on Object Oriented Programming Languages and Systems (OOPS track, SAC): 2015, 2016, 2018
3. Java Pathfinder Workshop: 2011-2013, 2017-2019, 2022
4. International Workshop on Java Technologies for Real-time and Embedded Systems (JTRES): 2010

Journal Referee

1. Formal Methods in System Design (FMSD)
2. Science of Computer Programming
3. Software Testing, Verification and Reliability (STVR)
4. ACM Transactions on Software Engineering and Methodology
5. Concurrency and Computation: Practice and Experience
6. IET Software

External Reviewer

1. International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS): 2022
2. Formal Methods in Computer-Aided Design (FMCAD): 2016
3. European Conference on Object-Oriented Programming (ECOOP): 2008, 2016
4. International Symposium on Static Analysis (SAS): 2011
5. International Symposium on Component-Based Software Engineering (CBSE): 2010
6. World Congress on Formal Methods (FM): 2009

Other

1. Member of the subject-area board for computer science (informatics) of the Charles University Grant Agency (GAUK): September 2016 – May 2022
2. Local organizer for conferences and workshops: ECOOP 2015
3. Mentor in the Google Summer of Code (GSoC) program for the Java Pathfinder team: 2010-2013, 2016, 2019-2024