Carlo A. Furia[1]

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Faculty of Informatics
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Current position

Associate professor at the Software Institute, Faculty of Informatics, USI, Lugano, Switzerland.

Personal data

Place and date of birth: Varese, Italy. 16 September 1979.

Nationality: Italian.

Research positions

June 2018–present: Associate professor (tenured) at the Software Institute, Faculty of Informatics, USI Università della Svizzera italiana, Lugano, Switzerland.

January 2016–May 2018: Associate professor ("docent", tenured) in the Formal Methods Division, Department of Computer Science and Engineering, Chalmers University of Technology, Göteborg, Sweden.

February 2009–December 2015: Lecturer and senior researcher ("Oberassistent") at the Chair of Software Engineering, Department of Computer Science, ETH Zurich (Switzerland).

November 2008–January 2009: Post-doctoral researcher at CNR IEIIT-MI (Milano, Italy).

June 2007–September 2008: Post-doctoral researcher at Deep-SE Group, Dipartimento di Elettronica e Informazione, Politecnico di Milano (Milano, Italy).

September–November 2006: Visiting scholar at the Computer Science Department, University of Virginia (Charlottesville, VA, USA). Host: Prof. John C. Knight.

March 2004–May 2007: PhD student, Dipartimento di Elettronica e Informazione, Politecnico di Milano (Milano, Italy).

[1] Latest update of this CV: 2024/02/05.

Education

Ph.D. in computer science, 2004–2007.
Politecnico di Milano (Milano, Italy).
Graduated on 3 May 2007; advisor: Prof. Dino Mandrioli

Laurea degree[2] in "Ingegneria informatica" (Computer science engineering), 1998–2003.
Politecnico di Milano (Milano, Italy).
Graduated on 19 December 2003; grade 100/100 *cum laude*, GPA: 29.45/30.00.
Thesis advisor: Prof. Dino Mandrioli.

Master of science in computer science, 2002–2003.
University of Illinois at Chicago (Chicago, IL, USA).
Graduated on 14 December 2003; GPA 5.0/5.0.
Thesis advisors: Prof. Ugo Buy and Prof. Dino Mandrioli.

Research interests

My research interests center around developing rigorous techniques and tools to analyze and improve the quality, correctness, and reliability of software and systems.
Most of my research is in the area of *formal methods for software engineering*. These include a wide array of models, techniques, methods, and tools to support the analysis, rigorous development, and verification of software and software-intensive systems. Much of my work aims at making formal methods *practical* and *widely applicable* – for example by increasing the level of automation. It often features combinations and integration of diverse techniques to improve versatility and reduce limitations; and thorough empirical evaluations to assess relevance and impact of research outcomes.
The main themes of my recent work are:

- Automatic program repair;
- Automated program verification, especially of object-oriented programming languages;
- Practical specification-based dynamic analysis of software;
- Empirical software engineering;
- Modeling and analyzing real-time, hybrid, and cyber-physical systems.

For a more detailed overview of my recent research see `http://bugcounting.net/research.html`.

[2] MS equivalent.

Supervision

Postdocs at USI

Abhishek Tiwari. November 2023–present

PhD students at USI

Marco Paganoni. September 2022–present

Riccardo Felici. (Co-supervised with Prof. Laura Pozzi) October 2020–present

Diego Marcílio. September 2019–November 2023.
Practical Automated Program Analysis for Improving Java Software

Mohammad Rezaalipour. August 2019–present.

Bhargav Bhatt. October 2018–September 2022.

PhD student at Chalmers

YuTing (Jeff) Chen. June 2016–January 2022.
Robust and flexible intermediate verification.

PhD students at ETH Zurich

Co-supervisor, with Bertrand Meyer as main supervisor:

Julian Tschannen. Automated usable functional verification of object-oriented programs.
Defended on 18 December 2014.
(Afterward: software engineer at Google Zurich.)

H.-Christian Estler. Understanding and improving collaboration in distributed software development.
(Co-supervised also with Martin Nordio)
Defended on 18 December 2014.
(Afterward: post-doc at ETH Zurich developing a web-based IDE for teaching `https://codeboard.io/`.)

Yu (Max) Pei. Automatic fixing of programs with contracts.
Defended on 18 December 2014.
(Afterward: assistant professor at the Hong Kong Polytechnic University.)

Nadia Polikarpova. Specifying and verifying reusable components.
Defended on 29 April 2014.
(Afterward: post-doc at MIT CSAIL, assistant professor at UCSD.)

Marco Trudel. Automatic translation and object-oriented reengineering of legacy code.
Defended on 26 April 2013.
(Afterward: funded by an ETH Pioneer Fellowship startup grant `https://www.mtsystems.ch/`; software engineer at Oepfelbaum IT management.)

Yi (Jason) Wei. Putting contracts to work for better automated testing and fixing.
Defended on 29 November 2012.
(Afterward: research software development engineer at Microsoft Research Cambridge, UK.)

Teaching

Organizer of the PhD course "Software research seminar", USI, Spring 2021, 2023. With Prof. Gabriele Bavota, Paolo Tonella, Cesare Pautasso.

Lecturer for the undergraduate course "Programming fundamentals 1", USI, Fall 2020, 2021, 2022, 2023.

Lecturer for the course "Programmazione 1", USI, Fall 2020.

Lecturer for the graduate course "Software analysis", USI, Spring 2019, 2020, 2021, 2022, 2023, 2024.

Lecturer for the graduate course "Software design and modeling", USI, Fall 2018, 2019, 2020, 2021, 2022, 2023.

Lecturer for the undergraduate course "Principles of concurrent programming", Chalmers University of Technology, Spring 2018.
For my teaching at Chalmers, I was nominated for the Chalmers Pedagogical Price 2018.

Lecturer for the undergraduate course "Concurrent programming", Chalmers University of Technology, Spring 2017.

Lecturer for the undergraduate course "Objektorienterad programmering (Object-oriented programming)", Chalmers University of Technology, Fall 2016, 2017. With Dr. Alex Gerdes.

Instructor for the MOOC "Computing: Art, Magic, Science – Part II", hosted by edX, first iteration in Fall 2015. With Prof. Bertrand Meyer and Dr. Marco Piccioni.

Lecturer for the PhD course "Modeling time in computing", Politecnico di Milano, April 2013, 2015. With Prof. Dino Mandrioli, Angelo Morzenti, and Matteo Rossi.

Lecturer for the graduate course "Software verification", ETH Zurich, Fall 2009, 2010, 2011, 2012, 2013, 2014, 2015. With Prof. Bertrand Meyer and Dr. Sebastian Nanz.

Lecturer for the graduate/advanced undergraduate course "Java and C# in depth", ETH Zurich, Spring 2010, 2013, 2014. With Prof. Bertrand Meyer.

Lecturer for the undergraduate course "Software architecture", ETH Zurich, Spring 2011. With Prof. Bertrand Meyer and Dr. Martin Nordio.

Lecturer for the compact industry course "Software testing and verification", ETH Zurich, 1 April 2011, 18 November 2011. With Prof. Bertrand Meyer and Dr. Sebastian Nanz.

Talks

Invited talks

Practical Formal Methods: Are We There Yet? Swiss Verification Day. 10 January 2024, Neuchâtel, Switzerland.

Gaming Your PhD Career. ETAPS Mentoring Workshop. 23 April 2023, Paris, France.

Panel of DeepTest 2020 (ICSE's 2nd Workshop on Testing for Deep Learning and Deep Learning for Testing). 1 July 2020, online (in lieu of Seoul, South Korea).

Should We Use Bayesian Statistics for Empirical Software Engineering? 7 May 2019, University of Zurich, Switzerland. (Host: Prof. Alberto Bacchelli)

Automated Program Repair with and without Contracts. 8 February 2018, Imperial College London, UK. (Host: Dr. Antonio Filieri)

What Good Are Formal Methods for Software Engineering? 22 November 2017, Università della Svizzera italiana (USI), Switzerland. (Host: Prof. Michele Lanza)

Assertions Considered Helpful: from Testing to Correctness Proofs. University of Luxembourg, 24 October 2016, Luxembourg. (Host: Prof. Lionel Briand)

How Banks Can Maintain Stability: Class-invariant Based Reasoning with Semantic Collaboration. 15th KeY Symposium. 26 July 2016, Manigod, France.

Assertions Considered Helpful: from Tests to Functional Correctness Proofs. Kick-off workshop of project TheProSE (Wallenberg Academy Fellowship). 4 September 2015, Gothenburg, Sweden.

Testing, Fixing, and Proving with Contracts. Invited tutorial at the 9th International Conference on Tests & Proofs (TAP), a STAF '15 event. 22 July 2015, L'Aquila, Italy.

Contracts in Practice. 17 April 2015, DEIB, Politecnico di Milano, Italy.

Practical Formal Methods. 30 March 2015, Technical University of Denmark (DTU), Denmark.

Practical Formal Methods. 27 March 2015, University of Sheffield, UK.

Contracts in Practice. Workshop "JML: Advancing Specification Language Methodologies". 25 March 2015, Lorentz Center, Leiden, the Netherlands.

Automatic Fixing of Programs with Contracts. 11 February 2015, Birkbeck, University of London, UK.

The Gotthard Approach: Designing an Integrated Verification Environment for Eiffel. Invited talk at the 1st Workshop on Formal Integrated Development Environment (F-IDE), an ETAPS '14 event. 6 April 2014, Grenoble, France.

A Publication Culture in Software Engineering. A *panel* at ESEC/FSE '13. 22 August 2013, Saint Petersburg, Russia.

From Simple to Stronger Specifications. Saarland University, 7 March 2013, Saarbrücken, Germany. (Host: Prof. Andreas Zeller)

Contracts for Verification – a personal perspective. Eiffel at 25, 24 November 2010. Zürich, Switzerland.

Inferring Loop Invariants Using Postconditions. IFIP WG 2.3 meeting 50. 3 March 2010, Lachen, Switzerland.

Integrating Discrete- and Continuous-Time Metric Temporal Logics Through Sampling: Framework and Applications. EPFL, 25 June 2007, Lausanne, Switzerland. (Host: Prof. Thomas A. Henzinger)

Compositionality and Integration for Real-Time Systems. EPFL, 20 October 2005, Lausanne, Switzerland. (Host: Prof. Thomas A. Henzinger)

Conference presentations

Why Just Boogie? Translating Between Intermediate Verification Languages. iFM '16, 1 June 2016. Reykjavik, Iceland.

A Comparative Study of Programming Languages in Rosetta Code. ICSE '15, 22 May 2015. Firenze, Italy.

Automated Program Repair in an Integrated Development Environment. ICSE '15, 21 May 2015. Firenze, Italy.

Bounded Variability of Metric Temporal Logic. TIME '14, 9 September 2014. Verona, Italy.

Loop Invariants by Mutation, Dynamic Validation, and Static Checking. WING '14, a workshop of the Vienna Summer of Logic, 23 July 2014. Vienna, Austria.

Really Automatic Scalable Object-Oriented Reengineering. ECOOP '13, 5 July 2013. Montpellier, France.

The Search for the Laws of Automatic Random Testing. SAC '13, 21 March 2013. Coimbra, Portugal.

A Verifier for Functional Properties of Sequence-Manipulating Programs. ATVA'12, 5 October 2012. Thiruvananthapuram (Trivandrum), India.

Automata-based Verification of Linear Temporal Logic Models with Bounded Variability. TIME'12, 12 September 2012. Leicester, UK.

On Relaxing Metric Information in Linear Temporal Logic. TIME'11, 13 September 2011. Lübeck, Germany.

What's Decidable about Sequences? ATVA'10, 22 September 2010. Singapore.

Using Compositionality to Formally Model and Analyze Systems Built of a High Number of Components. ICECCS'10, 25 March 2010. Oxford, UK.

Towards Relaxing Metric Information in Linear Temporal Logic. ICTCS'09, 29 September 2009. Cremona, Italy.

Practical Automated Partial Verification of Multi-Paradigm Real-Time Models. ICFEM'08, 30 October 2008. Kitakyushu, Japan.

Practical Efficient Modular Linear-Time Model-Checking. ATVA'08, 22 October 2008. Seoul, South Korea.

MTL with Bounded Variability: Decidability and Complexity. FORMATS'08, 15 September 2008, Saint-Malo, France.

Tomorrow and All Our Yesterdays: MTL Satisfiability over the Integers. ICTAC'08, 2 September 2008, Istanbul, Turkey.

Automated Verification of Dense-Time MTL Specifications via Discrete-Time Approximations. FM'08, 28 May 2008, Turku (Åbo), Finland.

On the Expressiveness of MTL Variants. FORMATS'07, 4 October 2007, Salzburg, Austria.

Modeling the Environment in Software-Intensive Systems. MiSE@ICSE'07, 20 May 2007, Minneapolis, MN, USA.

Integrating Discrete- and Continuous-Time Metric Temporal Logics Through Sampling. FORMATS'06, 25 September 2006, Paris, France.

Automated Compositional Proofs for Real-Time Systems. FASE'05, 8 April 2005, Edinburgh, UK.

Semi-Formal and Formal Models Applied to Flexible Manufacturing Systems. ISCIS'04, 29 October 2004, Kemer–Antalya, Turkey.

Compositional Proofs for Real-Time Systems. GIIS meeting ("Gruppo di Interesse in Ingegneria del Software" (software engineering interest group)), 30 September 2004, Università del Sannio, Benevento, Italy.

Research grants

USI Innovations in Teaching grant "Check My Recipe: An automated feedback system for programming assignments developed according to the design recipe", CHF 15'500. Applicant: Carlo A. Furia; Duration: 8 months from February 2023.

SNF (Schweizerischer Nationalfonds – Swiss National Science Foundation) grant 200021-207919 "LastMile: Narrowing the usability gap of software verification", CHF 757'550. Applicant: Carlo A. Furia; Duration: 4 years from September 2022.

SNF (Schweizerischer Nationalfonds – Swiss National Science Foundation) grant 200021-182060 "Hi-Fi: Widely applicable and usable automated program repair", CHF 476'106. Applicant: Carlo A. Furia; Duration: 4 years from August 2019.

SNF (Schweizerischer Nationalfonds – Swiss National Science Foundation) grant 200021-137931 "Complete and verifiable contracts (FullContracts)", CHF 151'482. Applicants: Carlo A. Furia and Bertrand Meyer; Duration: 3 years from November 2011.

SNF (Schweizerischer Nationalfonds – Swiss National Science Foundation) grant 200020-134974 "Large scale automatic testing (LSAT)", CHF 157'482. Applicants: Carlo A. Furia and Bertrand Meyer; Duration: 3 years from June 2011.

SNF (Schweizerischer Nationalfonds – Swiss National Science Foundation) grant 200021-153512 "Models and tools for collaboration in distributed software engineering (CloudStudio)", CHF 23'561. Applicants: Carlo A. Furia and Bertrand Meyer; Duration: 5 months from April 2014.

Awards

Distinguished paper award at the 38th IEEE International Conference on Software Maintenance and Evolution (ICSME 2022).

Best paper award at the 13th International Conference on Integrated Formal Methods (iFM 2017).

Outstanding reviewer award at the 39th International Conference on Software Engineering (ICSE 2017).

Best paper award at the 20th International Symposium on Formal Methods (FM 2015).

Best paper awards at the 7th, 8th, and 9th edition of the International Conference on Global Software Engineering (ICGSE 2012, 2013, and 2014).

ICSE 2009 certificate of appreciation for "outstanding contribution to the creation and organization of the first Student Contest in Software Engineering" (SCORE 2009).

Three-year Ph.D. scholarship of the Italian *Ministero dell'Università e della Ricerca* (Ministry of Education, University and Research), January 2004.

Professional service

Program chair and general chair

Co-chair of the Doctoral Symposium at the 26th Symposium on Formal Methods (FM 2024).

Program co-chair of the 12th International Conference on Formal Methods in Software Engineering (FormaliSE 2024) – a co-located event of ICSE 2024.

General chair of the 17th International Conference on Integrated Formal Methods (iFM 2022).

Program co-chair of the Software Institute Summit, USI (online), 17 February 2022.

General chair of the 16th International Conference on Integrated Formal Methods (iFM 2020, online).

Workshop co-chair of the 24th Symposium on Formal Methods (FM 2021).

Co-organizer of VerifyThis 2019 – a program verification competition part of ETAPS 2019.

Program co-chair of the 14th International Conference on Integrated Formal Methods (iFM 2018).

Program co-chair of the 10th International Conference on Tests & Proofs (TAP 2016), an event of STAF 2016.

Program co-chair of the Student Contest on Software Engineering (SCORE 2016), an event of the 38th International Conference on Software Engineering (ICSE 2016).

Program co-chair of the Tool Demonstrations Track at the 9th Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE 2013).

Program co-chair of the 50th International Conference on Objects, Models, Components and Patterns (TOOLS Europe 2012).

Editorial boards

Member of the editorial board of the Empirical Software Engineering (EMSE) journal: May 2021–present.

Program committee member

Program committee member of the ETAPS Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS): 2024.

Program committee member of the International Conference on Evaluation and Assessment in Software Engineering (EASE): 2023.

Program committee member of the New Ideas and Emerging Results (NIER) track: ICSE 2023, 2024.

Program committee member of the ETAPS Conference on Fundamental Approaches to Software Engineering (FASE): 2022, 2023.

Committee member of the Registered Reports Track of IEEE ICSME: 2020, 2021.

Committee member of the Registered Reports Track of MSR: 2020.

Program committee member of the Software Verification and Testing Track of ACM SAC (SAC-SVT): 2020

Program committee member of the Doctoral Symposium at FM: 2019, 2023

Program committee member of the Workshop on the Design and Analysis of Robust Systems (DARS): 2019

Program committee member of the ACM Student Research Competition (SRC): PLDI 2018, ICSE 2022.

Program committee member of the International Conference on Software Engineering and Formal Methods (SEFM): 2018.

Program committee member of the Conference on Formal Methods in Software Engineering (FormaliSE): 2018, 2019, 2020, 2021, 2022, 2023.

Program committee member of the Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE): 2017, 2020, 2021, 2022.

Program committee member of the International Conference on integrated Formal Methods (iFM): 2017, 2019, 2023.

Program committee member of the International Conference on Software Engineering (ICSE): 2017.

Outstanding reviewer award for my work for ICSE 2017.

Program committee member of the AutoProof Workshop: 2016.

Program committee member of the Workshop on Formal Techniques for Java-like Programs (FTfJP): 2016, 2019.

Program committee member of the Workshop on Synthesis (SYNT): 2015.

Program committee member of the Workshop on Formal Integrated Development Environment (F-IDE): 2015, 2016, 2018, 2019, 2021, 2022.

Program committee member of the Ershov Informatics Conference (PSI): 2015, 2017, 2019.

Program committee member of the International Conference on Global Software Engineering (ICGSE): 2015.

Program committee member of the Workshop on Logic and Model-checking for Self-* Systems (MOD*): 2014. Workshop on Formal Verification for Self-* Systems (VERY*): 2015.

Program committee member of the International Workshop on Invariant Generation (WING): 2014.

Program committee member of the Tool Demonstrations Track at the International Symposium on Software Testing and Analysis (ISSTA): 2014.

Program committee member of the International Conference on Model-Driven Engineering and Software Development (Modelsward): 2014, 2015, 2016.

Program committee member of the Annual Conference on Theory and Applications of Models of Computation (TAMC): 2014, 2016, 2017.

Program committee member of the International Symposium on Temporal Representation and Reasoning (TIME): 2012.

Program committee member of the International Conference on Tests & Proofs (TAP): 2010, 2011, 2017, 2018, 2022, 2023.

Program committee member of the IEEE International Conference on Engineering of Complex Computer Systems (ICECCS): 2011, 2012, 2013, 2014, 2015, 2016, 2017.

Program committee member of the Interaction and Concurrency Experience (ICE): 2009, 2010, 2015.

Program committee member of the Student Contest in Software Engineering (SCORE), an initiative of the International Conference on Software Engineering (ICSE): 2009, 2018.

PhD external examiner

Min-Hsien (Sam) Weng: "Efficient Compilation of a Verification-friendly Programming Language", University of Waikato, 18 January 2019. Thesis advisors: Robi Malik and Mark Utting.

Alexander Kogtenkov: "Void Safety", ETH Zurich, 31 January 2017. Thesis advisor: Bertrand Meyer.

Alessandro Rizzi: "A Syntactic-Semantic Approach for Incremental Program Verification of Matching Logic Properties", Politecnico di Milano, November 2016. Thesis advisor: Carlo Ghezzi.

Wei Dou: "A Model-Driven Approach to Offline Trace Checking of Temporal Properties", University of Luxembourg, 24 October 2016. Thesis advisors: Lionel Briand and Domenico Bianculli.

Organizational/administrative positions

Vice Dean, Faculty of Informatics, USI: 2023–2025.

Member of the *Communications Committee* of Formal Methods Europe: since 2018.

Financial examiner of Formal Methods Europe's budget: 2020, 2021.

Registration Chair of ICSE 2018.

PhD students delegate, Dipartimento di Elettronica e Informazione, Politecnico di Milano: 2005–2007.

Affiliations

Formal Methods Europe, member (since 2010).

Spoken languages

Italian (native), English (fluent), German (basic).

Publication list

Publications are listed in *reverse* cronological order in each category. Publications are available online at `http://bugcounting.net`. The hyperlinks in the margin directly link to each paper's details and text.

Google Scholar profile at `http://scholar.google.com/citations?user=pqbv1BAAAAAJ`

DBLP page at `http://dblp.uni-trier.de/pers/hd/f/Furia:Carlo_A=`

ORCID id 0000-0003-1040-3201

Books and edited proceedings

B4. Bernhard K. Aichernig and Carlo A. Furia, editors. *Tests and Proofs – 10th International Conference, TAP 2016. Held as Part of STAF 2016, Vienna, Austria, July 5–7, 2016. Proceedings*, volume 9762 of *Lecture Notes in Computer Science*. Springer, 2016 — TAP 2016

B3. Carlo A. Furia and Sebastian Nanz. TOOLS Europe 2012 special section. *Journal of Object Technology*, 12(3), August 2013. (editorial) — JOT 2013

B2. Carlo A. Furia, Dino Mandrioli, Angelo Morzenti, and Matteo Rossi. *Modeling Time in Computing*. Monographs in Theoretical Computer Science. An EATCS series. Springer, 2012 — Time Modeling

B1. Carlo A. Furia and Sebastian Nanz, editors. *Objects, Models, Components, Patterns – 50th International Conference, TOOLS 2012, Prague, Czech Republic, May 29–31, 2012. Proceedings*, volume 7304 of *Lecture Notes in Computer Science*. Springer, 2012 — TOOLS 2012

Research papers (refereed)

P94. Riccardo Felici, Laura Pozzi, and Carlo A. Furia. HyperPUT: Generating synthetic faulty programs to challenge bug-finding tools. *Empirical Software Engineering*, 2023. Accepted in November 2023 — EMSE

P93. Diego Marcilio and Carlo A. Furia. Lightweight precise automatic extraction of exception preconditions in Java methods. *Empirical Software Engineering*, 2023. Accepted in September 2023 — EMSE

Extended version of [P85], invited to a special issue with the best papers from ICSME 2022.

P92. Marco Paganoni and Carlo A. Furia. Reasoning about exceptional behavior at the level of Java bytecode. In *Proceedings of the 18th International Conference on integrated Formal Methods (iFM)*, volume 14300 of *Lecture Notes in Computer Science*, pages 113–133. Springer, November 2023. (Acceptance rate: 33%) — iFM 2023

Best paper award at iFM 2023.

P91. Diego Marcilio and Carlo A. Furia. Towards code improvements suggestions from client exception analysis. In *Proceedings of the 39th IEEE International Conference on Software Maintenance and Evolution (ICSME)*, pages 363–368. IEEE Computer Society, October 2023. New ideas and emerging results track, (Acceptance rate: 39%) — ICSME 2023

P90. Mohammad Rezaalipour and Carlo A. Furia. aNNoTest: An annotation-based test generation tool for neural network programs. In *Proceedings of the 39th IEEE International Conference on Software Maintenance and Evolution (ICSME)*, pages 574–579. IEEE Computer Society, October 2023. Tool demo track, (Acceptance rate: 61%) ICSME 2023

P89. Carlo A. Furia, Richard Torkar, and Robert Feldt. Towards causal analysis of empirical software engineering data: The impact of programming languages on coding competitions. *ACM Transactions on Software Engineering and Methodology*, 33(1):13:1–35, November 2023. Accepted in July 2023 TOSEM

Also available at `https://arxiv.org/abs/2301.07524`.

P88. Mohammad Rezaalipour and Carlo A. Furia. An annotation-based approach for finding bugs in neural network programs. *Journal of Systems and Software*, 201:111669, July 2023. Online since March 2023 JSS

Also available at `https://arxiv.org/abs/2112.05567`.

P87. Marco Paganoni and Carlo A. Furia. Verifying functional correctness properties at the level of Java bytecode. In *Proceedings of the 25th International Symposium on Formal Methods (FM)*, volume 14000 of *Lecture Notes in Computer Science*, pages 343–363. Springer, March 2023. (Acceptance rate: 29%) FM 2023

P86. Bhargav Nagaraja Bhatt and Carlo A. Furia. Automated repair of resource leaks in Android applications. *Journal of Systems and Software*, 192:111417, October 2022. Online since July 2022 JSS

Also available at `https://arxiv.org/abs/2003.03201`.

P85. Diego Marcilio and Carlo A. Furia. What is thrown? Lightweight precise automatic extraction of exception preconditions in Java methods. In *Proceedings of the 38th IEEE International Conference on Software Maintenance and Evolution (ICSME)*, pages 340–351. IEEE Computer Society, October 2022. Distinguished paper award, (Acceptance rate: 23%) ICSME 2022

Distinguished paper award at ICSME 2022.

P84. Liushan Chen, Yu Pei, Minxue Pan, Tian Zhang, Qixin Wang, and Carlo A. Furia. Program repair with repeated learning. *IEEE Transactions on Software Engineering*, 49(2):831–848, February 2023. Online since April 2022 TSE

P83. Martin Odermatt, Diego Marcilio, and Carlo A. Furia. Static analysis warnings and automatic fixing: A replication for C# projects. In *Proceedings of the 29th International Conference on Software Analysis, Evolution and Reengineering (SANER)*, pages 805–816. IEEE, March 2022. RENE (Reproducibility Studies and Negative Results) track, (Acceptance rate: 43%) SANER 2022

P82. Carlo A. Furia, Richard Torkar, and Robert Feldt. Applying Bayesian analysis guidelines to empirical software engineering data: The case of programming languages and code quality. *ACM Transactions on Software Engineering and Methodology*, 31(3):40:1–40:38, July 2022. Accepted in October 2021 TOSEM

Also available at `https://arxiv.org/abs/2101.12591`.

P81. Claire Dross, Carlo A. Furia, Marieke Huisman, Rosemary Monahan, and Peter Müller. VerifyThis 2019: A program verification competition. *International Journal on Software Tools for Technology Transfer*, 23:883–893, May 2021. Special issue with invited papers from ETAPS 2019's TOOLympics — STTT

Extended version at `https://arxiv.org/abs/2008.13610`.

P80. Diego Marcilio and Carlo A. Furia. How Java programmers test exceptional behavior. In *Proceedings of the 18th Mining Software Repositories Conference (MSR)*, pages 207–218. IEEE, May 2021. (Acceptance rate: 34%) — MSR 2021

Also available at `https://openreview.net/forum?id=nv2PwFSh3uz`.

P79. Richard Torkar, Carlo A. Furia, Robert Feldt, Francisco Gomes de Oliveira Neto, Lucas Gren, Per Lenberg, and Neil A. Ernst. A method to assess and argue for practical significance in software engineering. *IEEE Transactions on Software Engineering*, 48(6):2053–2065, June 2022. Online since January 2021 — TSE

Also available at `https://arxiv.org/abs/1809.09849`.

P78. Richard Torkar, Robert Feldt, and Carlo A. Furia. Bayesian data analysis in empirical software engineering—The case of missing data. In *Contemporary Empirical Methods in Software Engineering*, chapter 11, pages 289–324. Springer, August 2020 — CEMSE

P77. Diego Marcilio, Carlo A. Furia, Rodribo Bonifácio, and Gustavo Pinto. SpongeBugs: Automatically generating fix suggestions in response to static code analysis warnings. *Journal of Systems and Software*, 168:110671, October 2020. Online since June 2020 — JSS

Extended version of [P73].

P76. Tongtong Xu, Liushan Chen, Yu Pei, Tian Zhang, Minxue Pan, and Carlo A. Furia. Restore: Retrospective fault localization enhancing automated program repair. *IEEE Transactions on Software Engineering*, 48(1):309–326, January 2022. Online since April 2020 — TSE

Also available at `https://arxiv.org/abs/1906.01778`.

P75. Liushan Chen, Yu Pei, and Carlo A. Furia. Contract-based program repair without the contracts: An extended study. *IEEE Transactions on Software Engineering*, 47(12):2841–2857, December 2021. Online since January 2020 — TSE

Extended version of [P70].

P74. Carlo A. Furia, Robert Feldt, and Richard Torkar. Bayesian data analysis in empirical software engineering research. *IEEE Transactions on Software Engineering*, 47(9):1786–1810, September 2021. Publication date: August 2019 — TSE

Presented in ICSE 2020's Journal First track.

P73. Diego Marcilio, Carlo A. Furia, Rodrigo Bonifácio, and Gustavo Pinto. Automatically generating fix suggestions in response to static code analysis warnings. In *Proceedings of the 18th International Working Conference on Source Code Analysis and Manipulation (SCAM)*, pages 34–44. IEEE Computer Society, September 2019. (Acceptance rate: 40%) — SCAM 2019

P72. Francisco Gomes de Oliveira Neto, Richard Torkar, Robert Feldt, Lucas Gren, Carlo A. Furia, and Ziwei Huang. Evolution of statistical analysis in empirical software engineering research: Current state and steps forward. *Journal of Systems and Software*, 156:246–267, October 2019 — JSS

P71. YuTing Chen and Carlo A. Furia. Robustness testing of intermediate verifiers. In *Proceedings of the 16th International Symposium on Automated Technology for Verification and Analysis (ATVA)*, volume 11138 of *Lecture Notes in Computer Science*, pages 91–108. Springer, September 2018. (Acceptance rate: 32%) ATVA 2018

P70. Liushan Chen, Yu Pei, and Carlo A. Furia. Contract-based program repair without the contracts. In *Proceedings of the 32nd IEEE/ACM International Conference on Automated Software Engineering (ASE)*, pages 637–647. ACM, November 2017. (Acceptance rate: 21%) ASE 2017

P69. Nadia Polikarpova, Julian Tschannen, and Carlo A. Furia. A fully verified container library. *Formal Aspects of Computing*, 2017. Accepted in June 2017 FAOC

Extended version of [P61], invited to a special issue with the best papers from FM 2015.

P68. YuTing Chen and Carlo A. Furia. Triggerless happy – intermediate verification with a first-order prover. In *Proceedings of the 13th International Conference on integrated Formal Methods (iFM)*, volume 10510 of *Lecture Notes in Computer Science*, pages 295–311. Springer, September 2017. Best paper award, (Acceptance rate: 37%) iFM 2017

Best paper award at iFM 2017.

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