

Marcelo d'Amorim

Associate Professor, Computer Science Department
Federal University of Pernambuco (UFPE), Recife, Brazil

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Education

- 2007 **University of Illinois at Urbana-Champaign** Illinois, USA
Ph.D. in Computer Science
Dissertation title: “Efficient Explicit-State Model Checking for Programs with Dynamically Allocated Data”
Advisor: Prof. [Darko Marinov](#)
- 2001 **Federal University of Pernambuco** Pernambuco, Brazil
M.S. in Computer Science
- 1997 B.S. in Computer Science

Research Interests My research interests are in the areas of Software Engineering and Programming Languages, with a focus on improving software reliability through program analysis and systematic testing.

Software <https://github.com/damorim>, <https://github.com/damorimRG>, <https://github.com/STAR-RG/>

Experience

- 01/09– **Federal University of Pernambuco** Pernambuco, Brazil
Associate Professor. Advising: 3PhD+1MS students, Graduated: 1PhD+5MS, Co-advised: 3MS.
- 7/15–6/16 **Georgia Institute of Technology** Atlanta, USA
Visiting Scholar at the Arktos group led by Alessandro Orso
- 09/07–12/08 **Federal University of Pernambuco** Pernambuco, Brazil
Postdoctoral researcher at the SPG group led by Paulo Borba
- 05/04–08/04 **NASA Ames Research Center** California, USA
Summer intern. Supervisor: Klaus Havelund
- 08/02–08/07 **University of Illinois at Urbana-Champaign** Illinois, USA
Research assistant. Advisor: Darko Marinov

Awards & Honors

- 2016 IEEE/ACM ASE'16 Distinguished Reviewer Award.
- 2016 [CNPq](#) sabbatical scholarship.
- 2014 Finalist (with 5 others) Microsoft Research Faculty Fellowship Latin America. One award granted.
- 2013 Microsoft Software Engineering Innovation Foundation ([SEIF](#)) Award 2013.
- 2013 [CNPq](#) research productivity fellowship (2010-2012, renewed 2013-2015).
- 2008 [FACEPE/CNPq](#) postdoctoral scholarship.
- 2002 [CAPES](#) Ph.D. fellowship (2002-2006).

Publications

- ICSE'21 [1] Jordan Henkel, Denini Silva, Leopoldo Teixeira, **M. d'Amorim**, and Thomas Reps. Shipwright: A Human-in-the-Loop System for Dockerfile Repair. In *International Conference on Software Engineering (ICSE)*. May 2021.
- ICST'21 [2] Leopoldo Teixeira, Breno Miranda, Henrique Rebêlo, and **M. d'Amorim**. Demystifying the Challenges to Formally Specifying API Properties for Runtime Verification. In *IEEE International Conference on Software Testing, Verification and Validation (ICST)*. April 2021.
- IST'20 [3] Rohit Gheyi, Márcio Ribeiro, Beatriz Sousa, Marcio Guimarães, Leo Fernandes, **M. d'Amorim**, Vander Alves, Leopoldo Teixeira, and Balduino Fonseca. Identifying Method-Level Mutation Subsumption Relations using Z3. In *Information and Software Technology (IST)*. November 2020.
- JSS'20 [4] Igor Lima, Jefferson Silva, Breno Miranda, Gustavo Pinto, and **M. d'Amorim**. Exposing Bugs in JavaScript Engines through Test Transplantation and Differential Testing. In *Journal of Systems and Software (JSS)*. November 2020.
- ICST'20a [5] Breno Miranda, Igor Lima, Owolabi Legunsen, and **M. d'Amorim**. Prioritizing Runtime Verification Violations. In *IEEE International Conference on Software Testing, Verification and Validation (ICST)*. pages 297-308, October 2020.

- ICST'20b [6] Marcio A. Guimarães, Leo Fernandes, Márcio Ribeiro, **Marcelo d'Amorim**, and Rohit Gheyi **M. d'Amorim**. Optimizing Mutation Testing by Discovering Dynamic Mutant Subsumption Relations. In *IEEE International Conference on Software Testing, Verification and Validation (ICST)*. pages 198–208, October 2020.
- ICSME'20 [7] Denini Silva, Leopoldo Teixeira and **Marcelo d'Amorim**. Shake It! Detecting Flaky Tests Caused by Concurrency with Shaker. In *International Conference on Software Maintenance and Evolution (ICSME)*. pages 492–502, September 2020.
- MSR'20 [8] Gustavo Pinto, Breno Miranda, Supun Dissanayake, **Marcelo d'Amorim**, Christoph Treude, and Antonia Bertolino What is the Vocabulary of Flaky Tests?. In *International Conference on Mining Software Repositories (MSR)*. pages 492–502, July 2020.
- ICSE-NIER'20 [9] **M. d'Amorim**, Rui M. Abreu, and Carlos Mello. Visual Sketching: From Image Sketches to Code. In *ICSE New Ideas and Emerging Results*. pages 101–104, July 2020.
- IST'20 [10] Igor Lima, Jeanderson Candido, and **M. d'Amorim**. Practical Detection of CMS Plugin Conflicts in Large Plugin Sets. In *Information and Software Technology (IST)*. February 2020.
- TSE'20 [11] Luis Melo, Igor Wiese, and **M. d'Amorim**. Using Docker to Assist Q&A Forum Users. In *IEEE Transactions on Software Engineering (TSE)*. December 2019.
- IJCAI'19 [12] Sofia Reis, Rui Abreu, and **Marcelo d'Amorim**. A Study of Demystifying the Combination of Dynamic Slicing and Spectrum-based Fault Localization. In *International Joint Conference on Artificial Intelligence (IJCAI)*, pages 4760–4766, Macau (CN), US, Ago 2019.
- Safe-Things'19 [13] Davino Mauro Junior, Luis Melo, Harvey Lu, **Marcelo d'Amorim**, and Atul Prakash. A Study of Vulnerability Analysis of Popular Smart Devices Through Their Companion Apps. In *IEEE Workshop on the Internet of Safe Things (SafeThings)*, San Francisco (CA), US, May 2019.
- ICST'19 [14] Mattia Fazzini, Martin Prammer, **Marcelo d'Amorim**, and Alessandro Orso. Intent-Preserving Test Repair. In *IEEE International Conference on Software Testing, Verification and Validation (ICST)*, (To Appear), Xi'an, China, April 2019.
- ISSTA'18 [15] Mattia Fazzini, Martin Prammer, **Marcelo d'Amorim**, and Alessandro Orso. Automatically Translating Bug Reports into Test Cases for Mobile Apps. In *International Symposium on Software Testing and Analysis (ISSTA)*, pages 141–152, Amsterdam, The Netherlands, July 2018.
- ICSE'18 [16] Xiangyu Li, Shaowei Zhu, **Marcelo d'Amorim**, and Alessandro Orso. Enlightened Debugging. In *International Conference on Software Engineering (ICSE)*, pages 82–92, Gothenburg, Sweden, May 2018.
- JSS'17 [17] Sabrina Souto and **Marcelo d'Amorim**. Time-Space Efficient Regression Testing for Configurable Systems. In *Journal of Systems and Software (JSS)*, Volume 137, pages 733–746, 2018.
- ASE'17 [18] Jeanderson Candido, Luis Melo, **Marcelo d'Amorim**. Test Suite Parallelization in Open-Source Projects: a Study on its Usage and Impact. In *IEEE/ACM Intl. Conference on Automated Software Engineering (ASE)*, pages 838–848, Urbana-Champaign (IL), US, Nov. 2017.
- ICSE'17 [19] Sabrina Souto, **Marcelo d'Amorim**, Rohit Gheyi. Balancing Soundness and Efficiency for Practical Testing of Configurable Systems. In *International Conference on Software Engineering (ICSE)*, pages 632–642, Buenos Aires, AR, May 2017.
- ICST'17 [20] Alexandre Perez, Rui Abreu, **Marcelo d'Amorim**. Prevalence of Single-Fault Fixes and its Impact on Fault Localization. In *IEEE International Conference on Software Testing, Verification and Validation (ICST)*, pages 12–22, Tokyo, Japan, March 2017.
- HVC'16 [21] Xiangyu Li, **Marcelo d'Amorim**, Alessandro Orso. Iterative User-Driven Fault Localization. In *Haifa Verification Conference (HVC)*, pages 82–98, Haifa, IL, November 2016.
- ASE'15 [22] Paulo Barros, René Just, Suzanne Millstein, Paul Vines, Werner Dietl, **Marcelo d'Amorim**, and Michael D. Ernst. Static Analysis of Implicit Control Flow: Resolving Java Reflection and Android Intents. In *IEEE/ACM Intl. Conference on Automated Software Engineering (ASE)*, pages 669–679, Lincoln (NE), USA, November 2015.
- ESEC-FSE'15 [23] Mateus Borges, Antonio Filieri, **Marcelo d'Amorim**, and Corina S. Păsăreanu. Iterative Distribution-Aware Sampling for Probabilistic Software Analysis. In *European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*, pages 866–877, Bergamo, IT, Aug-Sept 2015.
- SPLC'15 [24] Sabrina Souto, Divya Gopinath, **Marcelo d'Amorim**, Darko Marinov, Sarfraz Khurshid and Don Batory. Faster Bug Detection for Software Product Lines with Incomplete Feature Models. In *International Systems and Software Product Line Conference (SPLC)*, pages 151–160, Nashville (TN), USA, July 2015.
- HVC'14 [25] Tianhai Liu, Mateus Borges, **Marcelo d'Amorim**, and Mana Taghidiri. A Comparative Study of Incremental Constraint Solving Approaches in Symbolic Execution. *Haifa Verification Conference (HVC)*, pages 284–299, Haifa, IL, November 2014.
- SPIN'14 [26] Quoc-Sang Phan, Pasquale Malacaria, Corina S. Păsăreanu, and **Marcelo d'Amorim**. Quantifying Information Leaks using Reliability Analysis. *International SPIN Symposium on Software Model Checking*, pages 105–108, San Jose (CA), USA, July 2014.

- PLDI'14 [27] Mateus Borges, Antonio Filieri, **Marcelo d'Amorim**, Corina S. Păsăreanu, and Willem Visser. Compositional Solution Space Quantification for Probabilistic Software Analysis. *ACM/SIGPLAN Programming Language Design and Implementation (PLDI)*, pages 123-132, Edinburgh, UK, June 2014.
- SCP'14 [28] Andrei Rimsa, **M. d'Amorim**, Fernando M. Q. Pereira, and Roberto S. Bigonha. Efficient Static Checker for Tainted Variable Attacks. *Science of Computer Programming*. Volume 80, pages 91-105, Feb. 2014
- ASE'13 [29] José Carlos de Campos, Rui Abreu, Gordon Fraser, and **Marcelo d'Amorim**. Entropy-based Test Generation for Improved Fault Localization. In *IEEE/ACM International Conference on Automated Software Engineering*, pages 257-267, Silicon Valley (CA), USA, November 2013.
- ESEC-FSE'13 [30] Chang Hwan Peter Kim, Darko Marinov, Sarfraz Khurshid, Don Batory, Sabrina Souto, Paulo Barros, and **Marcelo d'Amorim**. SPLat: Lightweight Dynamic Analysis for Reducing Combinatorics in Testing Configurable Systems. In *European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*, pages 257-267, Saint Petersburg, Russia, August 2013.
- ICST'12 [31] Mateus Borges, **M. d'Amorim**, Saswat Anand, David Bushnell, and Corina S. Păsăreanu. Symbolic Execution with Interval Solving and Meta-heuristic Search. In *IEEE International Conference on Software Testing, Verification, and Validation (ICST)*. pages 111-120. Montreal, CA, April 2012.
- ASE'11 [32] Elton Alves, Milos Gligoric, Vilas Jagannath, and **M. d'Amorim**. Improved Lightweight Debugging with Dynamic Slicing and Change Data. In *IEEE/ACM International Symposium on Automated Software Engineering (ASE)*, pages 520-523. Lawrence, KS, November 2011.
- NFM'11 [33] Matheus Souza, Mateus Borges, **M. d'Amorim**, and Corina S. Păsăreanu. CORAL: Solving Complex Constraints in Symbolic PathFinder. In *Proc. of the NASA Formal Methods Symposium (NFM)*. pages 359-374. Pasadena, CA, April 2011.
- CC'11 [34] Andrei Rimsa, **M. d'Amorim**, Fernando M. Q. Pereira. Efficient Tainted Flow Analysis. In *ETAPS Intl. Conference on Compiler Construction (CC)*. pages 124-143. Saarbrücken, Germany, March 2011.
- SIMULATION'10 [35] A. Sobeih, **M. d'Amorim**, M. Viswanathan, D. Marinov, and J. Hou. Assertion checking in J-Sim simulation models of network protocols. In *Transactions of The Society for Modeling and Simulation International (Simulation)*. Volume 86, Number 11, 651-673, November 2010.
- ISSE'10 [36] M. Takaki, D. Cavalcanti, R. Gheyi, J. Iyoda, **M. d'Amorim**, R. Prudencio. Randomized Constraint Solvers: A comparative study. In *Innovations in Systems and Software Engineering: a NASA journal (ISSE)*. Volume 6, Number 3, 243-253, September 2010.
- CbSoft'10 [37] Andrei Rimsa, **M. d'Amorim**, Fernando M. Q. Pereira. Efficient Static Checker for Tainted Variable Attacks. In *Brazilian Symposium on Programming Languages (SBLP)*. Salvador, Brazil, September 2010.
- NFM'09 [38] M. Takaki, D. Cavalcanti, R. Gheyi, J. Iyoda, **M. d'Amorim**, R. Prudencio. A Comparative Study of Randomized Constraint Solvers for Random-Symbolic Testing. In *NASA Formal Methods Symposium (NFM)*. pages 56-65, Mountain View, CA, April, 2009.
- ICST'09 [39] C. Bertolini, G. Peres, **M. d'Amorim**, A. Mota. An Empirical Evaluation of Automated Black Box Testing Techniques for Crashing GUIs. In *IEEE International Conference on Software Testing, Verification, and Validation (ICST)*, pages 21-30, Denver, CO, April, 2009.
- IEEE-TSE'08 [40] **M. d'Amorim**, S. Lauterburg and D. Marinov. Delta Execution for Efficient State-Space Exploration. In *IEEE Transactions on Software Engineering (TSE)*, Vol. 34, No. 5, pages 597-613, October 2008.
- ICSE'08 [41] T. Gvero, M. Gligoric, S.Lauterburg, **M. d'Amorim**, D. Marinov, S. Khurshid State Extensions for Java PathFinder. In *ACM/SIGSOFT Intl. Conference on Software Engineering Research Demonstrations (ICSE Demo)*. pages 863-866, Germany, May, 2008.
- ISSTA'07 [42] **M. d'Amorim**, S. Lauterburg, and D. Marinov. Delta Execution for Efficient State-Space Exploration of Object-Oriented Programs. In *ACM/SIGSOFT International Symposium on Software Testing and Analysis (ISSTA)*, London, UK, pages 50-60. July, 2007.
- HotDep'07 [43] Y. Zhou, D. Marinov, W. Sanders, C. Zilles, **M. d'Amorim**, S. Lauterburg, R. Lefever, J. Tucek Delta Execution for Software Reliability. In *Workshop on Hot Topics in System Dependability (HotDep)*. Edinburgh, UK, 2007.
- ASE'06 [44] **M. d'Amorim**, C. Pacheco, T. Xie, D. Marinov, and M. D. Ernst. An empirical comparison of automated generation and classification techniques for object-oriented unit testing. In *IEEE/ACM International Symposium on Automated Software Engineering (ASE)*, pages 59-68, Tokyo, Japan. 2006.
- ICFEM'06 [45] **M. d'Amorim**, A. Sobeih, and D. Marinov. Optimized execution of deterministic blocks in Java PathFinder. In *International Conference on Formal Engineering Methods (ICFEM)*, pages 549-567. Macau, 2006.
- CAV'05 [46] **M. d'Amorim** and G. Roşu. Efficient Monitoring of Omega-Languages. In *Intl. Conference on Computer Aided Verification (CAV)*. pages 364-378. Edinburgh, UK, 2005.
- RV'05 [47] F. Chen, **M. d'Amorim** and G. Roşu. Checking and Correcting Behaviors of Java Programs at Runtime with Java-MOP. In *5th Workshop on Runtime Verification (RV)*. pages 3-20. Edinburgh, Scotland, UK, 2005.
- JUCS'05 [48] **M. d'Amorim** and G. Roşu. An Equational Specification for the Scheme Language. In *Journal of Universal Computer Science (JUCS)*, 11(7), pages 1327-1348, 2005.

- WODA'05 [49] **M. d'Amorim** and K. Havelund. Event-Based Runtime Verification of Java Programs. In *ACM/SIGSOFT International Workshop on Dynamic Analysis (WODA)*. pages 15-21, St. Louis, MO, 2005.
- SBLP'05 [50] **M. d'Amorim** and G. Roşu. An Equational Specification for the Scheme Language. In *Simpósio Brasileiro de Linguagens de Programação (SBLP)*. pages 229-242, Recife, Brazil, June 2005.
- ICFEM'04 [51] F. Chen, **M. d'Amorim**, and G. Roşu. A Formal Monitoring-based Framework for Software Development and Analysis. In *Proc. of the International Conference on Formal Engineering Methods (ICFEM)*. pages 357-372, Seattle, WA, 2004.
- WGP'02 [52] **M. d'Amorim**, C. Nogueira, G. Santos, A. Souza, and P. Borba. Integrating Code Generation and Refactoring. In *Proc. of the Workshop on Generative Programming (ECOOP event)*. Málaga, Spain, June 2002.
- WLM-PSC'01 [53] **M. d'Amorim** and C. Ferraz. Designing Jini Distributed Services: A Framework to support the development of reliable component networks. In *Proc. of the Workshop on Language Mechanisms for Programming Software Components (OOPSLA event)*, Tampa Bay, FL, 2001.

Graduated Students

- MS'20 Igor Lima, Leveraging Diversity to Find Bugs in JavaScript Engines
- MS'19 Luis Melo, Using Docker to Assist QA Forum Users
- MS'18 Jeanderson Cândido, Test Suite Parallelization in Open-Source Projects
- MS'16 Paulo Barros, Resolving Java Reflection and Android Intents
- MS'15 Mateus Borges, qCORAL: Quantitative Constraint Solver for Complex Mathematical Constraints
- PhD'15 Sabrina Souto, Addressing High Dimensionality and Lack of Feature Models in Testing of Software Product Lines
- MS'12 Elton Alves, Improved Fault Localization with Dynamic Slicing and Change Impact Analysis
- MS'12 João Paulo Oliveira, Rabbit - A Novel Approach to Find Data Races in Concurrent Programs
Co-advised with Fernando Castor
- MS'10 Andrei Rimsa Alvares, Efficient Static Analysis to Find Tainted Variable Attacks
Co-advised with Fernando Pereira and Roberto Bigonha
- MS'09 Mitsuo Takaki, Effective CSP solvers with Particle-Swarm Optimization and Genetic Algorithms
Co-advised with Ricardo Prudêncio
- MS'08 Gláucia Peres, A Black-box Testing Technique for the Detection of Crashes Based on Automated Test Scenarios
Co-advised with Alexandre Mota

Funding (I am the PI, if not mentioned.)

- 2017-2020 Lightweight Policy Enforcement of Information Flows in IoT Infrastructures
\$300K – RNP (+\$300K US team, funded by NSF). **BR team:** José A. Suruagy, Paulo A. S. Gonçalves, Kiev Gama, Marcelo d'Amorim. **US team:** Darko Marinov (UIUC) and Atul Prakash (UMich)
- 2015-2017 Redução do Consumo de Energia de Aplicações Paralelas Através de Técnicas de Reestruturação de Software
~\$50K – FACEPE Pronem. **PI:** Fernando Castor.
- 2014-2017 Addressing High Dimensionality in Configurable Systems
~\$11K – CNPq Universal.
- 2014-2016 Program Analysis with Human-in-the-Loop (**co-PI** with Martin Rinard).
~\$25K – MIT Brazil Global Seed Fund (**MISTI**).
- 2013-2015 Human-Centric Test Generation.
\$25K – Microsoft Software Engineering Foundation (**SEIF**) Award.
- 2011–2013 Safe Evolution for Software Product lines
~\$86K – Grand Challenges CNPq. **PI:** Paulo Borba. This project is a joint collaboration across the Federal Universities of Pernambuco (UFPE), Campina Grande (UFCG), and Rio Grande do Norte (UFRN).
- 2011–2013 Emergent Modularization for Software Product Lines
~\$47K – Universal CNPq. **PI:** Paulo Borba.
- 2008–2011 Product Line for Generation, Prioritization, and Execution of Tests
~\$30K – A subproject of INES: National Institute of Science and Technology for Software Engineering. This project was funded jointly by CNPq and FACEPE. Involved collaboration with 30+ faculty members and researchers from several academic institutions in Brazil.
- 2008-2010 Effective GUI Testing for Mobile Phones.
~\$20K – FACEPE startup package.

Teaching

- Since 2009 Compilers (Undergrad) and Software Testing (Graduate and Undergraduate Students)
- Other [Other courses taught since 2009] Functional Programming, Static Analysis, Introduction to Programming.

Talks

- 2017 Ongoing Projects at the UFPE Program Analysis Group, UFPE
- 2017 –, Massachusetts Institute of Technology (MIT), USA

- 2015 Model Counting for Software Analysis, Georgia Institute of Technology, USA
- 2014 Testing Software Product Lines with Incomplete Feature Models (ISSTA-SATADAYWS), Urbana (IL), USA
- 2014 Malware Detection in Android Apps. Georgia Tech Seminar. Atlanta (GA), USA
- 2013 Lightweight Testing for Configurable Software. Microsoft SEIF Workshop. Rio de Janeiro, Brazil
- 2012 Automated Software Testing: Projects and Challenges. UFPE
- 2012 Symbolic Execution with Interval Constraint Solving and Meta-Heuristic Search. Iowa State University
- 2012 –, University of Waterloo
- 2012 –, State University of New York (SUNY) at Buffalo
- 2012 –, University of Illinois at Urbana-Champaign
- 2012 Ongoing Research at the Program Analysis Group, UFPE
- 2011 Fault Localization Using Dynamic Slicing and Change-Impact Analysis (ASE). Lawrence (KS), USA
- 2011 Optimized Delta Execution for Efficient Mutation Testing (ASE-SOTA). Mountain View (CA), USA.
- 2011 CORAL: Solving Complex Constraints for Symbolic PathFinder (NFM). Pasadena (CA), USA.
- 2010 Ongoing research at the Program Analysis Group. UFMG
- 2010 Randomized Constraint Solving of Floating Point Constraints (NASA). Mountain View (CA), USA
- 2007 Efficient Explicit-State Model Checking for Programs with Dynamically Allocated Data. Urbana(IL), USA
- 2006 Optimized Execution of Deterministic Blocks in Java PathFinder (ASE). Macau, SAR-China
- 2006 An Empirical Comparison of Automated Generation of and Classification Techniques for Object-Oriented Unit Testing (ASE). Tokyo, Japan
- 2005 Event Based Runtime Verification of Java Programs. St Louis (MI), USA
- 2004 Dynamically Discovering Likely Program Invariants to Support Program Evolution (UIUC Programming Languages Seminar). Urbana (IL), USA

Service

see <http://www.cin.ufpe.br/~damorim/service.html>

References (sorted by last name)

- Paulo Borba Federal University of Pernambuco
- Michael D. Ernst University of Washington
- Darko Marinov (PhD advisor) University of Illinois at Urbana-Champaign
- Alessandro Orso Georgia Institute of Technology
- Corina S. Păsăreanu Carnegie Mellon University Silicon Valley & NASA Ames Research Center