Maria Christakis

Date of birth	:	October 9, 1986
Place of birth	:	Heraklion, Crete, Greece
Sex	:	Female
Nationality	:	Greek
Website	:	https://mariachris.github.io
E-mail	:	maria@mpi-sws.org

Current Position

Oct 2017– Tenure-track faculty
Leader of the "Practical Formal Methods" Group
Max Planck Institute for Software Systems (MPI-SWS)
Kaiserslautern, Germany

Research Interests

My goal is to develop theoretical foundations and practical tools for building more reliable and usable software and increasing developer productivity. I am mostly interested in software engineering, programming languages, and formal methods. I particularly like investigating topics in automatic test generation, software verification, program analysis, and empirical software engineering. My tools and techniques explore novel ways in writing, specifying, verifying, testing, and debugging programs in order to make them more robust while at the same time improving the user experience.

Previous Positions

2016–2017 Lecturer (Assistant Professor),
School of Computing,
University of Kent,
Canterbury, England

2015–2016 Post-doctoral researcher,
Research in Software Engineering (RiSE) and Tools for Software Engineers (TSE),
Microsoft Research Redmond,
Washington, USA

Education

2011–2015 Ph.D., Chair of Programming Methodology,
Department of Computer Science,
ETH Zurich, Switzerland

GPA	:	6/6
Thesis	:	Narrowing the Gap between Verification and Systematic Testing
Advisor	:	Peter Müller

2009–2011 Work on concurrency error detection in Erlang
Advisor : Konstantinos Sagonas
Completion of Ph.D. courses, Division of Computer Science,
Department of Electrical and Computer Engineering,
National Technical University of Athens, Greece
GPA : 9.83/10

2003–2009 Diploma,
Department of Electrical and Computer Engineering,
National Technical University of Athens, Greece
GPA : 8.58/10 (upper 9%)
Major : Computer Science
Thesis : Race Condition Detection in Concurrent Erlang Applications Using Static Analysis
Advisor : Konstantinos Sagonas

2000–2003 American School of Madrid, Spain
GPA : 3.92/4

Awards and Distinctions

2017 **Facebook Faculty Research Award** for my research in combining static and dynamic program analysis (30,000 USD)

2017 **EAPLS Best PhD Dissertation Award 2015** for the most original and influential doctoral thesis in the area of Programming Languages and Systems published in 2015 at a European academic institute

2016 **Distinguished paper award** at ICSE'16 for
"Guiding Dynamic Symbolic Execution toward Unverified Program Executions",
which is also listed as a **notable item in ACM's 21st Annual Best of Computing**

2016 **Nomination for the GI doctoral thesis award** by the Department of Computer Science at ETH Zurich, Switzerland

2016 **ETH medal award** for an outstanding doctoral thesis and financial sum (2,000 CHF)

2016 **Empirikion scholarship** for doctoral thesis (5,000 EUR)

2015 **Google Anita Borg Finalist award**

2015 **Invitation** from VMCAI'15 to submit an extended version of
"An Experimental Evaluation of Deliberate Unsoundness in a Static Program Analyzer"
to the Computer Languages, Systems & Structures journal

2014 **Invitation** from SEFM'14 to submit an extended version of
"Synthesizing Parameterized Unit Tests to Detect Object Invariant Violations"
to the Formal Aspects of Computing journal

2013 **Google Anita Borg Finalist award**

2011 **Grant** for attending Summer School Marktoberdorf, Bayrischzell, Germany

2010 **Empirikion scholarship** for research (5,000 EUR)

2009 **Thomaideio award** for publishing "Static Detection of Race Conditions in Erlang", one of the best 200 research papers among all departments of the National Technical University of Athens, Greece

2009 **Distinction** for submitting the best diploma thesis in the Department of Electrical and Computer Engineering of the National Technical University of Athens, Greece

2003 **National Honor Society award**, American School of Madrid, Spain

2000–2003 **High Honor Roll award**, American School of Madrid, Spain

1998–2000 **Excellence** and **Progress awards**, 3rd High School of Ilioupoli, Athens, Greece

Research Grants

2017 **International Academic Visitor** research grant (1,000 GBP)
University of Kent, England

2017 **Faculty of Sciences** research grant (500 GBP)
University of Kent, England

Conference Papers

1. Alexandra Bugariu, Valentin Wüstholz, Maria Christakis and Peter Müller. **Automatically Testing Implementations of Numerical Abstract Domains**. In Proceedings of the 33rd International Conference on Automated Software Engineering (ASE'18), to appear, 2018. ACM.
   Acceptance rate: 19.9%

2. Austin Henley, Kıvanç Muşlu, Maria Christakis, Scott Fleming and Christian Bird. **CFar: A Tool to Increase Communication, Productivity, and Review Quality in Collaborative Code Reviews**. In Proceedings of the 36th International Conference on Human Factors in Computing Systems (CHI'18), pages 157:1–157:13, 2018. ACM.
   Acceptance rate: 25.7%

3. Kostas Ferles, Valentin Wüstholz, Maria Christakis and Isil Dillig. **Failure-Directed Program Trimming**. In Proceedings of the Eleventh Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE'17), pages 174–185, 2017. ACM.
   Acceptance rate: 24.4%

4. Maria Christakis, Patrick Emmisberger, Patrice Godefroid and Peter Müller. **A General Framework for Dynamic Stub Injection**. In Proceedings of the 39th International Conference on Software Engineering (ICSE'17), pages 586–596, 2017. ACM.
   Acceptance rate: 16.4%

5. Maria Christakis and Christian Bird. **What Developers Want and Need from Program Analysis: An Empirical Study**. In Proceedings of the 31st International Conference on Automated Software Engineering (ASE'16), pages 332–343, 2016. ACM.
   Acceptance rate: 19.1%

6. Maria Christakis and Valentin Wüstholz. **Bounded Abstract Interpretation**. In Proceedings of the 23rd Static Analysis Symposium (SAS'16), pages 105–125, 2016. Springer.
   Acceptance rate: 38.2%

7. Maria Christakis, K. Rustan M. Leino, Peter Müller and Valentin Wüstholz. **Integrated Environment for Diagnosing Verification Errors**. In Proceedings of the 22nd International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'16), pages 424–441, 2016. Springer.
   Acceptance rate: 28.7%

8. Maria Christakis, Peter Müller and Valentin Wüstholz. **Guiding Dynamic Symbolic Execution toward Unverified Program Executions**. In Proceedings of the 38th International Conference on Software Engineering (ICSE'16), pages 144–155, 2016. ACM.
   Acceptance rate: 19.1%
   Received a distinguished paper award.
   Listed as a notable item in ACM's 21st Annual Best of Computing.

9. Maria Christakis and Patrice Godefroid. **IC-Cut: A Compositional Search Strategy for Dynamic Test Generation**. In Proceedings of the 22nd International SPIN Symposium on Model Checking of Software (SPIN'15), pages 300–318, 2015. Springer.
   Acceptance rate: 69.2%

10. Maria Christakis, Peter Müller and Valentin Wüstholz. **An Experimental Evaluation of Deliberate Unsoundness in a Static Program Analyzer**. In Proceedings of the Sixteenth International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI'15), pages 336–354, 2015. Springer.
    Acceptance rate: 45.3%
    Selected for submission to the Computer Languages, Systems *&* Structures journal.

11. Maria Christakis and Patrice Godefroid. **Proving Memory Safety of the ANI Windows Image Parser using Compositional Exhaustive Testing**. In Proceedings of the Sixteenth International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI'15), pages 373–392, 2015. Springer.
    Acceptance rate: 45.3%

12. Maria Christakis, Patrick Emmisberger and Peter Müller. **Dynamic Test Generation with Static Fields and Initializers**. In Proceedings of the Fourteenth International Conference on Runtime Verification (RV'14), pages 269–284, 2014. Springer.
    Acceptance rate: 29.8%

13. Maria Christakis, Peter Müller and Valentin Wüstholz. **Synthesizing Parameterized Unit Tests to Detect Object Invariant Violations**. In Proceedings of the Twelfth International Conference on Software Engineering and Formal Methods (SEFM'14), pages 65–80, 2014. Springer.
    Acceptance rate: 27.4%
    Selected for submission to the Formal Aspects of Computing journal.

14. Maria Christakis, K. Rustan M. Leino and Wolfram Schulte. **Formalizing and Verifying a Modern Build Language**. In Proceedings of the Nineteenth International Symposium on Formal Methods (FM'14), pages 643–657, 2014. Springer.
    Acceptance rate: 43.8%

15. Maria Christakis, Alkis Gotovos and Konstantinos Sagonas. **Systematic Testing for Detecting Concurrency Errors in Erlang Programs**. In Proceedings of the Sixth IEEE International Conference on Software Testing, Verification and Validation (ICST'13), pages 154–163, 2013. IEEE.
    Acceptance rate: 25.0%

16. Maria Christakis, Peter Müller and Valentin Wüstholz. **Collaborative Verification and Testing with Explicit Assumptions**. In Proceedings of the Eighteenth International Symposium on Formal Methods (FM'12), pages 132–146, 2012. Springer.
    Acceptance rate: 26.5%

17. Maria Christakis and Konstantinos Sagonas. **Detection of Asynchronous Message Passing Errors Using Static Analysis**. In Proceedings of the Thirteenth International Symposium on Practical Aspects of Declarative Languages (PADL'11), pages 5–18, 2011. Springer.
    Acceptance rate: 45.0%

18. Maria Christakis and Konstantinos Sagonas. **Static Detection of Race Conditions in Erlang**. In Proceedings of the Twelfth International Symposium on Practical Aspects of Declarative Languages (PADL'10), pages 119–133, 2010. Springer.
    Acceptance rate: 37.9%

Workshop Papers

1. Alkis Gotovos, Maria Christakis and Konstantinos Sagonas. **Test-Driven Development of Concurrent Programs using Concuerror**. In Proceedings of the Tenth ACM SIGPLAN Erlang Workshop (ERLANG'11), pages 51–61, 2011. ACM.

Invited Papers

1. Maria Christakis. **On Narrowing the Gap between Verification and Systematic Testing**. In it - Information Technology, volume 59, issue 4, pages 197–202, 2017. de Gruyter.

2. Maria Christakis. **Brückenschlag zwischen Verifikation und systematischem Testen**. In Ausgezeichnete Informatikdissertationen 2015 (GIDISS'15), pages 61–70, 2015. GI.

Technical Reports

1. Valentin Wüstholz and Maria Christakis. **Learning Inputs in Greybox Fuzzing**. CoRR, 2018.

2. Florentin Guth, Valentin Wüstholz, Maria Christakis and Peter Müller. **Specification Mining for Smart Contracts with Automatic Abstraction Tuning**. CoRR, 2018.

3. Kostas Ferles, Valentin Wüstholz, Maria Christakis and Isil Dillig. **Failure-Directed Program Trimming (Extended Version)**. CoRR abs/1706.04468, 2017.

4. Maria Christakis, Patrick Emmisberger, Patrice Godefroid and Peter Müller. **A General Framework for Dynamic Stub Injection**. MSR–TR–2016–35, 2016. Microsoft Research.

5. Maria Christakis, Peter Müller and Valentin Wüstholz. **Guiding Dynamic Symbolic Execution toward Unverified Program Executions**. 2015. ETH Zurich.

6. Maria Christakis and Patrice Godefroid. **IC-Cut: A Compositional Search Strategy for Dynamic Test Generation**. MSR–TR–2015–10, 2015. Microsoft Research.

7. Maria Christakis, Peter Müller and Valentin Wüstholz. **An Experimental Evaluation of Deliberate Unsoundness in a Static Program Analyzer**. 2014. ETH Zurich.

8. Maria Christakis and Patrice Godefroid. **Proving Memory Safety of the ANI Windows Image Parser using Compositional Exhaustive Testing**. MSR–TR–2013–120, 2013. Microsoft Research.

9. Maria Christakis and Konstantinos Sagonas. **Static Detection of Deadlocks in Erlang**. In Draft Proceedings of the Twelfth International Symposium on Trends in Functional Programming (TFP'11), pages 62–76, 2011. Department of Computer Systems and Computing, Universidad Complutense de Madrid.

Theses

1. Maria Christakis. **Narrowing the Gap between Verification and Systematic Testing**. Ph.D. thesis advised by Peter Müller. Department of Computer Science, ETH Zurich, Switzerland, June 2015.

2. Maria Christakis. **Race Condition Detection in Concurrent Erlang Applications Using Static Analysis**. Diploma thesis advised by Konstantinos Sagonas. Department of Electrical and Computer Engineering, National Technical University of Athens, Greece, September 2009.

Research Internships

Summer 2014 Microsoft Research Redmond,
Washington, USA
Mentor : Patrice Godefroid

Summer 2013 Microsoft Research Redmond,
Washington, USA
Mentors : K. Rustan M. Leino and Wolfram Schulte

Spring 2013 Microsoft Research Redmond,
Washington, USA
Mentor : Patrice Godefroid

Summer Schools

Jun 2012 SAT/SMT Summer School, Trento, Italy

Aug 2011 **Tools for Analysis and Verification of Software Safety and Security**
Summer School Marktoberdorf, Bayrischzell, Germany

Service

(Co-)Chair	:	ECOOP'19 Artifact Evaluation, PLDI'19 Student Research Competition, ECOOP'18 Artifact Evaluation, PLDI'18 Student Research Competition
PC member	:	ISSTA'19, ICSE'19, TACAS'19, ACM Student Research Competition'18, iFM'18, OOPSLA'18, VMCAI'18, SAS'17, ECOOP'17, PrePost'16, ESEC/FSE'15 Artifact Evaluation
ERC member	:	PLDI'18, PLDI'17
Journal reviewer	:	IEEE Software (2016), Systems and Software (2016), JLAMP (2014), TSE (2013), STTT (2013)
External reviewer	:	ISSTA'18, TAP'16, TACAS'16, VMCAI'16, FM'15, WFLP'14, FLOPS'14, OOPSLA'13, PADL'11, DAMP'10
Student volunteer	:	Software Correctness and Reliability Workshop at ETH Zurich (2014), ICSE'12

Teaching Experience

Fall 2018 Lecturer in "Program Analysis",
Department of Computer Science,
University of Kaiserslautern and Saarland University, Germany

Summer 2018 Lecturer in "Static Program Analysis Meets Test Case Generation",
The Cornell, Maryland, Max Planck Pre-doctoral Research School (CMMRS) 2018,
MPI-SWS, Germany

Spring 2017 Lecturer in "Programming for University Study" (International Foundation Programme),
School of Computing,
University of Kent, England

2011–2014 Teaching assistant in "Computer Science for Mathematicians and Physicists",
Department of Computer Science,
ETH Zurich, Switzerland
Lecturers : Bernd Gärtner, Juraj Hromkovic

Fall 2014 Teaching assistant in "Software Engineering Seminar",
Department of Computer Science,
ETH Zurich, Switzerland
Lecturer : Peter Müller

Spring 2014 Teaching assistant in "Software Architecture and Engineering",
Department of Computer Science,
ETH Zurich, Switzerland
Lecturers : Peter Müller, Martin Vechev

2012–2013 Head teaching assistant in the industry course "Quality Assurance in .NET with Code Contracts",
Department of Computer Science,
ETH Zurich, Switzerland
Lecturer : Peter Müller

Spring 2012 Head teaching assistant in "Software Architecture and Engineering",
Department of Computer Science,
ETH Zurich, Switzerland
Lecturer : Peter Müller

Spring 2012 Teaching assistant in "Research Topics in Software Engineering",
Department of Computer Science,
ETH Zurich, Switzerland
Lecturers : Peter Müller, Martin Vechev

Fall 2011 Teaching assistant in "Software and Security Testing",
Department of Computer Science,
ETH Zurich, Switzerland
Lecturers : David Basin, Peter Müller

2009–2011 Teaching assistant in "Programming Languages I",
Department of Electrical and Computer Engineering,
National Technical University of Athens, Greece
Lecturers : Nikolaos Papaspyrou, Konstantinos Sagonas

2009–2011 Teaching assistant in "Computer Programming",
Department of Electrical and Computer Engineering,
National Technical University of Athens, Greece
Lecturers : Stathis Zachos, Nikolaos Papaspyrou, Dimitris Fotakis

Advisees

2018– Numair Mansur
PhD
MPI-SWS, Germany

2018 Praveen Kulkarni
Internship
MPI-SWS, Germany

2018 Christos Vrachas
Internship
MPI-SWS, Germany

2018 Abel Nieto
Internship
MPI-SWS, Germany

2018 Tobias Zimmermann
Bachelor's thesis
MPI-SWS, Germany

2018 Christian Klinger
Master's thesis
MPI-SWS, Germany

2017 Malte Schledjewski
Research immersion lab
MPI-SWS, Germany

2016 Austin Henley
Augmenting Code Reviews with Static Analysis Warnings to Improve Code and Enhance Collaboration
Internship
Microsoft Research Redmond,
Washington, USA

2016 Kostas Ferles
Failure-Directed Program Trimming
Internship
Microsoft Research Redmond,
Washington, USA

2016 Patrick Emmisberger
Testing Program Robustness Against Deviant Behavior
Master's thesis (during an internship at Microsoft Research Redmond)
Department of Computer Science,
ETH Zurich, Switzerland
Received the **ETH medal award** for an outstanding Master's thesis

2015 Patrick Emmisberger
Integrating Dynamic Test Generation with Sound Verification
Research in Computer Science
Department of Computer Science,
ETH Zurich, Switzerland

2014 David Rohr
Fixing Violated Object Invariants and Testing Inferred Object Invariants
Research in Computer Science
Department of Computer Science,
ETH Zurich, Switzerland

2013 Patrick Spettel
Delfy: Dynamic Test Generation for Dafny
Master's thesis
Department of Computer Science,
ETH Zurich, Switzerland

2013 Patrick Emmisberger
Dynamic Test Generation with Static Fields and Initializers
Bachelor's thesis
Department of Computer Science,
ETH Zurich, Switzerland

2013 Timon Gehr
Synthesizing Method Sequences to Detect Object Invariant Violations
Bachelor's thesis
Department of Computer Science,
ETH Zurich, Switzerland

2011 Alkis Gotovos
Dynamic Systematic Testing of Concurrent Erlang Programs
Diploma thesis
Department of Electrical and Computer Engineering,
National Technical University of Athens, Greece

Invited Talks

1. **60th IFIP WG2.4 Meeting on Software Implementation Technology**, Dijon, France, July 2018.
2. **Joint Lecture Series of MPI-INF, MPI-SWS, MMCI, and the Computer Science Department of Saarland University**, Saarbrücken, Germany, July 2018.
3. **59th IFIP WG2.4 Meeting on Software Implementation Technology**, Essex, Vermont, USA, October 2017.
4. **New Faculty Symposium at ICSE'17**, Buenos Aires, Argentina, May 2017.
5. Royal Holloway University of London, UK, March 2017.
6. Max Planck Institute for Software Systems, Germany, February 2017.
7. Aarhus University, Denmark, January 2017.
8. Queen Mary University of London, UK, January 2017.
9. University of Washington, Washington, USA, August 2016.
10. **Kolloquium zum GI Dissertationspreis 2015**, Dagstuhl Seminar, Saarland, Germany, May 2016.
11. University of Kent, England, March 2016.
12. École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, February 2015.

13. **Symbolic Execution and Constraint Solving**, Dagstuhl Seminar, Saarland, Germany, October 2014.
14. Carnegie Mellon University, Pennsylvania, USA, September 2014.
15. University of Washington, Washington, USA, May 2013.
16. **Programming Language working group**, Microsoft Research Redmond, Washington, USA, April 2013.
17. **Program Analysis working group**, Microsoft Research Redmond, Washington, USA, March 2013.
18. Imperial College London, UK, February 2013.
19. Commissariat à l'Énergie Atomique (CEA), Paris, France, February 2013.
20. **Symbolic Methods in Testing**, Dagstuhl Seminar, Saarland, Germany, January 2013.
21. **Tenth Programming Language Seminar**, National Technical University of Athens, Greece, December 2012.
22. **Eighth Programming Language Seminar**, National Technical University of Athens, Greece, December 2010.

Languages

Greek	:	Mother tongue
English	:	TOEFL iBT (Score: 117/120), 2011
		Certificate of Proficiency in English (University of Cambridge), 2003
Italian	:	Diploma di Lingua Italiana (CELI 5), 2011
Spanish	:	Diploma Superior de Español, 2003
French	:	Diplôme d'Études en Langue Française (DELF), 2001
German	:	Elementary proficiency

Hobbies

Biking, hiking, skiing, pilates, swimming, playing tennis, reading literature, listening to music, playing the piano...