Filip Nikšić

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Research Interests

Broadly, I am interested in the analysis, verification, and testing of concurrent and distributed systems. My doctoral research focused on applying combinatorial techniques to systematic and random testing of distributed systems. More recently, I have been working on programming models and testing techniques for distributed stream processing.

Education

09/2012–05/2019 **Max Planck Institute for Software Systems**

Doctor of Engineering (Dr.-Ing.) degree by Technische Universität Kaiserslautern
Dissertation: *Combinatorial Constructions for Effective Testing*
Grade: summa cum laude

10/2009–10/2011 **Department of Mathematics, University of Zagreb**

Enrolled in a doctoral program in mathematics

07/2004–10/2009 **Department of Mathematics, University of Zagreb**

Dipl. Ing. (4-year degree) in Mathematics (profile: Computer Science)
GPA: 4.7 / 5.0

Work Experience

09/2020–*present* **Google, New York City, NY**

Software engineer

10/2018–07/2020 **University of Pennsylvania, Philadelphia, PA**

Postdoctoral researcher, working with Rajeev Alur

09/2012–10/2018 **Max Planck Institute for Software Systems, Kaiserslautern, Germany**

Doctoral researcher, advised by Rupak Majumdar

05/2016–08/2016 **Microsoft, Redmond, WA**

Research intern working on a testing and fault-injection framework for concurrent software. Technologies: C#, .NET Compiler Platform ("Roslyn")

04/2010–09/2012 **IN2 d.o.o., Zagreb, Croatia**

Software engineer developing financial software. Technologies: Oracle DB (SQL, PL/SQL), Java (Spring Framework), and Adobe Flex

Teaching Experience

01/2019–05/2019 **University of Pennsylvania**

Occasional lectures and a student project for CIS 540: Principles of Embedded Computation (Spring 2019)

10/2016–02/2017 **Max Planck Institute for Software Systems (MPI-SWS)**

Teaching assistant: Program Analysis (Winter 2016/2017)

04/2014–07/2014 **Max Planck Institute for Software Systems (MPI-SWS)**

Teaching assistant: Verification of Reactive Systems (Summer 2014)

03/2008–09/2009 **Department of Mathematics, University of Zagreb**

Student assistant: Set Theory (Summer 2008), Introduction to Parallel Computing (Winter 2008), Application of Parallel Computers (Summer 2009).

09/2002–06/2005 **Informatics Club NET, Ivanić-Grad**

Tutored high school students for programming competitions

Professional Service

Artifact evaluation committee: ISSTA 2015, ECOOP 2018, CAV 2019

Conference reviews: CAV 2013, CSL 2013, FMCAD 2013, EMSOFT 2014, FMCAD 2014, LICS 2014, CADE 2015, VMCAI 2015, POPL 2016, TACAS 2016, VMCAI 2017, ICALP 2018

Journal reviews: ACM Transactions on Computational Logic, Acta Informatica

Technical Skills

Operating systems: GNU/Linux, Mac OS X, Windows

Programming languages: C/C++, C#, Java, Python, PL/SQL, ActionScript (Flex)

Databases: Oracle DB

Language Skills

Croatian (native), English (fluent), German (basic)

Publications

Konstantinos Kallas, Filip Niksic, Caleb Stanford, Rajeev Alur. *DiffStream: Differential Output Testing for Stream Processing Programs.* PACMPL 4 (OOPSLA) 2020

Cezara Drăgoi, Constantin Enea, Burcu Kulahcioglu Ozkan, Rupak Majumdar, Filip Niksic. *Testing Consensus Implementations Using Communication Closure.* PACMPL 4 (OOPSLA) 2020

Filip Niksic. *Combinatorial Constructions for Effective Testing.* Doctoral dissertation. Technische Universität Kaiserslautern, May 2019.

Burcu Kulahcioglu Ozkan, Rupak Majumdar, Filip Niksic. *Checking Linearizability Using Hitting Families.* PPoPP 2019

Burcu Kulahcioglu Ozkan, Rupak Majumdar, Filip Niksic, Mitra Tabaei Befrouei, Georg Weissenbacher. *Randomized Testing of Distributed Systems with Probabilistic Guarantees.* PACMPL 2 (OOPSLA) 2018
Recipient of **OOPSLA 2018 Distinguished Paper Award**

Rupak Majumdar, Filip Niksic. *Why is Random Testing Effective for Partition Tolerance Bugs?* PACMPL 2 (POPL) 2018

Dmitry Chistikov, Rupak Majumdar, Filip Niksic *Hitting Families of Schedules for Asynchronous Programs.* CAV 2016

Ivan Gavran, Filip Niksic, Aditya Kanade, Rupak Majumdar, Viktor Vafeiadis. *Rely/Guarantee Reasoning for Asynchronous Programs.* CONCUR 2015

Sumit Gulwani, Mikaël Mayer, Filip Niksic, Ruzica Piskac. *StriSynth: Synthesis for Live Programming.* ICSE 2015

Javier Esparza, Ruslán Ledesma-Garza, Rupak Majumdar, Philipp Meyer, Filip Niksic. *An SMT-Based Approach to Coverability Analysis.* CAV 2014

Johannes Kloos, Rupak Majumdar, Filip Niksic, Ruzica Piskac. *Incremental, Inductive Coverability.* CAV 2013

Philadelphia, November 17, 2020