

Marko Dimjašević, PhD

CONTACT INFORMATION

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SUMMARY

I am a computer scientist with a PhD in computer science from the University of Utah, USA. I have eight years of experience in software verification, software development, automatic testing and security in academia, government and the IT sector, and in successful grant application, with an international track record of delivering complex projects and research results.

- 10-year experience in communicating and managing work within distributed teams
- Strong coding abilities (numerous prizes won at national competitions in algorithm problem solving)
- Strong fundamentals in computer science (programming languages and paradigms, software design, advanced algorithms and data structures)
- Strong fundamentals in software verification, automatic testing and security (PhD dissertation)
- Developed an automatic verification framework for NASA's aircraft separation assurance system
- Interested in proving software correctness via dependent types and static type systems
- Interested in typed pure functional programming (Haskell, Agda) for software verification
- Experience with: Haskell, Agda, C
- Interest in effect systems and composable architecture via eDSLs
- Peer-reviewed research in machine learning for malware detection

WORK EXPERIENCE

Typus Tech, Zagreb, Croatia

Founder and Chief Executive Officer

August 2019 – present

Input Output Hong Kong, Hong Kong

Formal Methods Engineer

July 2018 – August 2019

Oradian, Zagreb, Croatia

Scala Developer — Property-based testing and design of FP APIs

October 2017 – June 2018

School of Computing, University of Utah, Salt Lake City, Utah, USA

Teaching Assistant and Research Assistant

August 2012 – May 2017

Robust Software Engineering Group, NASA Ames Research Center, Moffett Field, California, USA

Research Intern

September 2014 – December 2014

Grammar School “Gimnazija Ivana Zakmardija Dijankovečkoga”, Križevci, Croatia

Math Teacher and Informatics Teacher

January 2012 – May 2012

Elementary School “Osnovna škola Ljudevita Modeca”, Križevci, Croatia

Math Teacher

January 2011 – June 2011

EDUCATION

School of Computing, University of Utah, Salt Lake City, Utah, USA

PhD in Computer Science

August 2012 – June 2018

- Dissertation topic: Enhancing Automatic Software Testing for Broader Applicability
- Supervisor: Zvonimir Rakamarić

Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia

Dipl. ing. in Computing

October 2004 – October 2010

- Thesis Topic: Adding MOBIKE Support into the IKEv2 Implementation
- Supervisor: Leonardo Jelenković

SOFTWARE
DEVELOPED

Connect4: Connection board game, **Fencer**: Rate Limiting Service, **Cardano Specification**: Cardano Blockchain, **JDoop**: Automatic Test Case Generation for Java, **Clover**: Dynamic Symbolic Execution of Un-closed Software, **artifact-eval**: Reproducible Research Evaluation, **maline**: Malware Detection for Android, **The Runtime Verifier for AutoResolver**. Available at:

- Github – <https://github.com/mdimjasevic>
- Gitlab – <https://gitlab.com/mdimjasevic>

COMPUTER
SKILLS

Languages

Haskell, Agda, Idris, C, C++, Bash, HTML, L^AT_EX, R, SQL

Programming Paradigms

Functional programming, imperative programming, object-oriented programming, aspect-oriented programming, declarative programming

Operating systems

GNU/Linux, Android

Software Technologies

Debian, Git, Cabal, Stack, Servant, Yesod, Hackage, QEMU, libvirt, Docker, PostgreSQL

Other

Software and data reproducibility, advanced algorithms in optimization, graph theory, and heuristics

HONORS AND
AWARDS

The International Alumni Club Scholarship, The University of Utah Alumni Association, 2016
Ministry of Science, Education and Sports' National Scholarship for Talented Students, 2006 – 2009

3rd place in the Croatian National Informatics Student Team Competition, October 2005

2nd place in the Croatian National Programming League 2003/04, November 2004

Acknowledgment for Achieved Results in Advancement of Technical Culture, Technical Culture Association of Koprivnica – Križevci County, June 2004

6th place in the Croatian National Informatics Team election, June 2003

6th place in the IX. Croatian Olympiad in Informatics, May 2003

4th place in the National Competition in Informatics, Croatia, May 2003

First price “summa cum Laude” won with the Tamburica Orchestra of the Albert Štriga Music School at the 47th European Music Festival, Neerpelt, Belgium, 1999

Three gold plaquettes at the Croatian Tamburica Music Festival, won with the Tamburica Orchestra of the Albert Štriga Music School, 1998 – 2001

PEER-REVIEWED
PUBLICATIONS

M. Dimjašević, F. Howar, K. Luckow, and Z. Rakamarić, “Study of Integrating Random and Symbolic Testing for Object-oriented Software”, *The International Conference on integrated Formal Methods*, Maynooth, Ireland, 2018.

K. Luckow, M. Dimjašević, D. Giannakopoulou, F. Howar, M. Isberner, T. Kahsai, Z. Rakamarić, and V. Raman, “JDart: A Dynamic Symbolic Analysis Framework”, *The International Conference on Tools and Algorithms for the Construction and Analysis of Systems*, Eindhoven, The Netherlands, 2016.

M. Dimjašević, S. Atzeni, I. Ugrina, and Z. Rakamarić, “Evaluation of Android Malware Detection Based on System Calls”, *The International Workshop on Security and Privacy Analytics*, New Orleans, Louisiana, USA, 2016.

M. Dimjašević, D. Giannakopoulou, “Test-Case Generation for Runtime Analysis and Vice Versa: Verification of Aircraft Separation Assurance”, *The International Symposium on Software Testing and Analysis*, Baltimore, Maryland, USA, 2015.

M. Dimjašević, D. Giannakopoulou, F. Howar, M. Isberner, Z. Rakamarić, and V. Raman, “The Dart, the Psycho, and the Doop”, *Java PathFinder Workshop*, Salt Lake City, Utah, USA, 2014.

M. Dimjašević, Z. Rakamarić, “JPF-Doop: Combining Concolic and Random Testing for Java”, Extended abstract, *Java PathFinder Workshop*, Palo Alto, California, USA, 2013.

M. Dimjašević, “Automatic Testing of Software Libraries”, Presentation-only paper, Student Forum at the *13th conference on Formal Methods in Computer Aided Design*, Portland, Oregon,

USA, 2013.

TECHNICAL
REPORTS

M. Dimjašević, S. Atzeni, I. Ugrina, and Z. Rakamarić, “Android Malware Detection Based on System Calls”, University of Utah, School of Computing, UUCS-15-003, 2015.

SOFTWARE AND
DATA

Connect4 — Connection board game

Software development

November 2020 – present

Connect4 is a connection board game implemented in Haskell. The implementation utilises an effect system, the Servant web service framework and eDSLs via the Polysemy library.

<https://framagit.org/mdimjasevic/connect4>

Fencer — A Rate Limiting Service

Software development

August 2019 – January 2020

Fencer is a rate limiting service implemented in Haskell and developed by Juspay Technologies. It provides capabilities for configuring and serving rate limit scenarios. I was developing the code base and improving its quality by forming and implementing test cases.

<https://github.com/juspay/fencer>

Cardano Specification — Cardano Blockchain

Formal specification and prototype implementation

September 2018 – August 2019

Cardano Byron is a re-implementation of the Cardano blockchain, replacing the old Byron release implementation. I worked on formally specifying it and implementing a prototype based on the specification.

<https://github.com/input-output-hk/cardano-ledger-specs>

Idris — Pure functional programming language with dependent types

Language contributor

September 2017 – September 2018

Idris is a general purpose pure functional programming language with dependent types, implemented in Haskell. I contributed to the development of Idris.

<https://idris-lang.org/>

JDooop — Automatic Test Case Generation for Java

Mentor: Zvonimir Rakamarić

January 2013 – May 2017

JDooop is a tool for automatic test case generation for Java libraries and programs. It is based on a combination of random testing and dynamic symbolic execution.

<https://github.com/psycopaths/jdooop>

<https://github.com/soarlab/jdooop-wrapper>

maline — Malware Detection for Android

Mentor: Zvonimir Rakamarić

October 2013 – December 2015

maline is a malware detection tool for Android applications based on dynamic analysis and machine learning. Google’s Android Security Team showed interest in the tool.

<https://github.com/soarlab/maline>

maline — Malware Detection for Android: Dataset

Mentor: Zvonimir Rakamarić

October 2013 – December 2015

In order to facilitate reproducible research, we made our extensive dataset of over 300 GB from the malware detection project freely available to the public and other scientists.

<https://zenodo.org/record/154737>

Runtime Verification of AutoResolver

Mentor: Dimitra Giannakopoulou

September 2014 – December 2014

During my internship at the NASA Ames Research Center, I worked on specifying and verifying a future air traffic control system called AutoResolver. I specified properties, developed a novel way to generate test cases for runtime verification of the complex software system, developed a framework, and implemented the properties. We published this work at ISSSTA 2015.

OTHER
EDUCATION

“School and Workshop on Univalent Mathematics”, University of Birmingham, United Kingdom, 2019.

“Functional Correctness Training”, internal Input Output Hong Kong workshop, Regensburg, Germany, 2018.

“Software Systems Safety”, Summer School Marktobendorf, Marktobendorf, Germany, 2013.

“Third Summer School on Formal Techniques”, Atherton, California, USA, 2013.

“Albert Štriga Music School”, Elementary music school, Križevci, Croatia, 1995 – 2000.

TALKS

“ \neg Everything is for \forall (But there \exists an Introduction to Propositions as Types)”, March 2019, Lambda Zagreb Meetup, Zagreb, Croatia

“Introduction to Dependent Types”, February 2019, a workshop given at Lambda Days 2019, Kraków, Poland

“Function Totality: Abstraction Tool in Programming”, February 2019, Lambda Days 2019, Kraków, Poland

“Terminating and Productive Functions”, February 2019, Lambda Zagreb Meetup, Zagreb, Croatia

“Function Totality: Abstraction Tool in Programming”, December 2018, IEEE Croatia Section, University of Zagreb, Zagreb, Croatia

“The Role of Types in Programming”, February 2018, Lambda Zagreb Meetup, Zagreb, Croatia

“Precise Types in Idris”, August 2017, Lambda Zagreb Meetup, Zagreb, Croatia

“Evaluation of Android Malware Detection Based on System Calls”, March 2016, The 2nd International Workshop on Security and Privacy Analytics, New Orleans, Louisiana, USA

“Test-Case Generation for Runtime Analysis and Vice Versa: Verification of Aircraft Separation Assurance”, July 2015, The International Symposium on Software Testing and Analysis, Baltimore, Maryland, USA

“Runtime Verification of AutoResolver”, January 2015, NASA Ames Research Center, Moffett Field, California, USA

“JPF-Doop: Combining Concolic and Random Testing for Java”, November 2013, The Java Pathfinder Workshop 2013, Palo Alto, California, USA

“Automated Testing of Software Libraries”, October 2013, The 13th Conference on Formal Methods in Computer Aided Design, Portland, Oregon, USA

“Copy-wrong — Copyleft as a Cultural Reversing Mechanism”, March 2011, the Culture Shock Festival, Križevci, Croatia

“The Wealth of Networks — How Social Production Transforms Markets and Freedom”, March 2010, the Culture Shock Festival, Križevci, Croatia

“The Impact of Copyright on the Development of Culture”, March 2010, the Culture Shock Festival, Križevci, Croatia

“GNU/Linux — How Did the Penguin Fly in Through the Window”, March 2009, the Culture Shock Festival, Križevci, Croatia

PROFESSIONAL
ACTIVITIES

P.O.I.N.T., Križevci, Croatia

“Hub for Advanced Computing Križevci” Project Lead

October 2020 – present

A computer science workshop series supported by the Embassy of the United States, Zagreb – Croatia. My engagement is two-fold: both as a project lead and as a Haskell workshop lecturer.

<https://hack.udruga-point.hr/>

International Conference for High Performance Computing, Networking, Storage and Analysis, Salt Lake City, Utah, USA

Volunteer at SC12

November 2012

Free Software Croatia, Križevci, Croatia

Founder and President

June 2011 – June 2012

<http://slobodansoftver.hr>

Board of European Students of Technology (BEST) – Zagreb, Zagreb, Croatia

Project Manager and President

2006 – 2009

<http://www.best.hr>

PROFESSIONAL
SERVICE

International Workshop on Malware Analysis — Program Committee member *2016*

Conference on Programming Language Design and Implementation — Artifact Evaluation Committee member *2016*

Conference on Computer Aided Verification — Artifact Evaluation Committee member *2015*

Executive Committee member, Competition in Informatics, Križevci, Croatia *March 2006*

High school students' mentor, Competition in Informatics, Križevci, Croatia *2004 – 2006*