

Dmitrii Kuvaiskii

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<https://dimakuv.github.io/>

GitHub:

<https://github.com/dimakuv>

Research Interests

My research interests lie in the field of dependability in software systems, with a particular focus on fault tolerance and security.

Education

Ph.D. Candidate in Computer Science (Dec 2013 - present)

Technische Universität Dresden (TU Dresden), Germany

Advisors: Prof. Dr. Christof Fetzer and Prof. Dr. Pramod Bhatotia

Master of Science in Computer Science (Oct 2011 - Nov 2013)

Technische Universität Dresden (TU Dresden), Germany

Diplom in Electrical Engineering (Sep 2004 - Jul 2010)

Bauman University, Moscow, Russia

Employment

Auriga Inc, Moscow, Russia (Sep 2010 - Aug 2011)

Certification engineer, Software developer

Responsibilities:

- documenting and testing code of the PikeOS embedded operating system (C);
- writing medical special-purpose programs (C++ and C#).

Diasoft, Moscow, Russia (Sep 2007 - Aug 2010)

Software developer

Responsibilities: programming insurance subsystems using Transact SQL and Delphi.

Honors and Awards

Carter Award (Best student paper) at DSN'15

Best paper award at SRDS'14

Erasmus Mundus Action 2 MULTIC scholarship, 2011-2013

Ph.D. Dissertation

Topic: Dependable Systems Leveraging new ISA extensions (preliminary)

Supervisors: Prof. Dr. Christof Fetzer and Prof. Dr. Pramod Bhatotia

In the context of my Ph.D. dissertation, I investigate and build systems to increase software dependability leveraging recent sets of ISA extensions in Intel processors, with the focus on software-based fault tolerance and security for legacy C/C++ programs.

Research projects:

Intel MPX Explained: Detailed evaluation of Intel MPX and discussion of its applicability in comparison to other bounds-checking approaches.

— Software: [Intel-MPX.github.io](https://github.com/Intel-MPX)

SGXBounds: LLVM-based bounds checker to detect and tolerate security bugs in multithreaded legacy C/C++ programs inside Intel SGX enclaves.

— Software: <https://github.com/tudinfse/sgxbounds>

Elzar: LLVM compiler pass to detect and mask transient CPU faults in multithreaded legacy C/C++ programs using Intel AVX.

— Software: <https://github.com/tudinfse/elzar>

HAFT: LLVM compiler pass to detect and tolerate transient CPU faults in multithreaded legacy C/C++ programs using Intel TSX.

— Software: <https://github.com/tudinfse/haft>

Δ -Encoding: Source-to-source compiler to detect transient and permanent CPU faults in legacy C programs utilizing unused IPC resources of modern CPUs.

Publications

Conference publications:

- [1] Intel MPX Explained
Oleksii Oleksenko, Dmitrii Kuvaiskii, Pramod Bhatotia, Pascal Felber, and Christof Fetzer
USENIX ATC 2017 (Under submission)
- [2] SGXBounds: Memory Safety for Shielded Execution
Dmitrii Kuvaiskii, Oleksii Oleksenko, Sergei Arnautov, Bohdan Trach, Pramod Bhatotia, Pascal Felber, and Christof Fetzer
EuroSys 2017 (Under submission)
- [3] Elzar: Triple Modular Redundancy using Intel Advanced Vector Extensions
Dmitrii Kuvaiskii, Oleksii Oleksenko, Pramod Bhatotia, Pascal Felber, and Christof Fetzer
DSN 2016
- [4] HAFT: Hardware-Assisted Fault Tolerance
Dmitrii Kuvaiskii, Rasha Faqeh, Pramod Bhatotia, Pascal Felber, and Christof Fetzer
EuroSys 2016
- [5] Δ -Encoding: Practical Encoded Processing
Dmitrii Kuvaiskii and Christof Fetzer
DSN 2015 Carter Award (Best student paper)
- [6] HardPaxos: Replication hardened against hardware errors
Diogo Behrens, Dmitrii Kuvaiskii, and Christof Fetzer
SRDS 2014 Best paper award

Extended abstracts:

- [7] Efficient Fault Tolerance using Intel MPX and TSX
Oleksii Oleksenko, Dmitrii Kuvaiskii, Pramod Bhatotia, Christof Fetzer, and Pascal Felber
Fast abstract at **DSN 2016**

Talks

ACM EuroSys'16, London, April 2016
HAFT: Hardware-Assisted Fault Tolerance

IEEE DSN'16, Toulouse, June 2016
Elzar: Triple Modular Redundancy using Intel Advanced Vector Extensions

IEEE DSN'15, Rio de Janeiro, June 2015
 Δ -Encoding: Practical Encoded Processing

Teaching Experience

Teaching assistant: Distributed Systems Engineering (DSE) courses, TU Dresden, Dec 2013 - present.

- Concurrent and Distributed Systems lab, summer semesters: 2014, 2015, & 2016
- Principles of Dependable Systems exercises, winter semesters: 2014, 2015, & 2016
- Software Fault Tolerance exercises, summer semesters: 2014, 2015, & 2016

Professional Activities

Shadow PC member: **EuroSys 2016**

Skills

Languages: C, C++, Assembly (expert), Unix shell, Python, R (competent)

Frameworks: LLVM, gdb, Intel Pin, Intel SDE

Technologies: Intel SSE/AVX, Intel TSX, Intel MPX, Intel SGX

References

Prof. Dr. Christof Fetzer
TU Dresden, Germany
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Prof. Dr. Pramod Bhatotia
University of Edinburgh, UK
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Prof. Dr. Pascal Felber
University of Neuchatel, Switzerland
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