Zvonimir Rakamarić **December, 2025**

CONTACT INFORMATION

Email: zrakamar@gmail.com
Homepage: https://zvonimir.github.io

PROFESSIONAL APPOINTMENTS

Amazon Web Services (AWS), Seattle, WA, USA
Principal Applied Scientist *May 2021 – present*

School of Computing, University of Utah, Salt Lake City, UT, USA
Associate Professor *Jul 2018 – Aug 2023*

School of Computing, University of Utah, Salt Lake City, UT, USA
Assistant Professor *Jun 2012 – Jun 2018*

Carnegie Mellon University, Silicon Valley Campus, NASA Ames Research Park, CA, USA
Postdoctoral Fellow *Mar 2011 – Mar 2012*

Dept. of Computer Science, University of British Columbia, Vancouver, BC, Canada
Research Assistant *Sep 2006 – Mar 2011*

Software Reliability Research Group, Microsoft Research, Redmond, WA, USA
Research Intern *Jul 2006 – Oct 2006, Oct 2008 – Jan 2009, Nov 2009 – Feb 2010*

Dept. of Computer Science, University of British Columbia, Vancouver, BC, Canada
Research Assistant *May 2005 – Aug 2006*

TIS.kis, Zagreb, Croatia
Software Engineer *Mar 2003 – Aug 2004*

EDUCATION

University of British Columbia, Vancouver, BC, Canada

Ph.D. in Computer Science, Mar 2011

- Thesis: Modular Verification of Shared-Memory Concurrent System Software
- Supervisor: Alan J. Hu

M.Sc. in Computer Science, Aug 2006

- Thesis: A Logic and Decision Procedure for Verification of Heap-Manipulating Programs
- Supervisor: Alan J. Hu

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

Dipl. ing. (5-year degree) in Computer Science, Jun 2002

- Thesis: Java Assembler
- Supervisor: Danko Basch

HONORS AND AWARDS

Elevation to the grade of IEEE Senior Member, 2021

PRUNERS software project (includes Archer tool) launched in collaboration with Lawrence Livermore National Laboratory and RWTH Aachen has been named a finalist in the R&D 100 Awards, 2017

SMACK verifier wins 3 gold and 1 silver medal in the 6th International Competition on Software Verification (SV-COMP), 2017

NSF Faculty Early Career Development (CAREER) Award, 2016

SMACK verifier wins 2 silver and 2 bronze medals in the 5th International Competition on Software Verification (SV-COMP), 2016

SMACK verifier wins 2 gold, 1 silver, and 1 bronze medal in the 4th International Competition

on Software Verification (SV-COMP), 2015

NSF/IEEE Technical Committee on Parallel Processing (TCPP) Center for Parallel and Distributed Computing Curriculum Development and Educational Resources (CDER) Early Adopter Award [includes $1,000 in gift money], 2013

Microsoft Research Software Engineering Innovation Foundation (SEIF) Award [includes $25,000 in gift money], 2012

Silver Medal in the ACM Student Research Competition at the 32nd ACM/IEEE International Conference on Software Engineering (ICSE), 2010

Microsoft Research Graduate Fellowship, 2008/09 – 2009/10

UBC Four Year Doctoral Fellowship, 2009/10 [1]

Pacific Century Graduate Scholarship, 2008/09 [1]

UBC University Graduate Fellowship (4 times), 2005/06, 2006/07, 2007/08, 2008/09 [1]

Student travel award for the 5th Intl. Workshop on Satisfiability Modulo Theories (SMT), 2007

Outstanding Student Paper Award sponsored by Microsoft Research Cambridge, 13th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2007

Croatian Ministry of Science and Education Grant for Study Abroad, 2004

Grant for The Calculemus Autumn School, 2002

University of Zagreb Rector Award, 2002

Croatian Ministry of Science and Education Scholarship, 1997/98 – 2001/02

Second Place in Croatian Competition in Informatics, 1997

TEACHING

University of Utah, Salt Lake City, UT, USA

- CS 2100 — Discrete Structures, Fall 2020 (Section 20: students: 111, instructor: 4.67, course: 4.47), (Section 24: students: 102, instructor: 4.86, course: 4.66)
- COMP 1010 — Programming for All 1, Spring 2021 (students: 165)
- COMP 1010 — Programming for All 1, Spring 2020 (students: 96, instructor: 5.22, course: 5.08)
- CS 5110/6110 — Software Verification, Spring 2018 (students: 9, instructor: 5.81, course: 5.55)
- CS 6012 — MSD: Data Structures and Algorithms, Fall 2017 (students: 19, instructor: 5.71, course: 5.44)
- CS 5110/6110 — Rigorous System Design, Spring 2017 (students: 14, instructor: 5.64, course: 5.71)
- CS 2100 — Discrete Structures, Fall 2016 (students: 154, instructor: 5.23, course: 4.86)
- CS 5110/6110 — Rigorous System Design, Spring 2016 (students: 22, instructor: 5.05, course: 4.82)
- CS 5959 — Writing Solid Code, Fall 2015 (students: 20, instructor: 5.35, course: 4.83)
- CS 6110 — Formal Methods in System Design, Spring 2015 (students: 9, instructor: 5.64, course: 5.36). Received top instructor award from the College of Engineering.
- CS 2100 — Discrete Structures, Fall 2014 (students: 142, instructor: 5.36, course: 5.24)
- CS 2100 — Discrete Structures, Spring 2014 (students: 92, instructor: 5.06, course: 4.73)
- CS 5100/6100 — Foundations of Computer Science, Spring 2013 (students: 7, instructor: 5.54, course: 5.69). Received top instructor award from the College of Engineering.
- CS 6962 — Software Verification, Fall 2012 (students: 21, instructor: 5.40, course: 5.00)

University of British Columbia, Vancouver, BC, Canada

[1] Declined in order to accept the Microsoft Research Graduate Fellowship.

- CPSC 312 — Functional and Logic Programming, Spring 2005, teaching assistant
- CPSC 311 — Definition of Programming Languages, Fall 2004, teaching assistant

FUNDING

National Science Foundation, "FMitF:Track II: Lifting the SMACK Verifier to Production Software", CCF-2019267, PI Z. Rakamarić, Jul 2020–Sep 2021. [Award total: $100,000; Utah share: $100,000; My share: $100,000]

Amazon Web Services, "Verification of Multithreaded Programs with SMACK", PI Z. Rakamarić, 2020. [Gift total: $100,000; Utah share: $100,000; My share: $100,000]

VMware's University Research Fund, "Rust Verification Tools and Applications to Systems Software II", PI Z. Rakamarić, 2020. [Gift total: $40,000; Utah share: $40,000; My share: $40,000]

National Science Foundation, "SHF:Medium: Formal Methods as a First-Class Citizen of a Mainstream Compiler Framework", CCF-1955688, PI J. Regehr, co-PI Z. Rakamarić, Jun 2020–May 2024. [Award total: $1,114,703; Utah share: $1,114,703; My share: $557,351]

VMware's University Research Fund, "Rust Verification Tools and Applications to Systems Software I", PI Z. Rakamarić, 2019. [Gift total: $40,000; Utah share: $40,000; My share: $40,000]

National Science Foundation, "FMitF:Collaborative Research: RedLeaf: Verified Operating Systems in Rust", CCF-1837051, PIs A. Burtsev (UCI) and Z. Rakamarić, Sep 2018–Aug 2022. [Award total: $749,931; Utah share: $399,931; My share: $399,931]

Lawrence Livermore National Laboratory (LLNL) subcontract, "Result Variability and Mitigation, with Focus on OpenMP-4.0 Race-induced Variability and Compiler-caused Floating-point Variability", PI G. Gopalakrishnan, co-PI Z. Rakamarić, Mar 2018–Oct 2018. [Award total: $61,800; Utah share: $61,800; My share: $30,900]

National Science Foundation, "SHF:Medium: Hierarchical Tuning of Floating-Point Computations", CCF-1704715, PI G. Gopalakrishnan, co-PIs M. Hall, Z. Rakamarić, H. Sundar, Aug 2017–Jul 2020. [Award total: $1,200,000; Utah share: $1,200,000; My share: $300,000]

Lawrence Livermore National Laboratory (LLNL) subcontract, "Result Variability and Mitigation, with Focus on OpenMP-4.0 Race-induced Variability and Compiler-caused Floating-point Variability", PI G. Gopalakrishnan, co-PI Z. Rakamarić, Dec 2016–Oct 2017. [Award total: $61,798; Utah share: $61,798; My share: $30,899]

National Science Foundation, "EAGER: Application-driven Data Precision Selection Methods", CCF-1643056, PI G. Gopalakrishnan, co-PIs M. Hall, Z. Rakamarić, J. Regehr, V. Srikumar, H. Sundar, Aug 2016–Jul 2018. [Award total: $299,970; Utah share: $299,970; My share: $49,995]

National Science Foundation, "CAREER: Formal Methods for Approximate Computing", CCF-1552975, PI Z. Rakamarić, May 2016–Apr 2021. [Award total: $494,511; Utah share: $494,511; My share: $494,511]

Lawrence Livermore National Laboratory (LLNL) subcontract, "Developing Highly Scalable Data Race Checking Techniques for OpenMP", PI G. Gopalakrishnan, co-PI Z. Rakamarić, Aug 2015–Oct 2016. [Award total: $61,798; Utah share: $61,798; My share: $30,899]

National Science Foundation, "TWC:Small: Deker: Decomposing Commodity OS Kernels for Verification", CNS-1527526, PI Z. Rakamarić, co-PI A. Burtsev, Jul 2015–Jun 2018. [Award total: $499,999; Utah share: $499,999; My share: $250,000]

National Science Foundation, "SHF:Small:Collaborative Research: Compositional Verification of Heterogeneous Software Protocol Stacks", CCF-1421678, PIs Z. Rakamarić and F. Howar (CMU), co-PI T. K. Azene (CMU), Jul 2014–Jun 2017. [Award total: $499,954; Utah share:

$252,996; My share: $252,996]

Lawrence Livermore National Laboratory (LLNL) subcontract, "Nondeterminism Control in Scientific Codes", PI G. Gopalakrishnan, co-PI Z. Rakamarić, Jan 2014–Aug 2015. [Award total: $61,798; Utah share: $61,798; My share: $30,899]

National Science Foundation, "EAGER: Memory Models: Specification and Verification in a Concurrency Intermediate Verification Language (CIVL) Framework", CCF-1346756, PI Z. Rakamarić, co-PI G. Gopalakrishnan, Sep 2013–Aug 2015. [Award total: $299,998; Utah share: $299,998; My share: $149,999]

National Science Foundation and Semiconductor Research Corporation, "CCF: Localized, Layered Formal Hardware/Software Resilience Methods", CCF-1255776, PIs G. Gopalakrishnan and P. C. Diniz (USC), co-PI Z. Rakamarić, Apr 2013–Mar 2016. [Award total: $363,200; Utah share: $192,500; My share: $96,250]

NASA/Carnegie Mellon University, "Improving Coverage of Testing Complex Software Components", PI Z. Rakamarić, Oct 2012–Jan 2014. [Award total: $97,381; Utah share: $97,381; My share: $97,381]

Microsoft Research SEIF Award Gift, "Analysis of Heterogeneous Concurrent Programs", PI Z. Rakamarić. [Award total: $25,000; Utah share: $25,000; My share: $25,000]

STUDENTS

Current:

- Marek Baranowski, PhD
- Maryam Dabaghchian, PhD
- Jack Garzella, BS
- Thanh Son Nguyen, PhD
- Rocco Salvia, PhD

Graduated:

- Shaobo He, PhD, September 2019
- Liam Machado, BS, August 2019
- Ankit Agrawal, MS and non-student researcher, August 2019
- Simone Atzeni, PhD (co-advised with Ganesh Gopalakrishnan), August 2017
- Jiten Thakkar, MS, August 2017
- Marko Dimjašević, PhD, May 2017
- Dietrich Geisler, BS, May 2017
- Jonathan Whitaker, BS, December 2016
- Wei-Fan Chiang, PhD (co-advised with Ganesh Gopalakrishnan), August 2016
- Montgomery Carter, BS/MS, May 2016
- Arvind Haran, MS, December 2014

POSTDOCS

Current:

- Shaobo He, since January 2020

Alumni:

- Faraz Hussain, 2016–2017, currently Assistant Professor at Clarkson University
- Alexey Solovyev, 2013–2015

PEER-REVIEWED JOURNAL PUBLICATIONS [2]

I. Briggs, A. Das, *M. Baranowski*, V. Sharma, S. Krishnamoorthy, Z. Rakamarić, G. Gopalakrishnan, "FailAmp: Relativization Transformation for Soft Error Detection in Structured Address

[2] Underlined names indicate School of Computing students. Italicized names indicate students (co-)advised by me.

Generation", *ACM Transactions on Architecture and Code Optimimization (TACO)*, 16(4), ACM, Dec 2019.

K. Sato, I. Laguna, G. L. Lee, M. Schulz, C. M. Chambreau, S. Atzeni, M. Bentley, G. Gopalakrishnan, Z. Rakamarić, G. Sawaya, J. Protze, D. H. Ahn, "PRUNERS: Providing Reproducibility for Uncovering Non-Deterministic Errors in Runs on Supercomputers", *International Journal of High Performance Computing Applications (IJHPCA)*, 33(5), SAGE, Sep 2019.

A. Solovyev, M. Baranowski, I. Briggs, C. Jacobsen, Z. Rakamarić, G. Gopalakrishnan, "Rigorous Estimation of Floating-Point Round-off Errors with Symbolic Taylor Expansions", *ACM Transactions on Programming Languages and Systems (TOPLAS)*, 41(1), ACM, Dec 2018, pp 2:1–2:39.

S. He, S. Lahiri, Z. Rakamarić, "Verifying Relative Safety, Accuracy, and Termination for Program Approximations", *Journal of Automated Reasoning (JAR)*, 60(1), Springer, Jan 2018, pp 23–42. Invited paper.

A. Balasubramanian, M. Baranowski, A. Burtsev, A. Panda, Z. Rakamarić, L. Ryzhyk, "System Programming in Rust: Beyond Safety", *ACM SIGOPS Operating Systems Review*, 51(1), ACM, Sep 2017, pp 94–99. Special Topics: VMware Research.

A. Humphrey, Q. Meng, M. Berzins, D. C. B. de Oliveira, Z. Rakamarić, G. Gopalakrishnan, "Systematic Debugging Methods for Large Scale HPC Computational Frameworks", *Computing in Science and Engineering (CiSE)*, 16(3), IEEE, May 2014, pp 48–56.

D. Babić, B. Cook, A. J. Hu, Z. Rakamarić, "Proving Termination of Nonlinear Command Sequences", *Formal Aspects of Computing (FAC)*, 25(3), Springer, May 2013, pp 389–403. Invited paper.

S. Chatterjee, S. Lahiri, S. Qadeer, Z. Rakamarić, "A Low-Level Memory Model and an Accompanying Reachability Predicate", *International Journal on Software Tools for Technology Transfer (STTT)*, 11(2), Springer, Feb 2009, pp 105–116. Invited paper.

Peer-Reviewed Conference Publications [2]

G. A. Constantinides, F. Dahlqvist, Z. Rakamarić, R. Salvia, "Rigorous Roundoff Error Analysis of Probabilistic Floating-Point Computations", *Proceedings of the 33rd International Conference on Computer Aided Verification (CAV)*, Lecture Notes in Computer Science, Springer, Vol. 12760, 2021, pp 626–650. [Acceptance rate: $79/290 = 27\%$; Pages: 15]

M. Baranowski, S. He, M. Lechner, T. S. Nguyen, Z. Rakamarić, "An SMT Theory of Fixed-Point Arithmetic", *Proceedings of the 10th International Joint Conference on Automated Reasoning (IJCAR)*, Lecture Notes in Computer Science, Springer, Vol. 12166, 2020, pp 13–31. [Acceptance rate: $46/105 = 43\%$; Pages: 19]

J. Garzella, M. Baranowski, S. He, Z. Rakamarić, "Leveraging Compiler Intermediate Representation for Multi- and Cross-Language Verification", *Proceedings of the 21st International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI)*, Lecture Notes in Computer Science, Springer, Vol. 11990, 2020, pp 90–111. [Acceptance rate: $21/44 = 48\%$; Pages: 22]

M. Dabaghchian, Z. Rakamarić, "A Timeless Model for The Verification of Quasi-Periodic Distributed Systems", *Proceedings of the 17th ACM/IEEE International Conference on Formal Methods and Models for System Design (MEMOCODE)*, ACM, 2019, pp 4:1–4:11. [Acceptance rate: $17/34 = 50\%$; Pages: 11]

R. Salvia, L. Titolo, M. A. Feliú, M. M. Moscato, C. A. Muñoz, Z. Rakamarić, "A Mixed Real and Floating-Point Solver", *Proceedings of the 11th NASA Formal Methods Symposium (NFM)*, Lecture Notes in Computer Science, Springer, Vol. 11460, 2019, pp 363–370. [Acceptance rate: $8/18 = 44\%$; Pages: 8]

M. Baranowski, S. He, Z. Rakamarić, "Verifying Rust Programs with SMACK", *Proceedings of the*

16th International Symposium on Automated Technology for Verification and Analysis (ATVA), Lecture Notes in Computer Science, Springer, Vol. 11138, 2018, pp 528–535. [Acceptance rate: $32/82 = 39\%$; Pages: 7]

M. Dimjašević, F. Howar, K. Luckow, Z. Rakamarić, "Study of Integrating Random and Symbolic Testing for Object-Oriented Software", *Proceedings of the 14th International Conference on Integrated Formal Methods (IFM)*, Lecture Notes in Computer Science, Springer, Vol. 11023, 2018, pp 89–109. [Acceptance rate: $22/60 = 37\%$; Pages: 20]

S. Atzeni, G. Gopalakrishnan, Z. Rakamarić, I. Laguna, G. L. Lee, D. H. Ahn, "Sword: A Bounded Memory-Overhead Detector of OpenMP Data Races in Production Runs", *Proceedings of the 32nd IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, IEEE Computer Society, 2018, pp 845–854. [Acceptance rate: $113/461 = 25\%$; Pages: 10]
LLNL Deputy Director's 2019 S&T Excellence in Publication Award.

S. He, Z. Rakamarić, "Counterexample-Guided Bit-Precision Selection", *Proceedings of the 15th Asian Symposium on Programming Languages and Systems (APLAS)*, Lecture Notes in Computer Science, Springer, Vol. 10695, 2017, pp 534–553. [Acceptance rate: $24/56 = 43\%$; Pages: 18]

W. Chiang, *M. Baranowski*, I. Briggs, A. Solovyev, G. Gopalakrishnan, Z. Rakamarić, "Rigorous Floating-Point Mixed-Precision Tuning", *Proceedings of the 44th ACM SIGPLAN Symposium on Principles of Programming Languages (POPL)*, ACM, 2017, pp 300–315. [Acceptance rate: $64/282 = 23\%$; Pages: 16]

T. Sorensen, A. F. Donaldson, M. Batty, G. Gopalakrishnan, Z. Rakamarić, "Portable Inter-workgroup Barrier Synchronisation for GPUs", *Proceedings of the ACM SIGPLAN International Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, ACM, 2016, pp 39–58. [Acceptance rate: $52/203 = 26\%$; Pages: 20]

S. He, S. Lahiri, Z. Rakamarić, "Verifying Relative Safety, Accuracy, and Termination for Program Approximations", *Proceedings of the 8th NASA Formal Methods Symposium (NFM)*, Lecture Notes in Computer Science, Springer, Vol. 9690, 2016, pp 237–254. [Acceptance rate: $19/51 = 37\%$; Pages: 18]
Invited for special section submission to the Journal of Automated Reasoning (JAR).

S. Atzeni, G. Gopalakrishnan, Z. Rakamarić, D. H. Ahn, I. Laguna, M. Schulz, G. L. Lee, J. Protze, M. S. Müller, "Archer: Effectively Spotting Data Races in Large OpenMP Applications", *Proceedings of the 30th IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, IEEE Computer Society, 2016, pp 53–62. [Acceptance rate: $114/496 = 23\%$; Pages: 10]

K. Luckow, *M. Dimjašević*, D. Giannakopoulou, F. Howar, M. Isberner, T. Kahsai, Z. Rakamarić, V. Raman, "JDart: A Dynamic Symbolic Analysis Framework", *Proceedings of the 22nd International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, Lecture Notes in Computer Science, Springer, Vol. 9636, 2016, pp 442–459. [Acceptance rate: $44/157 = 28\%$; Pages: 17]

P. Deligiannis, A. F. Donaldson, Z. Rakamarić, "Fast and Precise Symbolic Analysis of Concurrency Bugs in Device Drivers", *Proceedings of the 30th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, IEEE, 2015, pp 166–177. [Acceptance rate: $60/289 = 21\%$; Pages: 12]

A. Solovyev, C. Jacobsen, Z. Rakamarić, G. Gopalakrishnan, "Rigorous Estimation of Floating-Point Round-off Errors with Symbolic Taylor Expansions", *Proceedings of the 20th International Symposium on Formal Methods (FM)*, Lecture Notes in Computer Science, Springer, Vol. 9109, 2015, pp 532–550. [Acceptance rate: $32/124 = 26\%$; Pages: 19]

D. Giannakopoulou, F. Howar, M. Isberner, T. Lauderdale, Z. Rakamarić, V. Raman, "Taming Test Inputs for Separation Assurance", *Proceedings of the 29th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, ACM, 2014, pp 373–384. [Acceptance rate: $55/276 =$

20%; Pages: 12]

Z. Rakamarić, M. Emmi, "SMACK: Decoupling Source Language Details from Verifier Implementations", *Proceedings of the 26th International Conference on Computer Aided Verification (CAV)*, Lecture Notes in Computer Science, Springer, Vol. 8559, 2014, pp 106–113. Short paper. [Acceptance rate: $11/54 = 20\%$; Pages: 7]

W. Chiang, G. Gopalakrishnan, Z. Rakamarić, A. Solovyev, "Efficient Search for Inputs Causing High Floating-point Errors", *Proceedings of the ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP)*, ACM, 2014, pp 43–52. [Acceptance rate: $28/184 = 15\%$; Pages: 10]

V. C. Sharma, *A. Haran*, Z. Rakamarić, G. Gopalakrishnan, "Towards Formal Approaches to System Resilience", *Proceedings of the 19th IEEE Pacific Rim International Symposium on Dependable Computing (PRDC)*, 2013, pp 41–50. [Acceptance rate: $33/71 = 47\%$; Pages: 10]

F. Howar, D. Giannakopoulou, Z. Rakamarić, "Hybrid Learning: Interface Generation through Static, Dynamic, and Symbolic Analysis", *Proceedings of the International Symposium on Software Testing and Analysis (ISSTA)*, ACM, 2013, pp 268–279. [Acceptance rate: $32/124 = 26\%$; Pages: 12]

D. Babić, Z. Rakamarić, "Asynchronously Communicating Visibly Pushdown Systems", *Proceedings of the 2013 IFIP Joint International Conference on Formal Techniques for Distributed Systems (33rd FORTE/15th FMOODS)*, Lecture Notes in Computer Science, Springer, Vol. 7892, 2013, pp 225–241. [Acceptance rate: $20/49 = 41\%$; Pages: 17]

W. Chiang, G. Gopalakrishnan, G. Li, Z. Rakamarić, "Formal Analysis of GPU Programs with Atomics via Conflict-Directed Delay-Bounding", *Proceedings of the 5th NASA Formal Methods Symposium (NFM)*, Lecture Notes in Computer Science, Springer, Vol. 7871, 2013, pp 213–228. [Acceptance rate: $28/75 = 37\%$; Pages: 16]

D. Giannakopoulou, Z. Rakamarić, V. Raman, "Symbolic Learning of Component Interfaces", *Proceedings of the 19th International Static Analysis Symposium (SAS)*, Lecture Notes in Computer Science, Springer, Vol. 7460, 2012, pp 248–264. [Acceptance rate: $25/62 = 40\%$; Pages: 17]

M. Emmi, S. Qadeer, Z. Rakamarić, "Delay-Bounded Scheduling", *Proceedings of the 38th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL)*, ACM, 2011, pp 411–422. [Acceptance rate: $49/209 = 24\%$; Pages: 12]

S. Lahiri, S. Qadeer, Z. Rakamarić, "Static and Precise Detection of Concurrency Errors in Systems Code Using SMT Solvers", *Proceedings of the 21st International Conference on Computer Aided Verification (CAV)*, Lecture Notes in Computer Science, Springer, Vol. 5643, 2009, pp 509–524. [Acceptance rate: $36/135 = 27\%$; Pages: 16]

Z. Rakamarić, A. J. Hu, "A Scalable Memory Model for Low-Level Code", *Proceedings of the 10th International Conference on Verification, Model Checking and Abstract Interpretation (VMCAI)*, Lecture Notes in Computer Science, Springer, Vol. 5403, 2009, pp 290–304. [Acceptance rate: $24/72 = 33\%$; Pages: 15]

Z. Rakamarić, A. J. Hu, "Automatic Inference of Frame Axioms Using Static Analysis", *Proceedings of the 23rd IEEE/ACM International Conference on Automated Software Engineering (ASE)*, IEEE, 2008, pp 89–98. [Acceptance rate: $34/280 = 12\%$; Pages: 10]

Z. Rakamarić, R. Bruttomesso, A. J. Hu, A. Cimatti, "Verifying Heap-Manipulating Programs in an SMT Framework", *Proceedings of the 5th International Symposium on Automated Technology for Verification and Analysis (ATVA)*, Lecture Notes in Computer Science, Springer, Vol. 4762, 2007, pp 237–252. [Acceptance rate: $36/88 = 41\%$; Pages: 16]

D. Babić, B. Cook, A. J. Hu, Z. Rakamarić, "Proving Termination by Divergence", *Proceedings of the 5th IEEE International Conference on Software Engineering and Formal Methods (SEFM)*, IEEE

Computer Society, 2007, pp 93–102. [Acceptance rate: unknown; Pages: 10]
Invited for special section submission to the Formal Aspects of Computing (FAC).

S. Chatterjee, S. Lahiri, S. Qadeer, Z. Rakamarić, "A Reachability Predicate for Analyzing Low-Level Software", *Proceedings of the 13th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, Lecture Notes in Computer Science, Springer, Vol. 4424, 2007, pp 19–33. [Acceptance rate: $45/204 = 22\%$; Pages: 15]
Outstanding Student Paper Award. Invited for special section submission to the International Journal on Software Tools for Technology Transfer (STTT).

Z. Rakamarić, J. Bingham, A. J. Hu, "An Inference-Rule-Based Decision Procedure for Verification of Heap-Manipulating Programs with Mutable Data and Cyclic Data Structures", *Proceedings of the 8th International Conference on Verification, Model Checking and Abstract Interpretation (VMCAI)*, Lecture Notes in Computer Science, Springer, Vol. 4349, 2007, pp 106–121. [Acceptance rate: $21/85 = 24\%$; Pages: 16]

J. Bingham, Z. Rakamarić, "A Logic and Decision Procedure for Predicate Abstraction of Heap-Manipulating Programs", *Proceedings of the 7th International Conference on Verification, Model Checking and Abstract Interpretation (VMCAI 2006)*, Lecture Notes in Computer Science, Springer, Vol. 3855, 2005, pp 207–221. [Acceptance rate: $27/58 = 47\%$; Pages: 15]

D. Babić, Z. Rakamarić, "Bytecode Optimization", *Proceedings of the 24th International Conference on Information Technology Interfaces (ITI)*, 2002 ,pp 377–382. [Acceptance rate: unknown; Pages: 6]

G. Jakovljević, Z. Rakamarić, D. Babić, "Java Simulator of Real-Time Scheduling Algorithms", *Proceedings of the 24th International Conference on Information Technology Interfaces (ITI)*, 2002, pp 411–417. [Acceptance rate: unknown; Pages: 7]

PEER-REVIEWED WORKSHOP PUBLICATIONS [2]

S. He, *M. Baranowski*, Z. Rakamarić, "Stochastic Local Search for Solving Floating-Point Constraints", *Proceedings of the 12th International Workshop on Numerical Software Verification (NSV)*, Lecture Notes in Computer Science, Springer, Vol. 11652, 2019, pp 76–84. [Acceptance rate: $7/10 = 70\%$; Pages: 9]

V. Narayanan, *M. Baranowski*, L. Ryzhyk, Z. Rakamarić, A. Burtsev, "RedLeaf: Towards An Operating System for Safe and Verified Firmware", *Proceedings of the 18th Workshop on Hot Topics in Operating Systems (HotOS)*, ACM, 2019, pp 37–44. [Acceptance rate: TBD; Pages: 8]

R. Salvia, Z. Rakamarić, "Exploring Floating-Point Trade-Offs in ML", *Informal Proceedings of the Workshop on Approximate Computing Across the Stack (WAX)*, 2018. Position paper. [Acceptance rate: unknown; Pages: 3]

M. Dabaghchian, Z. Rakamarić, B. K. Ozkan, E. Mutlu, S. Tasiran, "Consistency-Aware Scheduling for Weakly Consistent Programs", *Proceedings of the 2017 Java Pathfinder Workshop (JPF)*, *ACM SIGSOFT Software Engineering Notes*, 42(4), ACM, Oct 2017, pp 1–5. [Acceptance rate: $5/6 = 83\%$; Pages: 5]

M. Baranowski, I. Briggs, *W. Chiang*, G. Gopalakrishnan, Z. Rakamarić, A. Solovyev, "Moving the Needle on Rigorous Floating-point Precision Tuning", *Proceedings of the 6th Automated Formal Methods Workshop (AFM 2017)*, *Kalpa Publications in Computing*, 5, EasyChair, 2018, pp 19–30. [Acceptance rate: unknown; Pages: 12]

A. Balasubramanian, *M. Baranowski*, A. Burtsev, A. Panda, Z. Rakamarić, L. Ryzhyk, "System Programming in Rust: Beyond Safety", *Proceedings of the 16th Workshop on Hot Topics in Operating Systems (HotOS)*, ACM, 2017, pp 156–161. [Acceptance rate: $29/94 = 31\%$; Pages: 6]

M. Mues, F. Howar, T. Kahsai, K. Luckow, Z. Rakamarić, "Releasing the PSYCO: Using Symbolic Search in Interface Generation for Java", *Proceedings of the 2016 Java Pathfinder Workshop (JPF)*, *ACM SIGSOFT Software Engineering Notes*, 41(6), ACM, Jan 2017, pp 1–5. [Acceptance rate:

$8/9 = 89\%$; Pages: 5]

M. Dimjašević, *S. Atzeni*, I. Ugrina, Z. Rakamarić, "Evaluation of Android Malware Detection Based on System Calls", *Proceedings of the 2nd ACM International Workshop on Security and Privacy Analytics (IWSPA)*, ACM, 2016, pp 1–8. [Acceptance rate: $6/20 = 30\%$; Pages: 8]

W. Chiang, G. Gopalakrishnan, Z. Rakamarić, "Practical Floating-point Divergence Detection", *Proceedings of the 28th International Workshop on Languages and Compilers for Parallel Computing (LCPC)*, Lecture Notes in Computer Science, Springer, Vol. 9519, 2015, pp 271–286. [Acceptance rate: $19/37 = 51\%$; Pages: 15]

S. Atzeni, G. Gopalakrishnan, Z. Rakamarić, D. H. Ahn, I. Laguna, M. Schulz, G. L. Lee, J. Protze, M. S. Müller, "Archer: Effectively Spotting Data Races in Large OpenMP Applications", *Informal Proceedings of the 8th International Workshop on Exploiting Concurrency Efficiently and Correctly (EC2)*, 2015. Position paper. [Acceptance rate: $3/3 = 100\%$; Pages: 6]

S. Lahiri, Z. Rakamarić, "Towards Automated Differential Program Verification for Approximate Computing", *Informal Proceedings of the Workshop on Approximate Computing Across the Stack (WAX)*, 2015. Position paper. [Acceptance rate: unknown; Pages: 3]

W. Chiang, G. Gopalakrishnan, Z. Rakamarić, "Unsafe Floating-point to Unsigned Integer Casting Check for GPU Programs", *Proceedings of the 8th International Workshop on Numerical Software Verification (NSV)*, Electronic Notes in Theoretical Computer Science, Elsevier, Vol. 317, 2015, pp 33–45. [Acceptance rate: unknown; Pages: 12]

J. Protze, *S. Atzeni*, D. H. Ahn, M. Schulz, G. Gopalakrishnan, M. S. Müller, I. Laguna, Z. Rakamarić, G. L. Lee, "Towards Providing Low-Overhead Data Race Detection for Large OpenMP Applications", *Proceedings of the LLVM Compiler Infrastructure in HPC Workshop (LLVM-HPC)*, IEEE, 2014, pp 40–47. [Acceptance rate: $5/6 = 83\%$; Pages: 8]

D. C. B. de Oliveira, Z. Rakamarić, G. Gopalakrishnan, A. Humphrey, Q. Meng, M. Berzins, "Systematic Debugging of Concurrent Systems Using Coalesced Stack Trace Graphs", *Proceedings of the 27th International Workshop on Languages and Compilers for Parallel Computing (LCPC)*, Lecture Notes in Computer Science, Springer, Vol. 8967, 2014, pp 317–331. [Acceptance rate: $25/39 = 64\%$; Pages: 15]

M. Dimjašević, D. Giannakopoulou, F. Howar, M. Isberner, Z. Rakamarić, V. Raman, "The Dart, the Psyco, and the Doop: Concolic Execution in Java PathFinder and its Applications", *Proceedings of the 2014 Java Pathfinder Workshop (JPF)*, *ACM SIGSOFT Software Engineering Notes*, 40(1), ACM, Jan 2015, pp 1–5. [Acceptance rate: $10/11 = 91\%$; Pages: 5]

V. C. Sharma, Z. Rakamarić, G. Gopalakrishnan, "FUSED: A Low-cost Online Soft-Error Detector", *10th IEEE Workshop on Silicon Errors in Logic—System Effects (SELSE)*, 2014. Poster paper. [Acceptance rate: unknown; Pages: 5]

D. H. Ahn, G. L. Lee, G. Gopalakrishnan, Z. Rakamarić, M. Schulz, I. Laguna, "Overcoming Extreme-Scale Reproducibility Challenges Through a Unified, Targeted, and Multilevel Toolset", *Proceedings of the 1st International Workshop on Software Engineering for High Performance Computing in Computational Science and Engineering (SE-HPCCSE)*, ACM, 2013, pp 41–44. [Acceptance rate: $7/12 = 58\%$; Pages: 4]

D. C. B. de Oliveira, Z. Rakamarić, G. Gopalakrishnan, A. Humphrey, Q. Meng, M. Berzins, "Practical Formal Correctness Checking of Million-core Problem Solving Environments for HPC", *Proceedings of the 5th International Workshop on Software Engineering for Computational Science and Engineering (SE-CSE)*, ACM, 2013, pp 75–83. [Acceptance rate: $10/15 = 67\%$; Pages: 9]

W. Chiang, G. Gopalakrishnan, Z. Rakamarić, D. H. Ahn, G. L. Lee, "Determinism and Reproducibility in Large-Scale HPC Systems", *Informal Proceedings of the 4th Workshop on Determinism*

and Correctness in Parallel Programming (WoDet), 2013. [Acceptance rate: unknown; Pages: 7]

N. Ghafari, A. J. Hu, Z. Rakamarić, "Context-Bounded Translations for Concurrent Software: An Empirical Evaluation", *Proceedings of the 17th International SPIN Workshop on Model Checking Software (SPIN)*, Lecture Notes in Computer Science, Springer, Vol. 6349, 2010, pp 227–244. [Acceptance rate: $13/29 = 45\%$; Pages: 18]

Other Peer-Reviewed Publications [2]

K. Sato, I. Laguna, G. L. Lee, M. Schulz, C. M. Chambreau, D. H. Ahn, S. Atzeni, M. Bentley, G. Gopalakrishnan, Z. Rakamarić, G. Sawaya, J. Protze, "PRUNERS: Providing Reproducibility for Uncovering Non-Deterministic Errors in Runs on Supercomputers", *Computational Reproducibility at Exascale Workshop (CRE)*, 2017. Extended abstract. [Acceptance rate: unknown; Pages: 2]

S. He, S. Lahiri, A. Lal, Z. Rakamarić, "Static Assertion Checking of Production Software with Angelic Verification", *8th Workshop on Tools for Automatic Program Analysis (TAPAS)*, 2017. Extended abstract. [Acceptance rate: unknown; Pages: 2]

C. Zhou, K. Luckow, F. Howar, Z. Rakamarić, "Visualization Support for JDart", *Java Pathfinder Workshop (JPF)*, 2016. Extended abstract. [Acceptance rate: $2/2 = 100\%$; Pages: 2]

M. Carter, S. He, J. Whitaker, Z. Rakamarić, M. Emmi, "SMACK Software Verification Toolchain", *Proceedings of the 38th IEEE/ACM International Conference on Software Engineering (ICSE) Companion*, ACM, 2016, pp 589–592. Demonstrations Track. [Acceptance rate: $18/56 = 32\%$; Pages: 4]

A. Haran, M. Carter, M. Emmi, A. Lal, S. Qadeer, Z. Rakamarić, "SMACK+Corral: A Modular Verifier", *Proceedings of the 21st International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, Lecture Notes in Computer Science, Springer, Vol. 9035, 2015, pp 450–453. Competition contribution. [Acceptance rate: $15/19 = 79\%$; Pages: 4]

M. Dimjašević, Z. Rakamarić, "JPF-Doop: Combining Concolic and Random Testing for Java", *Java Pathfinder Workshop (JPF)*, 2013. Extended abstract. [Acceptance rate: unknown; Pages: 4]

Z. Rakamarić, "STORM: Static Unit Checking of Concurrent Programs", *Proceedings of the 32nd ACM/IEEE International Conference on Software Engineering (ICSE)*, ACM, Vol. 2, 2010, pp 519–520. ACM Student Research Competition. [Acceptance rate: unknown; Pages: 2]
Silver Medal Winner in the Competition.

Z. Rakamarić, R. Bruttomesso, A. J. Hu, A. Cimatti, "Deciding Unbounded Heaps in an SMT Framework", *Proceedings of the 5th International Workshop on Satisfiability Modulo Theories (SMT)*, 2007, page 60. Presentation-only paper. [Acceptance rate: unknown; Pages: 1]

Theses

Z. Rakamarić, "Modular Verification of Shared-Memory Concurrent System Software", *Ph.D. Thesis*, Department of Computer Science, The University of British Columbia, Mar 2011.

Z. Rakamarić, "A Logic and Decision Procedure for Verification of Heap-Manipulating Programs", *M.Sc. Thesis*, Department of Computer Science, The University of British Columbia, Aug 2006.

Technical Reports [2]

M. Dabaghchian, Z. Rakamarić, B. K. Ozkan, E. Mutlu, S. Tasiran, "Consistency-Aware Scheduling for Weakly Consistent Programs", *School of Computing, University of Utah, Tech Report UUCS-17-002*, Nov 2017.

S. He, S. Lahiri, Z. Rakamarić, "Verifying Relative Safety, Accuracy, and Termination for Program Approximations", *Microsoft Research Tech Report*, Apr 2016.

M. Dimjašević, S. Atzeni, I. Ugrina, Z. Rakamarić, "Android Malware Detection Based on System

Calls", *School of Computing, University of Utah, Tech Report UUCS-15-003*, May 2015.

A. Solovyev, C. Jacobsen, Z. Rakamarić, G. Gopalakrishnan, "Rigorous Estimation of Floating-Point Round-off Errors with Symbolic Taylor Expansions", *School of Computing, University of Utah, Tech Report UUCS-15-001*, Apr 2015.

D. Babić, Z. Rakamarić, "Asynchronously Communicating Visibly Pushdown Systems", *EECS Department, University of California, Berkeley Tech Report UCB/EECS-2011-108*, Oct 2011.

M. Emmi, S. Qadeer, Z. Rakamarić, "Delay-Bounded Scheduling: A Canonical Characterization of Scheduler Nondeterminism", *Microsoft Research Tech Report MSR-TR-2010-123*, Sep 2010.

S. Chatterjee, S. Lahiri, S. Qadeer, Z. Rakamarić, "A Reachability Predicate for Analyzing Low-Level Software", *Microsoft Research Tech Report MSR-TR-2006-154*, Nov 2006.

Z. Rakamarić, J. Bingham, A. J. Hu, "A Better Logic and Decision Procedure for Predicate Abstraction of Heap-Manipulating Programs", *UBC Department of Computer Science Tech Report TR-2006-02*, Jan 2006.

J. Bingham, Z. Rakamarić, "A Logic and Decision Procedure for Predicate Abstraction of Heap-Manipulating Programs", *UBC Department of Computer Science Tech Report TR-2005-19*, Sep 2005.

Books and Reports

E. Darulova, A. F. Donaldson, Z. Rakamarić, C. Rubio-González, "Analysis and Synthesis of Floating-point Programs (Dagstuhl Seminar 17352)", *Dagstuhl Reports*, 7(8), Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, 2018, pp 74–101.

D. Babić, Z. Rakamarić, J. Lorincz, "Guidebook for Graduate Studies Abroad" (in Croatian), 2nd edition, P.O.I.N.T., ISBN: 978-953-99805-3-3, Croatia, 2012.

D. Babić, Z. Rakamarić, "Guidebook for Graduate Studies Abroad" (in Croatian), P.O.I.N.T., ISBN: 978-953-99805-1-9, Croatia, 2007.

Invited Talks

"SMACK Software Verification Toolchain", Amazon, virtual, Nov 18, 2020

"Analysis and Synthesis of Floating-point Routines", Workshop on Dependable and Secure Software Systems, ETH, Zurich, Switzerland, Oct 19, 2019

"Data Race Detection for Industry-Scale OpenMP Applications", Vienna University of Technology (TU Wien), Vienna, Austria, Jan 22, 2019

"Analysis and Synthesis of Floating-point Routines", Imperial College London, London, UK, Nov 27, 2018

"Analysis and Synthesis of Floating-point Routines", Vienna University of Technology (TU Wien), Vienna, Austria, Nov 6, 2018

"Formal Verification (Expert Panel)", Panelist, MathWorks Research Summit, Newton, MA, USA, Jun 2, 2018

"Data Race Detection for Industry-Scale OpenMP Applications", Workshop on Verification of Distributed Systems (VDS), Essaouira, Morocco, May 7, 2018

"Analysis and Synthesis of Floating-point Routines", University of Waterloo, Waterloo, ON, Canada, Sep 29, 2017

"Utah Floating-point Toolset", *Analysis and Synthesis of Floating-point Programs*, Schloss Dagstuhl Seminar (by-invitation-only international seminar), Wadern, Germany, Aug 29, 2017

"SMACK Software Verification Toolchain", Vienna University of Technology (TU Wien), Vienna,

Austria, Jun 7, 2017

"Analysis and Synthesis of Floating-point Routines", Institute of Science and Technology (IST) Austria, Klosterneuburg, Austria, Jun 6, 2017

"SMACK Software Verification Toolchain", University of British Columbia, Vancouver, BC, Canada, May 8, 2017

"Software Verification Competitions", JASON Defense Advisory Group study on industrial-scale formal methods, La Jolla, CA, USA, Jan 17, 2017

"SMACK Software Verification Toolchain", NASA Ames Research Center, CA, USA, Nov 2, 2016

"SMACK Software Verification Toolchain", University of California, Irvine, CA, USA, Sep 23, 2016

"Decomposing Commodity Kernels for Verification", DARPA Transparent Computing PI Meeting, Cambridge, MA, USA, Jul 28, 2016

"Formal Methods for High-Performance Computing: Finding Data Races in Large OpenMP Applications", International Workshop on Exploiting Concurrency Efficiently and Correctly (EC2), Toronto, Canada, Jul 18, 2016

"Analysis and Synthesis of Floating-point Routines", MathWorks Research Summit, Newton, MA, USA, Jun 4, 2016

"Android Malware Detection", Ruđer Bošković Institute, Zagreb, Croatia, May 3, 2016

"Automated SMT-Based Verification for Reasoning About Approximations", Microsoft Research, Redmond, WA, USA, Oct 14, 2015

"SMACK: Decoupling Source Language Details from Verifier Implementations", New York University (NYU), New York, NY, USA, Sep 24, 2014

"SMACK: Decoupling Source Language Details from Verifier Implementations", Yale University, New Haven, CT, USA, Sep 23, 2014

"SMACK: Decoupling Source Language Details from Verifier Implementations", University of Texas at Austin, Austin, TX, USA, Sep 9, 2014

"Efficient Estimation of Floating-point Errors", University of Delaware, Newark, DE, USA, May 13, 2014

"Formal Analysis of GPU Programs with Atomics via Conflict-Directed Delay-Bounding", *Correct and Efficient Accelerator Programming*, Schloss Dagstuhl Seminar (by-invitation-only international seminar), Wadern, Germany, Apr 3, 2013

"Learning Symbolic Interfaces of Software Components", Brigham Young University, Provo, UT, USA, Mar 21, 2013

"Learning Symbolic Interfaces of Software Components", University of British Columbia, Vancouver, BC, Canada, Mar 13, 2013

"SMT at Utah", *Z3 Special Interest Group Meeting*, Microsoft Research, Redmond, WA, USA, Oct 22, 2012

"Static and Precise Detection of Concurrency Errors in Systems Code Using SMT Solvers", Institute of Science and Technology (IST) Austria, Klosterneuburg, Austria, Oct 20, 2009

"Static and Precise Detection of Concurrency Errors in Systems Code Using SMT Solvers", *Interaction versus Automation: The Two Faces of Deduction*, Schloss Dagstuhl Seminar (by-invitation-

only international seminar), Wadern, Germany, Oct 9, 2009

"Static and Precise Detection of Concurrency Errors in Systems Code Using SMT Solvers", Intel, Hillsboro, OR, USA, Aug 5, 2009

"Static and Precise Detection of Concurrency Errors in Systems Code Using SMT Solvers", Verimag, Grenoble, France, Jun 25, 2009

"Automatizing Modular Software Verification Using Static Analysis", Faculty of Electrical Engineering and Computing, University of Zagreb, Zagreb, Croatia, Oct 2, 2008

Conference and Workshop Talks

"Analysis and Synthesis of Floating-point Routines", LASER Summer School on Software Engineering, Elba Island, Italy, Jun 4, 2019

"SMACK Software Verification Toolchain", LLVM Developers' Meeting, San Jose, CA, USA, Nov 3, 2016

"SMACK Software Verification Toolchain", ICSE, Austin, TX, USA, May 18, 2016

"Towards Automated Differential Program Verification for Approximate Computing", WAX, Portland, OR, USA, Jun 13, 2015

"SMACK: Decoupling Source Language Details from Verifier Implementations", CAV, Vienna, Austria, Jul 19, 2014

"Practical Formal Correctness Checking of Million-core Problem Solving Environments for HPC", SE-CSE, San Francisco, CA, USA, May 18, 2013

"Context-Bounded Translations for Concurrent Software: An Empirical Evaluation", SPIN, Enschede, The Netherlands, Sep 29, 2010

"STORM: Static Unit Checking of Concurrent Programs", ICSE, Cape Town, South Africa, May 6, 2010

"Static and Precise Detection of Concurrency Errors in Systems Code Using SMT Solvers", CAV, Grenoble, France, Jun 29, 2009

"A Scalable Memory Model for Low-Level Code", VMCAI, Savannah, GA, USA, Jan 20, 2009

"Automatic Inference of Frame Axioms Using Static Analysis", ASE, L'Aquila, Italy, Sep 17, 2008

"Verifying Heap-Manipulating Programs in an SMT Framework", ATVA, Tokyo, Japan, Oct 25, 2007

"Deciding Unbounded Heaps in an SMT Framework", SMT, Berlin, Germany, Jul 1, 2007

"A Reachability Predicate for Analyzing Low-Level Software", TACAS, Braga, Portugal, Mar 24, 2007

"An Inference-Rule-Based Decision Procedure for Verification of Heap-Manipulating Programs with Mutable Data and Cyclic Data Structures", VMCAI, Nice, France, Jan 14, 2007

Software

Sword: Lightweight Bounded-Memory-Overhead OpenMP Data Race Detector
`https://github.com/PRUNERS/sword`

FPTaylor: Tool for Rigorous Estimation of Round-Off Floating-Point Errors
`https://github.com/soarlab/FPTaylor`

FPTuner: Rigorous Floating-Point Mixed-Precision Tuner
`https://github.com/soarlab/FPTuner`

Gelpia: Rigorous Global Branch-and-Bound Optimizer

https://github.com/soarlab/gelpia

S3FP: Guided Random Testing for Floating-Point Error Estimation
https://github.com/soarlab/S3FP

JDoop: Automatic Testing Tool for Java Software
https://github.com/psycopaths/jdoop

JDart: Dynamic Symbolic Analysis Tool for Java
https://github.com/psycopaths/jdart
Used to automatically test NASA's flight control system called AutoResolver.

Archer: Data Race Detection Tool for Large OpenMP Applications
https://github.com/PRUNER/archer
Used by developers at LLNL to find data races in real-world high performance computing applications. Featured in LLNL research highlights. Part of the PRUNERS software project that has been named a finalist in the 2017 R&D 100 Awards.

maline: Android Malware Detection Framework
https://github.com/soarlab/maline

SMACKd: Eclipse Plugin for Debugging with SMACK
http://github.com/smackers/smackd

SMACK: Software Verifier and Verification Toolchain
http://github.com/smackers/smack [Starred: 211; Forked: 47]
Contributions from University of Utah, IMDEA Software Institute, Microsoft Research, SRI International, and Imperial College London. Used in both research and teaching at other institutions; also, used by industry to find bugs in proprietary software.

KULFI: LLVM Instruction Level Fault Injector
http://github.com/soarlab/KULFI

STORM: Tool for Detecting Concurrency Errors in System Software

STRACLOS: Decision Procedure for a Transitive Closure Logic

Internal Service

Committees:

- Member, graduate admissions committee, 2017–2018
- Member, gemstone recruiting committee, 2017–2018
- Member, undergraduate studies committee, 2017–2018
- Member, security recruiting committee, 2016–2017
- Member, graduate admissions committee, 2016–2017
- Member, lecturing faculty recruiting committee, 2015–2016
- Member, architecture recruiting committee, 2015–2016
- Member, human-computer interaction (HCI) recruiting committee, 2014–2015
- Chair, undergraduate studies committee, 2014–2017
- Member, security recruiting committee, 2013–2014
- Member, graduate admissions committee, 2013–2014
- Member, graduate admissions committee, 2012–2013
- Member, graduate admissions committee, 2011–2012

Other:

- Director of Graduate Studies, 2020–2021
- Organizing Tech Talks lecture series in collaboration with Salt Lake City Public Library, 2017–2018
- ACM Student Chapter faculty sponsor, 2014–2016
- Department colloquium chair (bootstrapped graduate bootcamp lecture series), 2013–2015

Professional Service

Program committees and organization:

- Member, NASA Formal Methods Symposium (NFM), 2021
- Member, Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE), 2020
- Workshop Chair, International Conference on Computer Aided Verification (CAV), 2020
- Member, European Symposium on Programming (ESOP), 2020
- Chair, Workshop on Democratizing Software Verification (DSV), 2019
- Publicity Chair, International Conference on Computer Aided Verification (CAV), 2019
- Member, International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC), 2019
- Member, International Competition on Software Verification (SV-COMP), 2019
- Member, International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2018
- Member, ACM SIGPLAN Symposium on Principles of Programming Languages (POPL), 2018
- Member (external review committee), ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI), 2017
- Member, International Conference on Computer Aided Verification (CAV), 2017
- Member, NASA Formal Methods Symposium (NFM), 2017
- Member, International Competition on Software Verification (SV-COMP), 2017
- Member (external review committee), International Conference on Computer Aided Verification (CAV), 2016
- Member (poster track), International Conference on Software Engineering (ICSE), 2016
- Member, International Competition on Software Verification (SV-COMP), 2016
- Member, Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE), 2015
- Chair, International Workshop on Exploiting Concurrency Efficiently and Correctly (EC2), 2015
- Member, International Conference on Computer Aided Verification (CAV), 2015
- Member, International Competition on Software Verification (SV-COMP), 2015
- Publications Chair, ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP), 2015
- Chair, Java Pathfinder Workshop (JPF), 2014
- Member, International Conference on Runtime Verification (RV), 2014
- Member, International SPIN Symposium on Model Checking of Software (SPIN), 2014
- Member, Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE), 2014
- Member, International Workshop on Exploiting Concurrency Efficiently and Correctly (EC2), 2014
- Member (external review committee), ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP), 2014
- Member, AAAI Symposium on Formal Verification in Human-Machine Systems (FVHMS), 2014
- Member, International Conference on Reconfigurable Computing and FPGAs (ReConFig), 2013
- Chair, International Workshop on Exploiting Concurrency Efficiently and Correctly (EC2), 2013
- Member, International Workshop on Satisfiability Modulo Theories (SMT), 2013
- Member, Asian Symposium on Programming Languages and Systems (APLAS), 2012
- Member, Java Pathfinder Workshop (JPF), 2012
- Member, International Conference on Computer Aided Verification (CAV), 2012
- Chair, International Workshop on Intermediate Verification Languages (BOOGIE), 2012

Panels:

- National Science Foundation (NSF), 2017

- National Science Foundation (NSF), 2016
- National Science Foundation (NSF), 2015
- National Science Foundation (NSF), 2013
- National Science Foundation (NSF), 2012

Reviewer for journals:

- ACM Transactions on Programming Languages and Systems (TOPLAS), 2021
- Journal of Computing and Information Technology (CIT), 2017
- ACM Transactions on Programming Languages and Systems (TOPLAS), 2015
- Journal of Zhejiang University Science C (Computers & Electronics), 2014
- Acta Informatica, 2014
- Formal Methods in System Design (FMSD), 2013
- IEEE Transactions on Software Engineering (TSE), 2012
- Formal Methods in System Design (FMSD), 2011
- ACM Transactions on Programming Languages and Systems (TOPLAS), 2009

Reviewer for conferences:

- International Conference on Formal Methods and Models for System Design (MEMOCODE), 2019
- International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI), 2017
- International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2016
- International Conference on Automated Software Engineering (ASE), 2013
- International Conference on Software Engineering (ICSE), 2013
- International Conference on Fundamental Approaches to Software Engineering (FASE), 2012
- International Conference on Formal Methods in Computer-Aided Design (FMCAD), 2011
- International Conference on Computer Aided Verification (CAV), 2010
- International Conference on Fundamental Approaches to Software Engineering (FASE), 2010
- International Conference on Computer Aided Verification (CAV), 2009
- International Symposium on Automated Technology for Verification and Analysis (ATVA), 2008
- International Conference on Computer Aided Verification (CAV), 2008
- Design, Automation and Test in Europe Conference and Exposition (DATE), 2008
- International Haifa Verification Conference (HVC), 2007
- International Symposium on Automated Technology for Verification and Analysis (ATVA), 2007
- International Conference on Computer Aided Verification (CAV), 2007
- Heap Analysis and Verification Workshop (HAV), 2007
- International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2007
- Workshop on Pragmatics of Decision Procedures in Automated Reasoning (PDPAR), 2006
- Design Automation Conference (DAC), 2006
- Design, Automation and Test in Europe Conference and Exposition (DATE), 2006

Other:

- External PhD thesis reviewer for Yulia Demyanova, Vienna University of Technology (TU Wien), 2018
- Organizer, Schloss Dagstuhl Seminar "Analysis and Synthesis of Floating-point Programs", 2017
- Mentor, Google Summer of Code mentor, 2016
- Mentor, Google Summer of Code mentor, 2013
- Mentor, Google Summer of Code mentor, 2012

INVITATION-ONLY EVENTS	MathWorks Research Summit, 2018, Newton, MA, USA
	Microsoft Research Faculty Summit, 2016, Redmond, WA, USA
	MathWorks Research Summit, 2016, Newton, MA, USA
	Schloss Dagstuhl Seminar "Machine Learning for Dynamic Software Analysis", 2016, Wadern, Germany
	Schloss Dagstuhl Seminar "Correct and Efficient Accelerator Programming", 2013, Wadern, Germany
	Microsoft Research Faculty Summit, 2012, Redmond, WA, USA
	Schloss Dagstuhl Seminar "Decision Procedures in Software, Hardware and Bioware", 2010, Wadern, Germany[3]
	Schloss Dagstuhl Seminar "Interaction versus Automation: The Two Faces of Deduction", 2009, Wadern, Germany
MEDIA COVERAGE	Paper "System Programming in Rust: Beyond Safety" featured in The Morning Paper and Hacker News, June 2017
	""Pruning" Sources of Nondeterminism in Large-Scale Applications", News Highlights in LLNL Computation's Bits and Bytes, June 2015
	"Supercomputing Tools Speed Simulations", Research Highlights in LLNL Science and Technology Review (S&TR), July 2014

[3] Could not attend because volcanic ash from Iceland brought air traffic to a halt in Europe.