CURRICULUM VITAE

CHRISTOPH M. KIRSCH

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RESEARCH INTERESTS

Principled design and implementation of programming languages and runtime systems

Server, quantum, embedded, real-time, and mobile systems

Symbolic reasoning, memory management, concurrency, virtualization

EDUCATION

October 1999	Dr.-Ing., Saarland University While at the Max Planck Institute for Computer Science Saarbrücken, Germany (Advisor: Prof. Harald Ganzinger)
March 1996	Dipl.-Inform., Saarland University While at the Max Planck Institute for Computer Science Saarbrücken, Germany (Advisor: Prof. Hans-Jürgen Ohlbach)

ACADEMIC EMPLOYMENT

Since October 2022	Chair, Programming Research Laboratory Faculty of Information Technology Czech Technical University, Prague, Czech Republic
Since January 2022	Chair, Dept. of Computer Science, University of Salzburg, Salzburg, Austria
Since April 2004	Full Professor and Chair, Computational Systems Group Department of Computer Science University of Salzburg, Salzburg, Austria
August 2014—December 2014	Visiting Professor (Host: Prof. Raja Sengupta) Department of Civil and Environmental Engineering University of California at Berkeley, Berkeley, California, USA
September 2008—August 2013	Visiting Scholar (Sponsor: Prof. Raja Sengupta) Department of Civil and Environmental Engineering University of California at Berkeley, Berkeley, California, USA
May 2003—March 2004	Assistant Research Engineer (Sponsor: Prof. Thomas Henzinger) Department of Electrical Engineering and Computer Sciences University of California at Berkeley, Berkeley, California, USA
November 1999—April 2003	Postdoctoral Researcher (Sponsor: Prof. Thomas Henzinger) Department of Electrical Engineering and Computer Sciences University of California at Berkeley, Berkeley, California, USA
March 1996—October 1999	Research Assistant (Sponsor: Prof. Harald Ganzinger) Max Planck Institute for Computer Science, Saarbrücken, Germany

PUBLICATIONS

CONFERENCE AND WORKSHOP PAPERS

[1] T. Hütter et al. "JEDI: These aren't the JSON documents you're looking for..." In: *Proc. International Conference on Management of Data (SIGMOD)*. ACM, 2022. Click here for PDF file.

[2] A. Goel et al. "What We Eval in the Shadows: A Large-Scale Study of Eval in R Programs". In: *Proc. ACM SIGPLAN Conference on Systems, Programming, Languages, and Applications: Software for Humanity (OOPSLA)*. ACM, 2021. Click here for PDF file.

[3] A.S. Abyaneh and C.M. Kirsch. "ASE: A Value Set Decision Procedure for Symbolic Execution". In: *Proc. IEEE/ACM International Conference on Automated Software Engineering (ASE)*. IEEE/ACM, 2021. Click here for PDF file.

[4] A.S. Abyaneh et al. "Selfie: Towards Minimal Symbolic Execution". In: *Online Proc. Workshop on Modern Language Runtimes, Ecosystems, and VMs (MoreVMs)*. 2018. Click here for PDF file.

[5] P. Donat-Bouillud and C.M. Kirsch. "Work in Progress: Adaptive Scheduling with Approximate Computing of Audio Graphs". In: *Proc. IEEE Real-Time Systems Symposium (RTSS)*. 2017. Click here for PDF file.

[6] C.M. Kirsch. "Selfie and the Basics". In: *Proc. ACM SIGPLAN International Symposium on New Ideas, New Paradigms, and Reflections on Programming and Software (Onward!)* ACM, 2017. Click here for PDF file.

[7] A. Haas et al. "Local Linearizability for Concurrent Container-Type Data Structures". In: *Proc. International Conference on Concurrency Theory (CONCUR)*. Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, 2016, 6:1–6:15. DOI: 10.4230/LIPIcs.CONCUR.2016.6. Click here for PDF file.

[8] M. Aigner et al. "Fast, Multicore-Scalable, Low-Fragmentation Memory Allocation through Large Virtual Memory and Global Data Structures". In: *Proc. ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*. ACM, 2015. Click here for PDF file.

[9] E. Pereira et al. "A Runtime System for Logical-Space Programming". In: *Proc. Workshop on the Swarm at the Edge of the Cloud (SWEC)*. 2015. Click here for PDF file.

[10] M. Dodds, A. Haas, and C.M. Kirsch. "A Scalable, Correct Time-Stamped Stack". In: *Proc. Symposium on Principles of Programming Languages (POPL)*. ACM, 2015. Click here for PDF file.

[11] M. Aigner et al. "ACDC-JS: Explorative Benchmarking of JavaScript Memory Management". In: *Proc. Dynamic Languages Symposium (DLS)*. ACM, 2014. Click here for PDF file.

[12] C. Krainer and C.M. Kirsch. "Cyber-Physical Cloud Computing Implemented as PaaS". In: *Proc. Workshop on Design, Modeling, and Evaluation of Cyber-Physical Systems (CyPhy)*. ACM, 2014. Click here for PDF file.

[13] C.M. Kirsch, M. Lippautz, and H. Payer. "Fast and Scalable, Lock-free k-FIFO Queues". In: *Proc. International Conference on Parallel Computing Technologies (PaCT)*. LNCS. Springer, 2013. Click here for PDF file.

[14] M. Aigner et al. "Analysis of Portfolio-Style Parallel SAT Solving on Current Multi-Core Architectures". In: *Proc. Workshop on Pragmatics of SAT (PoS)*. EPiC. EasyChair, 2013. Click here for PDF file.

[15] M. Aigner and C.M. Kirsch. "ACDC: Towards a Universal Mutator for Benchmarking Heap Management Systems". In: *Proc. International Symposium on Memory Management (ISMM)*. ACM, 2013. Click here for PDF file.

[16] E. Pereira et al. "Modeling and Controlling the Structure of Heterogeneous Mobile Robotic Systems: A BigActor Approach". In: *International Systems Conference (SysCon)*. IEEE, 2013. Click here for PDF file.

[17] E. Pereira et al. "BigActors - A Model for Structure-aware Computation". In: *Proc. International Conference on Cyber-Physical Systems (ICCPS)*. ACM, 2013. Click here for PDF file.

[18] T.A. Henzinger et al. "Quantitative Relaxation of Concurrent Data Structures". In: *Proc. Symposium on Principles of Programming Languages (POPL)*. ACM, 2013. Click here for PDF file.

[19] S.S. Craciunas and C.M. Kirsch. "The Power of Isolation". In: *Proc. International Conference on Embedded and Ubiquitous Computing (EUC)*. IEEE, 2012. Click here for PDF file.

[20] A. Haas et al. “How FIFO is Your Concurrent FIFO Queue?” In: *Proc. OOPSLA Workshop on Relaxing Synchronization for Multicore and Manycore Scalability (RACES)*. 2012. Click here for PDF file.

[21] C.M. Kirsch et al. “Performance, Scalability, and Semantics of Concurrent FIFO Queues”. In: *Proc. International Conference on Algorithms and Architectures for Parallel Processing (ICA3PP)*. LNCS. Springer, 2012. Click here for PDF file.

[22] C.M. Kirsch and H. Payer. “Incorrect Systems: It’s not the Problem, It’s the Solution”. In: *Proc. Design Automation Conference (DAC)*. ACM, 2012. Click here for PDF file.

[23] C.M. Kirsch et al. “Cyber-Physical Cloud Computing: The Binding and Migration Problem”. In: *Proc. International Conference on Design, Automation and Test in Europe (DATE)*. 2012. Click here for PDF file.

[24] C.M. Kirsch, H. Payer, and H. Röck. “Hierarchical PLABs, CLABs, TLABs in Hotspot”. In: *Proc. International Conference on Systems (ICONS)*. 2012. Click here for PDF file.

[25] H. Chen et al. “Cloud Computing on Wings: Applications to Air Quality”. In: *Proc. American Astronautical Society Guidance and Control Conference (AASGNC)*. AAS, 2012. Click here for PDF file.

[26] C.M. Kirsch et al. “Runtime Programming through Model-Preserving, Scalable Runtime Patches”. In: *Proc. International Conference on Application of Concurrency to System Design (ACSD)*. IEEE, 2011, pp. 77–86. Click here for PDF file.

[27] C.M. Kirsch et al. “Brief Announcement: Scalability versus Semantics of Concurrent FIFO Queues”. In: *Proc. Symposium on Principles of Distributed Computing (PODC)*. ACM, 2011, pp. 331–332. Click here for PDF file.

[28] M. Aigner et al. “Short-term Memory for Self-collecting Mutators”. In: *Proc. International Symposium on Memory Management (ISMM)*. ACM, 2011. Click here for PDF file.

[29] C.M. Kirsch et al. “Runtime Programming through Model-Preserving, Scalable Runtime Patches”. In: *Proc. International Workshop on Formal Aspects of Component Software (FACS), Doctoral Track*. Vol. 6921. LNCS. Springer, 2010, pp. 290–294. Click here for PDF file.

[30] S.S. Craciunas, C.M. Kirsch, and A. Sokolova. “Power-aware Temporal Isolation with Variable-Bandwidth Servers”. In: *Proc. International Conference on Embedded Software (EMSOFT)*. ACM, 2010. Click here for PDF file.

[31] S.S. Craciunas et al. “Information-Acquisition-as-a-Service for Cyber-Physical Cloud Computing”. In: *Proc. Workshop on Hot Topics in Cloud Computing (HotCloud)*. USENIX, 2010. Click here for PDF file.

[32] S.S. Craciunas, C.M. Kirsch, and A. Sokolova. “Response Time versus Utilization in Scheduler Overhead Accounting”. In: *Proc. Real-Time and Embedded Technology and Applications Symposium (RTAS)*. IEEE, 2010. Click here for PDF file.

[33] T.A. Henzinger et al. “Distributed, Modular HTL”. In: *Proc. Real-Time Systems Symposium (RTSS)*. IEEE, 2009. Click here for PDF file.

[34] S.S. Craciunas, C.M. Kirsch, and A. Sokolova. “A Workload-oriented Programming Model for Temporal Isolation with VBS”. In: *Online Proc. Workshop on Reconciling Performance with Predictability (RePP)*. 2009. Click here for PDF file.

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[37] K. Hedrick et al. “CSL: A Language to Specify and Re-Specify Mobile Sensor Network Behaviors”. In: *Proc. Real-Time and Embedded Technology and Applications Symposium (RTAS)*. IEEE, 2009. Click here for PDF file.

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[42] C.M. Kirsch, L. Lopes, and E.R.B. Marques. “Semantics-Preserving and Incremental Runtime Patching of Real-Time Programs”. In: *Proc. Workshop on Adaptive and Reconfigurable Embedded Systems (APRES)*. 2008. Click here for PDF file.

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[44] C.M. Kirsch and R. Wilhelm. “Grand Challenges in Embedded Software”. In: *Proc. International Conference on Embedded Software (EMSOFT)*. ACM, 2007, pp. 2–6.

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[46] J. Auerbach et al. “Java Takes Flight: Time-portable Real-time Programming with Exotasks”. In: *Proc. ACM SIGPLAN/SIGBED Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES)*. ACM, 2007. Click here for PDF file.

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[48] C.M. Kirsch, M.A.A. Sanvido, and T.A. Henzinger. “A Programmable Microkernel for Real-Time Systems”. In: *Proc. ACM/USENIX Conference on Virtual Execution Environments (VEE)*. ACM, 2005. Click here for PDF file.

[49] T.A. Henzinger, C.M. Kirsch, and S. Matic. “Composable Code Generation for Distributed Giotto”. In: *Proc. ACM SIGPLAN/SIGBED Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES)*. ACM, 2005. Click here for PDF file.

[50] C.M. Kirsch. “Threading by Appointment”. In: *Proc. Monterey Workshop*. CRC Press, 2004. Click here for PDF file.

[51] T.A. Henzinger and C.M. Kirsch. “A Typed Assembly Language for Real-Time Programs”. In: *Proc. International Conference on Embedded Software (EMSOFT)*. ACM, 2004, pp. 104–113. Click here for PDF file.

[52] A. Ghosal et al. “Event-driven Programming with Logical Execution Times”. In: *Proc. International Workshop on Hybrid Systems: Computation and Control (HSCC)*. Vol. 2993. LNCS. Springer, 2004, pp. 357–371. Click here for PDF file.

[53] T.A. Henzinger, C.M. Kirsch, and S. Matic. “Schedule-Carrying Code”. In: *Proc. International Conference on Embedded Software (EMSOFT)*. Vol. 2855. LNCS. Springer, 2003, pp. 241–256. Click here for PDF file.

[54] T.A. Henzinger and C.M. Kirsch. “The Embedded Machine: Predictable, Portable Real-Time Code”. In: *Proc. ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*. ACM, 2002, pp. 315–326. Click here for PDF file.

[55] T.A. Henzinger et al. “Time Safety Checking for Embedded Programs”. In: *Proc. International Workshop on Embedded Software (EMSOFT)*. Vol. 2491. LNCS. Springer, 2002, pp. 76–92. Click here for PDF file.

[56] C.M. Kirsch et al. “A Giotto-Based Helicopter Control System”. In: *Proc. International Workshop on Embedded Software (EMSOFT)*. Vol. 2491. LNCS. Springer, 2002, pp. 46–60. Click here for PDF file.

[57] T.A. Henzinger, B. Horowitz, and C.M. Kirsch. “Giotto: A Time-triggered Language for Embedded Programming”. In: *Proc. International Workshop on Embedded Software (EMSOFT)*. Vol. 2211. LNCS. Springer, 2001, pp. 166–184. Click here for PDF file.

[58] T.A. Henzinger, B. Horowitz, and C.M. Kirsch. “Embedded Control Systems Development with Giotto”. In: *Proc. ACM SIGPLAN Workshop on Languages, Compilers, and Tools for Embedded Systems (LCTES)*. ACM, 2001. Click here for PDF file.

[59] T.B. Brown et al. “A Reusable and Platform-Independent Framework for Distributed Control Systems”. In: *Proc. Digital Avionics Systems Conference (DASC)*. IEEE, 2001. Click here for PDF file.

[60] H. Ganzinger, C. Meyer, and M. Veanes. “The Two-Variable Guarded Fragment with Transitive Relations”. In: *Proc. Symposium on Logic in Computer Science (LICS)*. IEEE, 1999. Click here for PDF file.

[61] H. Ganzinger et al. “A Resolution-Based Decision Procedure for Extensions of K4”. In: *Proc. Workshop on Advances in Modal Logic (AiML)*. Vol. 2. Lecture Notes. CSLI Publications, Stanford, CA, 1998. Click here for PDF file.

[62] F. Jacquemard, C. Meyer, and C. Weidenbach. “Unification in Extensions of Shallow Equational Theories”. In: *Proc. International Conference on Rewriting Techniques and Applications (RTA)*. Vol. 1379. LNCS. Springer, 1998. Click here for PDF file.

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[64] P. Graf and C. Meyer. “Advanced Indexing Operations on Substitution Trees”. In: *Proc. International Conference on Automated Deduction (CADE)*. Vol. 1104. LNCS. Springer, 1996. Click here for PDF file.

JOURNAL PAPERS

[1] R. Ambros et al. “Two-Year Progress of Pilot Research Activities in Teaching Digital Thinking Project (TDT)”. In: *Zeitschrift für Hochschulentwicklung* 18 (2023). Ed. by Martin Ebner and Charlotte Zwiauer, pp. 117–136. DOI: 10.3217/zfhe-SH-HL/07. URL: https://zfhe.at/index.php/zfhe/article/view/1755. Click here for PDF file.

[2] J. Huang, C.M. Kirsch, and R. Sengupta. “Cloud Computing in Space”. In: *INFORMS Journal on Computing* 27.4 (2015), pp. 704–717. DOI: 10.1287/ijoc.2015.0652.

[3] S.S. Craciunas et al. “Temporal Isolation in Real-Time Systems: The VBS Approach”. In: *Software Tools for Technology Transfer (STTT)* 15.3 (2013), pp. 189–209. Click here for PDF file.

[4] A. Ghosal et al. “Separate Compilation of Hierarchical Real-Time Programs into Linear-bounded Embedded Machine Code”. In: *Science of Computer Programming* 77.2 (2012), pp. 96–112.

[5] J. Auerbach et al. “Low-Latency Time-portable Real-time Programming with Exotasks”. In: *ACM Transactions on Embedded Computing Systems (TECS)* 8.2 (Jan. 2009), pp. 1–48. Click here for PDF file.

[6] S.S. Craciunas, C.M. Kirsch, and H. Röck. “I/O Resource Management through System Call Scheduling”. In: *ACM Operating Systems Review (OSR), Special Issue on Research and Developments in the Linux Kernel* (July 2008). Click here for PDF file.

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[8] T.A. Henzinger, B. Horowitz, and C.M. Kirsch. “Giotto: A Time-triggered Language for Embedded Programming”. In: *Proceedings of the IEEE* 91.1 (Jan. 2003), pp. 84–99. Click here for PDF file.

[9] T.A. Henzinger et al. “From Control Models to Real-Time Code using Giotto”. In: *IEEE Control Systems Magazine (CSM)* 23.1 (Feb. 2003), pp. 50–64. Click here for PDF file.

INVITED PAPERS AND ABSTRACTS

[1] C.M. Kirsch. “On the Self in Selfie (Invited Talk)”. In: *Proc. ACM SIGPLAN International Workshop on Virtual Machines and Intermediate Languages (VMIL)*. ACM, 2018. Click here for PDF file.

[2] C.M. Kirsch. “From Logical Execution Time to Principled Systems Engineering”. In: *Dagstuhl Reports* 8.2 (2018). Ed. by Rolf Ernst et al., p. 133. ISSN: 2192-5283. DOI: 10.4230/DagRep.8.2.122. URL: http://drops.dagstuhl.de/opus/volltexte/2018/9293. Click here for PDF file.

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[4] A. Haas et al. “Scal: A Benchmarking Suite for Concurrent Data Structures”. In: *Proc. International Conference on Networked Systems (NETYS)*. LNCS. Springer, 2015. Click here for PDF file.

[5] A. Haas et al. “Distributed Queues in Shared Memory—Multicore Performance and Scalability through Quantitative Relaxation”. In: *Proc. International Conference on Computing Frontiers*. ACM, 2013. Click here for PDF file.

[6] D.F. Bacon et al. “High-Level Real-Time Programming in Java”. In: *Proc. International Conference on Embedded Software (EMSOFT)*. ACM, 2005. Click here for PDF file.

[7] C.M. Kirsch. “Principles of Real-Time Programming”. In: *Proc. International Workshop on Embedded Software (EMSOFT)*. Vol. 2491. LNCS. Springer, 2002, pp. 61–75. Click here for PDF file.

PROCEEDINGS AND SPECIAL ISSUES

[1] Christoph M. Kirsch and Ben L. Titzer, eds. *Proc. ACM SIGPLAN International Symposium on Memory Management (ISMM)*. Barcelona, Spain: ACM, 2017.

[2] “Introduction to Special Section on Probabilistic Embedded Computing”. In: *ACM Trans. Embed. Comput. Syst.* 12.2s (May 2013). Ed. by C.M. Kirsch and V. Mooney, 86:1–86:2. ISSN: 1539-9087. DOI: 10.1145/2465787.2465788. URL: http://doi.acm.org/10.1145/2465787.2465788. Click here for PDF file.

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[5] Christoph M. Kirsch and Reinhard Wilhelm, eds. *ACM & IEEE International Conference on Embedded Software, EMSOFT 2007, Salzburg, Austria, September 30 - October, 3, 2007, Proceedings*. New York, NY, USA: ACM, 2007.

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BOOK CHAPTERS

[1] C.M. Kirsch and A. Sokolova. “The Logical Execution Time Paradigm”. In: *Advances in Real-Time Systems*. 2012, pp. 103–120.

[2] “Handbook of Real-Time and Embedded Systems”. In: ed. by I. Lee, J. Leung, and S.H. Son. CRC Press, 2007. Chap. The Evolution of Real-Time Programming.

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SYSTEM PAPERS

[1] R. Alur et al. “jMocha: A Model Checking Tool that Exploits Design Structure”. In: *Proc. International Conference on Software Engineering (ICSE)*. 2001. Click here for PDF file.

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SHORT TALKS AND POSTERS

[1] M. Dodds, A. Haas, and C.M. Kirsch. *Fairness vs. Linearizability in a Concurrent FIFO Queue*. Short Talk at the Joint Euro-TM/MEDIAN Workshop on Dependable Multicore and Transactional Memory Systems (DMTM). 2014.

[2] E. Pereira et al. *A Networked Robotic System and its Use in an Oil Spill Monitoring Exercise*. Short Talk at the International Workshop on the Swarm at the Edge of the Cloud. 2013. Click here for PDF file.

[3] J. Huang, C.M. Kirsch, and R. Sengupta. *Scalability of Vehicle Networks through Vehicle Virtualization*. Poster at the International Workshop on the Swarm at the Edge of the Cloud. 2013. Click here for PDF file.

[4] H. Payer, H. Röck, and C.M. Kirsch. *Get What You Pay For: Providing Performance Isolation in Virtualized Execution Environments*. Poster at the ACM SIGOPS European Systems Conference (EuroSys). 2010. Click here for PDF file.

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TECHNICAL REPORTS

[1] M. Dodds, A. Haas, and C.M. Kirsch. *Fast Concurrent Data-Structures Through Explicit Timestamping*. Tech. rep. 2014-03. Department of Computer Science, University of Salzburg, Feb. 2014. Click here for PDF file.

[2] C.M. Kirsch, M. Lippautz, and H. Payer. *Fast and Scalable k-FIFO Queues*. Tech. rep. 2012-04. Department of Computer Science, University of Salzburg, June 2012. Click here for PDF file.

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[9] M. Aigner et al. *Short-term Memory for Self-collecting Mutators*. Tech. rep. 2010-03. Department of Computer Science, University of Salzburg, Apr. 2010. Click here for PDF file.

[10] S.S. Craciunas, C.M. Kirsch, and A. Sokolova. *Power-aware Temporal Isolation with Variable-Bandwidth Servers*. Tech. rep. 2010-02. Department of Computer Science, University of Salzburg, Apr. 2010. Click here for PDF file.

[11] S.S. Craciunas, C.M. Kirsch, and A. Sokolova. *Response Time versus Utilization in Scheduler Overhead Accounting*. Tech. rep. 2009-03. Department of Computer Science, University of Salzburg, Aug. 2009. Click here for PDF file.

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[15] M. Törngren et al. *Co-Design of Control Systems and Their Real-Time Implementation — A Tool Survey*. Tech. rep. KTH/MMK/R-06/11-SE. Stockholm, Sweden: Department of Machine Design, Royal Institute of Technology (KTH), Sept. 2006. Click here for PDF file.

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[19] C.M. Kirsch, T.A. Henzinger, and M.A.A. Sanvido. *A Programmable Microkernel for Real-Time Systems*. Tech. rep. UCB//CSD-03-1250. California: University of California at Berkeley, June 2003. Click here for PDF file.

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[21] C.M. Kirsch. *The Embedded Machine*. Tech. rep. UCB//CSD-01-1137. California: University of California at Berkeley, Mar. 2001. Click here for PDF file.

[22] T.A. Henzinger, B. Horowitz, and C.M. Kirsch. *Giotto: A Time-Triggered Language for Embedded Programming*. Tech. rep. UCB//CSD-00-1121. California: University of California at Berkeley, 2000. Click here for PDF file.

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[24] P. Graf and C. Meyer. *Extended Path-Indexing*. Tech. rep. MPI-I-93-253. Saarbrücken, Germany: Max Planck Institute for Computer Science, Dec. 1993. Click here for PDF file.

THESES

[1] C. Meyer. "Soft Typing for Clausal Inference Systems". PhD Thesis. Saarbrücken, Germany: Saarland University, 1999. Click here for PDF file.

[2] C. Meyer. "Parallel Unit Resulting Resolution". Master's Thesis. Saarbrücken, Germany: Saarland University, 1996. Click here for PDF file.

SOFTWARE

1. Unicorn: Symbolic Execution, Bounded Model Checking, and Code Optimization of C Programs on Quantum Computers, with Daniel Kocher, Stefanie Lei Muroya, and Michael Starzinger. Web: `https://github.com/cksystemsgroup/unicorn`

2. The Selfie Project: A Fully Self-Referential System of a Tiny C Compiler, Tiny MIPS Emulator, and Tiny MIPS Hypervisor, with Martin Aigner, Christian Barthel, Michael Lippautz, and Simone Oblasser. Web: `https://selfie.cs.uni-salzburg.at`

3. The Scalloc Project: A Fast, Multicore-Scalable, Low-Memory-Overhead Allocator, with Martin Aigner, Michael Lippautz, and Ana Sokolova. Web: `https://scalloc.cs.uni-salzburg.at`

4. The ACDC Project: Towards a Universal Mutator for Benchmarking Heap Management Systems, with Martin Aigner. Web: `https://acdc.cs.uni-salzburg.at`

5. The Short-term Memory Project: Short-term Memory for Self-collecting Mutators, with Martin Aigner, Andreas Haas, Michael Lippautz, Ana Sokolova, Stephanie Stroka, and Andreas Unterweger. Web: `https://libscm.cs.uni-salzburg.at`

6. The Scal Project: High-Performance, Multicore-Scalable Data Structures, with Andreas Haas, Thomas A. Henzinger, Michael Lippautz, Hannes Payer, Ali Sezgin, and Ana Sokolova. Web: `https://scal.cs.uni-salzburg.at`

7. The Tiptoe Project: A Compositional Real-Time Operating System, with Silviu Craciunas, Hannes Payer, Harald Röck, Ana Sokolova, and Horst Stadler. Web: `https://tiptoe.cs.uni-salzburg.at`

8. The Jarol Project: A Java Infrastructure for Control Systems, with Bernhard Kast, Eduardo Marques, and Rainer Trummer. Web: `https://jarol.cs.uni-salzburg.at`

9. The JAviator Project: Quadrotor UAV Software Entirely Written in Java, with Joshua Auerbach, David Bacon, Harald Röck, and Rainer Trummer. Web: `https://javiator.cs.uni-salzburg.at`

10. The TAP Project: Concurrent Programming with Threading by Appointment, with Silviu Craciunas and Harald Röck. Web: `https://tap.cs.uni-salzburg.at`

11. The HTL Project: Compositional Real-Time Programming in a Hierarchical Timing Language, with Arkadeb Ghosal, Thomas A. Henzinger, Daniel Iercan, and Alberto L. Sangiovanni-Vincentelli. Web: `https://htl.cs.uni-salzburg.at`

12. Giotto: An Embedded Programming Language, Compiler, and Runtime System for Distributed Control Systems, with Arkadeb Ghosal, Thomas A. Henzinger, Slobodan Matic, and Marco A.A. Sanvido. Web: `http://embedded.eecs.berkeley.edu/giotto`

13. jMocha: A Model Checking Tool that Exploits Design Structure, with Rajeev Alur, Luca de Alfaro, Radu Grosu, Thomas A. Henzinger, Minsu Kang, Rupak Majumdar, Freddy Mang, and Bow-Yaw Wang. Web: `http://embedded.eecs.berkeley.edu/research/mocha`

14. SPASS v0.77: An Automated Theorem Prover for First-Order Logic with Equality, with Christoph Weidenbach, Christian Cohrs, Thorsten Engel, and Enno Keen. Web: `http://spass.mpi-sb.mpg.de`

15. PURR: Parallel Unit Resulting Resolution, a concurrent first-order theorem prover with advanced indexing operations, see Master's Thesis.

16. ACID: A Collection of Indexing Data Structures, implemented in C and Prolog, with Peter Graf.

HARDWARE

1. The JAviator: A Quadrotor Helicopter and Software Laboratory for Time-Portable Java Programming, with Rainer Trummer. Web: `https://javiator.cs.uni-salzburg.at`

TALKS

INVITED TALKS

1. *Take a Selfie: Self-Referentiality in the Automation of Everything*, ARGE Kulturelle Dynamiken, Vienna, January 2020. Click here for PDF file.

2. *Take a Selfie in Class*, SPLASH-E Track on Computing Education, Boston, November 2018. Click here for PDF file.

3. *On the Self in Selfie*, SPLASH Workshop on Virtual Machines and Language Implementations (VMIL), Boston, November 2018. Click here for PDF file.

4. *From Logical Execution Time to Principled Systems Engineering*, Dagstuhl Seminar on the Logical Execution Time Paradigm, Schloss Dagstuhl, Wadern, Germany, February 2018. Click here for PDF file.

5. *You can program what you want but you cannot compute what you want*, Edward A. Lee Festschrift Symposium, UC Berkeley, Berkeley, California, October 2017. Click here for PDF file.

6. *Design versus Performance: From Giotto via the Embedded Machine to Selfie*, ACM SIGPLAN/SIGBED Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES), Barcelona, Spain, June 2017. Click here for PDF file.

7. *Scalloc: From Relaxed Concurrent Data Structures to the Fastest Multicore-Scalable Memory Allocator*, International Conference on Networked Systems (NETYS), Agadir, Morocco, May 2015. Click here for PDF file.

8. *Concurrent Data Structures: Fast but Relaxed versus Strict but Slow Semantics*, International Workshop on the Chemistry of Concurrent and Distributed Programming (CCDP), Agadir, Morocco, May 2015. Click here for PDF file.

9. *Distributed Queues in Shared Memory—Multicore Performance and Scalability through Quantitative Relaxation*, ACM Computing Frontiers, Ischia, Italy, May 2013. Click here for PDF file.

10. *Inexact Software Is the Solution*, CASA Workshop, Tampere, Finland, October 2012. Click here for PDF file.

11. *Incorrect Systems: It's not the Problem, It's the Solution*, EC2 Workshop, Berkeley, California, July 2012. Click here for PDF file.

12. *Incorrect Systems: It's not the Problem, It's the Solution*, Austrian Computer Science Day, University of Vienna, Austria, June 2012. Click here for PDF file.

13. *Virtualizing Time, Space, and Power for Cyber-Physical Cloud Computing*, ARTIST Workshop on Rigorous Embedded Design, Salzburg, Austria, April 2011. Click here for PDF file.

14. *Short-term Memory for Self-collecting Mutators: Towards Time- and Space-predictable Virtualization*, Computer Science Symposium, IST Austria, Klosterneuburg, Austria, May 2010. Click here for PDF file.

15. *Tiptoe: A Compositional Real-Time Operating System (Memory Management)*, ARTIST Workshop on Foundations and Applications of Component-Based Design, Salzburg, Austria, September 2007. Click here for PDF file.

16. *Trends and Challenges in Embedded Systems Research*, Österreichische Forschungsförderungsgesellschaft (FFG), Vienna, Austria, May, 2007. Click here for PDF file.

17. *Shaping Process Semantics (and the JAviator: A Flying MoCC Laboratory)*, ARTIST Workshop on Models of Computation and Communication, Zürich, Switzerland, November 2006. Click here for PDF file

18. *Shaping Process Semantics*, Monterey Workshop on Composition of Embedded Systems: Scientific and Industrial Issues, Paris, France, October 2006. Click here for PDF file.

19. *Threading by Appointment*, Monterey Workshop on Software Engineering Tools: Compatibility and Integration, Vienna, Austria, October 2004. Click here for PDF file.

20. *Embedded Systems Frontiers*, Bundesministerium für Verkehr, Innovation und Technologie, Vienna, Austria, July 2003. Click here for PDF file.

21. *Principles of Real-Time Programming*, Second International Workshop on Embedded Software (EMSOFT), Grenoble, France, October 2002. Click here for PDF file.

PANELS

1. *Looking at Past Data to Improve the Future*, Embedded Systems Week, Montreal, Canada, October 2013.

2. *Vehicular Wireless Networks: What should the future hold?*, International Symposium on Wireless Vehicular Communications (WiVeC), San Francisco, California, September 2011.

3. *Collaboration and Virtualization in Cyber-Physical Systems*, CPS Forum, Cyber-Physical Systems Week, San Francisco, California, April 2009. Click here for PDF file

COLLOQUIA

1. *Time-Portable Programming the JAviator in Tiptoe OS*, Department of Computer Science and Engineering, UC Riverside, California, October 2008. Click here for PDF file.

2. *Tiptoe: A Compositional Real-Time Operating System (Memory Management)*, Center for Embedded Computer Systems, UC Irvine, California, March 2008. Click here for PDF file.

SCHOOLS

1. *Scal, Scalloc, and Selfie: Fast Multicore-Scalable Concurrent Data Structures and Memory Management, and Educational Self-referential Systems Software*, UPMARC Summer School on Multicore Computing, Uppsala, Sweden, June 2016. Click here for PDF file.
2. *Design of Concurrent and Distributed Data Structures*, International Spring School on Distributed Systems (METIS), Agadir, Morocco, May 2015. Click here for PDF file.
3. *Virtualizing Time, Space, and Power for Cyber-Physical Cloud Computing*, Georgia Tech Summer School on Cyber-Physical Systems, Atlanta, Georgia, USA, June, 2011. Click here for PDF file.
4. *Explicit, Dynamic Memory Management with Temporal and Spatial Guarantees*, ARTIST Summer School on Embedded Systems Design, Buenos Aires, Argentina, August 2009. Click here for PDF file.
5. *Explicit, Dynamic Memory Management with Temporal and Spatial Guarantees*, ARTIST Summer School on Embedded Systems Design, Beijing, China, July 2009. Click here for PDF file.
6. *Designing a Compositional Real-Time Operating System*, ARTIST Summer School on Embedded Systems Design, Shanghai, China, July 2008. Click here for PDF file.
7. *From Control Models to Real-Time Code Using Giotto*, Summer School on Embedded Systems (EmSys), Salzburg, Austria, June 2003. Click here for PDF file.
8. *Principles of Real-Time Programming*, Summer School on Embedded Systems (EmSys), Salzburg, Austria, June 2003. Click here for PDF file.

TUTORIAL

1. *The Logical Execution Time Paradigm*, Tutorials on Time-Predictable and Composable Architectures for Dependable Embedded Systems, ESWEEK, Taipei, Taiwan, October 2011. Click here for PDF file.

CONFERENCES AND SEMINARS

1. *Quantum Advantage for All*, IFIP WG2.4 Workshop, Salzburg, Austria, July 2022. Click here for PDF file.
2. *Symbolic Execution Crash Course*, Czech Technical University, CVUT, Prague, February 2020. Click here for PDF file.
3. *On the Self in Selfie*, Université Diderot, IRIF, Paris, April 2019. Click here for PDF file.
4. *On the Self in Selfie*, INESC-ID, Lisbon, Portugal, October 2018. Click here for PDF file.
5. *On the Self in Selfie*, Alpine Verification Meeting (AVM), Wagrain, Austria, September 2018. Click here for PDF file.
6. *Selfie: Towards Minimal Symbolic Execution*, ARC Group Meeting, UC Berkeley, Berkeley, California, July 2018. Click here for PDF file.
7. *Selfie: Towards Minimal Symbolic Execution*, VDS Workshop, Essaouira, Morocco, May 2018. Click here for PDF file.
8. *Selfie: Towards Minimal Symbolic Execution*, MoreVMs Workshop, Nice, France, April 2018. Click here for PDF file.
9. *Self-Referential Compilation, Emulation, Virtualization, and Symbolic Execution with Selfie*, Lund University, Lund, Sweden, March 2018. Click here for PDF file.
10. *Self-Referential Compilation, Emulation, Virtualization, and Symbolic Execution with Selfie*, Google, Munich, Germany, March 2018. Click here for PDF file.
11. *Selfie and the Basics*, University of Freiburg, Germany, November 2017. Click here for PDF file.

12. *Selfie and the Basics*, Onward!, Vancouver, British Columbia, October 2017. Click here for PDF file.

13. *Selfie: A Sandbox for Principled Systems Engineering*, ARM Research Summit, Cambridge, UK, September 2017. Click here for PDF file.

14. *Scal, Scalloc, and Selfie*, University of Cambridge, Cambridge, UK, September 2017. Click here for PDF file.

15. *Selfie: Sandboxed Concurrency*, Research Seminar on Open Problems in Concurrency Theory (OPCT), IST Austria, Klosterneuburg, Austria, June 2017. Click here for PDF file.

16. *Selfie: What is the Difference between Emulation and Virtualization?*, ETH Zurich, Zurich, Switzerland, March 2017. Click here for PDF file.

17. *Teaching Computer Science Through Self-Referentiality*, Helmut Veith Memorial Workshop, Obergurgl, Austria, February 2017. Click here for PDF file.

18. *Teaching Computer Science Through Self-Referentiality*, Hong Kong University of Science and Technology, Hong Kong, China, January 2017. Click here for PDF file.

19. *Scal, Scalloc, and Selfie*, University of Melbourne, Melbourne, Australia, December 2016. Click here for PDF file.

20. *Scal, Scalloc, and Selfie*, Australien National University and DATA61, Canberra, Australia, December 2016. Click here for PDF file.

21. *Scal, Scalloc, and Selfie*, University of New South Wales and DATA61, Sydney, Australia, November 2016. Click here for PDF file.

22. *Scal, Scalloc, and Selfie*, IST Austria, Klosterneuburg, Austria, September 2016. Click here for PDF file.

23. *Scal, Scalloc, and Selfie*, Northeastern University, Boston, Massachusetts, November 2015. Click here for PDF file.

24. *Distributed Queues: Faster Pools and Better Queues*, Oracle, Belmont, California, December 2012. Click here for PDF file.

25. *Distributed Queues: Faster Pools and Better Queues*, Stanford University, Palo Alto, California, December 2012. Click here for PDF file.

26. *Incorrect Systems: It's not the Problem, It's the Solution*, DREAMS Seminar, UC Berkeley, Berkeley, California, July 2012. Click here for PDF file.

27. *The Next Frontier of Cloud Computing is in the Clouds, Literally*, AI-Systems-Robotics Seminar, CS Department, Cornell University, Ithaca, New York, February 2011. Click here for PDF file.

28. *The Next Frontier of Cloud Computing is in the Clouds, Literally*, CS Department, UC Davis, Davis, California, February 2011. Click here for PDF file.

29. *Scal☠: Non-Linearizable Computing Breaks the Scalability Barrier*, Center for Hybrid and Embedded Software Systems, UC Berkeley, Berkeley, California, November 2010. Click here for PDF file.

30. *Short-term Memory for Self-collecting Mutators*, Center for Hybrid and Embedded Software Systems, UC Berkeley, Berkeley, California, September 2010. Click here for PDF file.

31. *The Next Frontier of Cloud Computing is in the Clouds, Literally*, Google Tech Talk, Mountain View, California, September 2010. Click here for PDF file.

32. *Short-term Memory for Self-collecting Mutators*, CSAIL, MIT, Boston, Massachusetts, May 2010. Click here for PDF file.

33. *Distributed, Modular HTL*, Department of Electrical Engineering and Information Technology, Technical University of Munich, Munich, Germany, June 2009. Click here for PDF file.

34. *Time-Portable Programming the JAviator in the Tiptoe VM*, Center for Hybrid and Embedded Software Systems, UC Berkeley, Berkeley, California, January 2009. Click here for PDF file.

35. *The JAviator: Time-Portable Programming in Java and C*, Hitachi Global Storage Technologies, San Jose, California, September 2008. Click here for PDF file.

36. *The JAviator: Time-Portable Programming in Java*, Sun Microsystems, Palo Alto, California, September 2008. Click here for PDF file.

37. *Tiptoe: A Compositional Real-Time Operating System (Process Model and Scheduler)*, EPFL, Lausanne, Switzerland, May 2008. Click here for PDF file.

38. *Tiptoe: A Compositional Real-Time Operating System (Process Model and Scheduler)*, ETHZ, Zürich, Switzerland, May 2008. Click here for PDF file.

39. *Tiptoe: A Compositional Real-Time Operating System (Memory Management)*, IBM T.J. Watson Research Center, Hawthorne, New York, September 2007. Click here for PDF file.

40. *Time-Portable Real-Time Programming with Exotasks*, Center for Hybrid and Embedded Software Systems, UC Berkeley, Berkeley, California, February 2007. Click here for PDF file.

41. *An Introduction to Logical Execution Time Programming*, Center for Collaborative Control of Unmanned Vehicles, UC Berkeley, Berkeley, California, September 2006. Click here for PDF file.

42. *High-Level Programming of Real-Time Software Systems*, University of Lugano, Lugano, Switzerland, March 2006. Click here for PDF file.

43. *The JAviator Project*, Center for Hybrid and Embedded Software Systems, UC Berkeley, Berkeley, California, February 2006. Click here for PDF file.

44. *High-Level Programming of Real-Time and Concurrent Software Systems*, Purdue University, West Lafayette, Indiana, December 2005. Click here for PDF file.

45. *Traffic Shaping System Calls Using Threading by Appointment*, UC Berkeley, Berkeley, California, September 2005. Click here for PDF file.

46. *Traffic Shaping System Calls Using Threading by Appointment*, UCLA, Los Angeles, California, August 2005. Click here for PDF file.

47. *The Embedded Machine: Status and Future Directions*, IBM T.J. Watson Research Center, Hawthorne, New York, March 2005. Click here for PDF file.

48. *Threading by Appointment*, Center for Collaborative Control of Unmanned Vehicles, UC Berkeley, Berkeley, California, February 2005. Click here for PDF file.

49. *Real-Time Programming Based on Schedule-Carrying Code*, McGill University, Montreal, Canada, January, 2004. Click here for PDF file.

50. *The Embedded Machine: Predictable, Portable Real-Time Code*, Verimag, Grenoble, France, November 2001. Click here for PDF file.

51. *Giotto: A Time-triggered Language for Embedded Programming*, Honeywell, Minneapolis, Minnesota, September 2001. Click here for PDF file.

52. *Embedded Control Systems Development with Giotto*, Stanford University, Palo Alto, California, November 2000. Click here for PDF file.

GROUP

MASTERS STUDENT

Anna Bolotina (since 2022).

POSTDOC

Daniel Kocher, Dr. Tech., University of Salzburg (2021–2024).

POSTDOC ALUMNI

Clément Poncelet, Docteur de l'Université Pierre et Marie Curie (2017–2019); Andreas Holzer, Dr. Tech., Technical University of Vienna (2015); Rainer Trummer, Dr. Tech., University of Salzburg (2012–2014); Ana Sokolova, PhD, Technical University of Eindhoven (2007–2009).

GRADUATED PHD STUDENTS

Alireza Abyaneh, Dr. Tech., University of Salzburg, 2022 (*Abstract Symbolic Execution*); Clemens Krainer, Dr. Tech., University of Salzburg, 2017 (*Cyber-Physical Systems as a Service*); Martin Aigner, Dr. Tech., University of Salzburg, 2017 (*Explorative Benchmarking with ACDC*); Andreas Haas, Dr. Tech., University of Salzburg, 2015 (*Fast Concurrent Data Structures Through Timestamping*); Michael Lippautz, Dr. Tech., University of Salzburg, 2015 (*From Relaxed Data Structures to Scalable Software Systems*); Hannes Payer, Dr. Tech., University of Salzburg, 2012 (*Multicore Scalability of Concurrent Objects*); Harald Röck, Dr. Tech., University of Salzburg, 2012 (*Tiptoe: A Virtual Execution Environment for Real-Time and Embedded Systems*); Eduardo Marques, PhD, University of Porto, 2011, co-advised (*Runtime Programming*); Rainer Trummer, Dr. Tech., University of Salzburg, 2011 (*Design and Implementation of the JAviator Quadrotor - An Aerial Software Testbed*); Silviu Craciunas, Dr. Tech., University of Salzburg, 2010 (*Programmable Temporal Isolation for High-Performance and Real-Time Systems*); Daniel Iercan, PhD, Technical University of Timisoara, 2008, co-advised (*Contributions to the Development of Real-Time Programming Techniques and Technologies*).

GRADUATED MASTERS STUDENTS

Alexander Miller, Dipl.-Ing., University of Salzburg, 2018 (*madlay: A Trace-Driven Cache Simulator for Address Allocators*); Mario Preishuber, Dipl.-Ing., University of Salzburg, 2018 (*Towards cache-optimal address allocation: How slow is your code?*); Thomas Hütter, Dipl.-Ing., University of Salzburg, 2017 (*Mixter: Towards Simultaneous Emulation and Virtualization*); Cornelia Mayer, Mag. rer. nat., University of Salzburg, 2017 (*From 0s and 1s to Computer Science for All*); Andreas Löcker, Dipl.-Ing., University of Salzburg, 2013 (*Generalized Polygons for Soft-walling a Micro UAV*); Martin Aigner, Dipl.-Ing., University of Salzburg, 2012 (*Short-term Memory for the C Programming Language*); Stephanie Stroka, Dipl.-Ing., University of Salzburg, 2012 (*Short-term Regions: A Region-based Short-term Memory Allocator*); Michael Lippautz, Dipl.-Ing., University of Salzburg, 2011 (*Self-collecting Goroutines: Short-term Memory Management in Go*); Florian Landolt, Dipl.-Ing., University of Salzburg, 2011 (*High-Throughput Inter-Domain Multicast on the Xen Hypervisor*); Andreas Unterweger, Dipl.-Ing., University of Salzburg, 2011 (*Performance Analysis of Short-Term Memory in a State-of-the-Art H.264 Video Encoder*); Clemens Krainer, Dipl.-Ing., University of Salzburg, 2009 (*JNavigator - An Autonomous Navigation System for the JAviator Quadrotor Helicopter*); Andreas Haas, Dipl.-Ing., University of Salzburg, 2009 (*Expiration Classes for Implicit Memory Management*); Wolfgang Kreil, Dipl.-Ing., University of Salzburg, 2009 (*Cubic UWB-based Soft Walls for a Micro-UAV*); Horst Stadler, Dipl.-Ing., University of Salzburg, 2008 (*A Virtualized Real-Time I/O Subsystem*); Hannes Payer, Dipl.-Ing., University of Salzburg, 2007 (*A Compacting Real-Time Memory Management System*); Bernhard Kast, Dipl.-Ing., University of Salzburg, 2007 (*Jarol: A Java Control Infrastructure*); Harald Röck, Dipl.-Ing., University of Salzburg, 2006 (*Threading by Appointment*); Marcus Harringer, Dipl.-Ing., University of Salzburg, 2005 (*Real-Time Java Programming with Logical Execution Times and Real-Time Garbage Collection*).

GRADUATED BACHELOR STUDENTS

David Pape, Bakk.-techn., University of Salzburg, 2022 (*RISC-U Binary Optimization for Selfie*); Thomas Wulz, Bakk.-techn., University of Salzburg, 2021 (*Linear-Time Static Analysis of RISC-V Binary Code*); Alexander Linz, Bakk.-techn., University of Salzburg, 2021 (*Incomplete Symbolic Execution with Monster: Systems*); Alexander Lackner, Bakk.-techn., University of Salzburg, 2021 (*Incomplete Symbolic Execution*

with Monster: Solver); Marcell Haritopoulos, Bakk.-techn., University of Salzburg, 2021 (*RISC-V Bare-Metal Library Operating System for Selfie*); Martin Fischer, Bakk.-techn., University of Salzburg, 2020 (*RISC-V S-Mode-Hosted Bare-Metal Selfie*); Gregor Bachinger, Bakk.-techn., University of Salzburg, 2020 (*Conservative Garbage Collection in Kernel and Mutator Space*); Sebastian Landl, Bakk.-techn., University of Salzburg, 2020 (*Generating Path Conditions for Bounded Model Checking of RISC-V Code in Selfie*); Christoph Siller, Bakk.-techn., University of Salzburg, 2020 (*Implementation and Application of a Parser for Boolector's Witness Format*); Alexander Kollert, Bakk.-techn., University of Salzburg, 2020 (*Selfie - RISC-V to x86-64 Binary Translation*); Andreas Vorderleitner, Bakk.-techn., University of Salzburg, 2020 (*Porting of Amazon FreeRTOS on ARMv7-M*); Christian Edelmayer, Bakk.-techn., University of Salzburg, 2019 (*A Hybrid Symbolic Execution and Bounded Model Checking Engine in Selfie*); Sara Seidl, Bakk.-techn., University of Salzburg, 2019 (*Symbolic Execution with Selfie—Logics*); Simon Bauer, Bakk.-techn., University of Salzburg, 2018 (*Symbolic Execution with Selfie—Systems*); Manuel Widmoser, Bakk.-techn., University of Salzburg, 2018 (*Symbolic Execution with Selfie—Arithmetics*); Simone Oblasser, Bakk.-techn., University of Salzburg, 2017 (*Porting Selfie to RISC-V: State-of-the-Art ISA Support*); Christian Barthel, Bakk.-techn., University of Salzburg, 2017 (*Porting Selfie to RISC-V: Native Toolchain Support*); Dalmir Hasic, Bakk.-techn., University of Salzburg, 2015 (*Arduino Port with JAviator*); Alexander Miller, Bakk.-techn., University of Salzburg, 2014 (*ACDC 4 Java: Analyzing Garbage Collection*); Mario Preishuber, Bakk.-techn., University of Salzburg, 2014 (*JavaScript Heap Analysis Using Real-World Web Applications*); Martin Schwaighofer, Bakk.-techn., University of Salzburg, 2014 (*Concurrent Compact-fit*); Günther Eder, Bakk.-techn., University of Salzburg, 2012 (*Benchmarking Idempotent Work Stealing*); Franziska Halbrainer, Bakk.-techn., University of Salzburg, 2011 (*Visualisierung des Heaps*).

TEACHING

UNDERGRADUATE COURSES

Introduction to Computer Science, University of Salzburg, Winter 2023. Systems Engineering, University of Salzburg, Winter 2023. Compiler Construction, University of Salzburg, Summer 2023. Introduction to Computer Science, University of Salzburg, Winter 2022. Systems Engineering, University of Salzburg, Winter 2022. Compiler Construction, University of Salzburg, Summer 2022. Introduction to Computer Science, University of Salzburg, Winter 2021. Systems Engineering, University of Salzburg, Winter 2021. Compiler Construction, University of Salzburg, Summer 2021. Introduction to Computer Science, University of Salzburg, Winter 2020. Systems Engineering, University of Salzburg, Winter 2020. Compiler Construction, University of Salzburg, Summer 2020. Introduction to Computer Science, University of Salzburg, Winter 2019. Systems Engineering, University of Salzburg, Winter 2019. Compiler Construction, University of Salzburg, Summer 2019. Operating Systems, University of Salzburg, Winter 2018. Systems Engineering, University of Salzburg, Winter 2018. Compiler Construction, University of Salzburg, Summer 2018. Operating Systems, University of Salzburg, Winter 2017. Systems Engineering, University of Salzburg, Winter 2017. Compiler Construction, University of Salzburg, Summer 2017. *Compiler Construction*, University of Salzburg, Summer 2016. *Operating Systems*, University of Salzburg, Winter 2015. *Systems Engineering*, University of Salzburg, Winter 2015. *Compiler Construction*, University of Salzburg, Summer 2015. *Operating Systems*, University of Salzburg, Winter 2014. *Systems Engineering*, University of Salzburg, Winter 2014. *Compiler Construction*, University of Salzburg, Summer 2014. *Operating Systems*, University of Salzburg, Winter 2013. *Compiler Construction*, University of Salzburg, Summer 2013. *Compiler Construction*, University of Salzburg, Summer 2012. *Compiler Construction*, University of Salzburg, Summer 2011. *Compiler Construction*, University of Salzburg, Summer 2010. *Compiler Construction*, University of Salzburg, Summer 2009.

GRADUATE COURSES

Software Systems, University of Salzburg, Winter 2022. Introduction to Concurrency Theory and Practice, University of Salzburg, Summer 2021. Software Systems, University of Salzburg, Winter 2020. Software Systems, University of Salzburg, Winter 2019. Introduction to Concurrency Theory and Practice, University of Salzburg, Summer 2019. Advanced Operating Systems, University of Salzburg, Winter 2018. IT Security, University of Salzburg, Winter 2017. Advanced Operating Systems, University of Salzburg, Winter 2017. IT Security, University of Salzburg, Winter 2015. *Advanced Operating Systems*, University of Salzburg,

Winter 2015; *Advanced Operating Systems*, University of Salzburg, Winter 2014; *Control and Information Management*, University of California, Berkeley, Fall 2014; *Advanced Operating Systems*, University of Salzburg, Winter 2013; *Advanced Operating Systems*, University of Salzburg, Winter 2011; *Embedded Software Engineering*, University of Salzburg, Winter 2011; *Embedded Software Engineering*, University of Salzburg, Winter 2010; *Embedded Software Engineering*, University of Salzburg, Winter 2009; *Advanced Operating Systems*, University of Salzburg, Winter 2009; *Compiler Construction*, University of Salzburg, Summer 2008; *Operating Systems*, University of Salzburg, Winter 2007; *Compiler Construction*, University of Salzburg, Summer 2007; *Embedded Software Engineering*, University of Salzburg, Winter 2006; *Operating Systems*, University of Salzburg, Winter 2006; *Compiler Construction*, University of Salzburg, Summer 2006; *Theory of Computational Systems*, University of Salzburg, Summer 2006; *Embedded Software Engineering*, University of Salzburg, Winter 2005; *Operating Systems*, University of Salzburg, Winter 2005; *Compiler Construction*, University of Salzburg, Summer 2005; *Theory of Computational Systems*, University of Salzburg, Summer 2005; *Computational Systems Engineering*, University of Salzburg, Winter 2004; *Embedded Software Engineering*, University of Salzburg, Winter 2004; *Embedded Software Engineering*, UC Berkeley (EECS290O), Spring 2002; *Embedded Software Engineering*, UC Berkeley (EECS290O), Spring 2001.

GRADUATE SEMINARS

Concurrency and Memory Management Seminar, University of Salzburg, Summer 2015; *Concurrency and Memory Management Seminar*, University of Salzburg, Summer 2014; *Concurrency and Memory Management Seminar*, University of Salzburg, Summer 2013; *Concurrency and Memory Management Seminar*, University of Salzburg, Summer 2012; *Concurrency and Memory Management Seminar*, University of Salzburg, Winter 2010; *Software Systems Seminar*, University of Salzburg, Summer 2010; *Software Systems Seminar*, University of Salzburg, Summer 2009; *Software Systems Seminar*, University of Salzburg, Summer 2008; *Compositionality Seminar*, University of Salzburg, Winter 2007; *Software Systems Seminar*, University of Salzburg, Summer 2007; *Computational Systems Seminar*, University of Salzburg, Summer 2004.

PROFESSIONAL ACTIVITIES

CONFERENCE FOUNDER

Co-Founder, First International Workshop on Embedded Software (EMSOFT), Tahoe City, California, October 2001 (T. Henzinger, UC Berkeley, Co-Founder).

AWARD FOUNDER

Co-Founder, ACM SIGBED Paul Caspi Memorial Dissertation Award, 2013 (X.S. Hu, University of Notre Dame, S. Tripakis, UC Berkeley, Co-Founders).

MEMBER OF EDITORIAL BOARDS

IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2016–2018; Open Access Journal on Advances in Software Engineering (ASE), 2012–2016; ACM Transactions on Design Automation of Electronic Systems (TODAES), 2011–2014.

GUEST EDITOR

Co-Editor, Special Issue on "Probabilistic Embedded Computing", ACM Transactions on Embedded Computing Systems, 2013 (V. Mooney, Georgia Institute of Technology, Co-Editor); Co-Editor, Special Issue on "ESWEEK 2007 Best Papers", Journal of Design Automation for Embedded Systems, 2009 (R. Wilhelm, Saarland University, Co-Editor).

PROFESSIONAL SOCIETIES

Distinguished Speaker, Association for Computing Machinery (ACM), 2017–2020; Chair, ACM Special Interest Group on Embedded Systems (SIGBED), 2011–2013; Treasurer, European Chapter of the ACM Special Interest Group on Operating Systems (SIGOPS), 2011–2017; Vice-Chair, ACM Special Interest Group on Embedded Systems (SIGBED), 2009–2011.

STEERING COMMITTEE CHAIR

ACM SIGPLAN International Symposium on Memory Management (ISMM), 2018; Chair, ACM/IEEE International Conference on Embedded Software (EMSOFT), 2013–2017 (W. Yi, Uppsala, Vice-Chair).

MEMBER OF CONFERENCE STEERING COMMITTEES

ACM/IEEE International Conference on Embedded Software (EMSOFT), since 2013; Embedded Systems Week (ESWEEK), since 2013; ACM SIGPLAN International Symposium on Memory Management (ISMM), 2018–2020; ACM SIGPLAN/SIGBED Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES), 2009–2014.

GENERAL CHAIR

General Chair, ACM SIGPLAN International Symposium on Memory Management (ISMM), 2017; General Chair, European Systems Conference (EuroSys), 2011; General Chair, ACM SIGPLAN/SIGBED Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES), 2009; General Co-Chair, Embedded Systems Week (ESWEEK), 2008 (N. Dutt, UC Irvine, General Co-Chair).

ORGANIZING COMMITTEE CHAIR

Embedded Systems Week (ESWEEK), 2007.

WORKSHOP CO-CHAIR

Cyber-Physical Systems Week (CPSWEEK), 2016 (A. Sokolova, University of Salzburg, Co-Chair).

SUMMER SCHOOL ORGANIZER

Co-Organizer, Summer School on Embedded Systems (EmSys), Salzburg, Austria, June 2003 (W. Pree, University of Salzburg, Co-Organizer).

SPECIAL SESSION ORGANIZER

Special Session on “Probabilistic Embedded Computing”, Design Automation Conference (DAC), 2012; Special Session on “Virtualization in Embedded Systems”, Design Automation Conference (DAC), 2011.

PROGRAM COMMITTEE CHAIR

PC Chair, International Conference on Managed Programming Languages and Runtimes (MPLR), 2024; Track Chair, “Embedded Systems Software”, International Conference on Computer-Aided Design (ICCAD), 2012; Subcommittee Chair, “Embedded Software and Tools”, Design Automation Conference (DAC), 2011; Topic Chair, “Model-Based Design for Embedded Systems”, Design Automation and Test in Europe (DATE), 2011 (R. Majumdar, Max-Planck-Institute for Software Systems, Topic Co-Chair); Track Chair, “Design and Verification of Embedded Real-Time Systems”, IEEE International Real-Time Systems Symposium (RTSS), 2010; Topic Co-Chair, “Model-Based Design for Embedded Systems”, Design Automation and Test in Europe (DATE), 2010 (A. Benveniste, INRIA Rennes, Topic Co-Chair); PC Co-Chair, ACM/IEEE International Conference on Embedded Software (EMSOFT), 2007 (R. Wilhelm, Saarland University, PC Co-Chair).

MEMBER OF CONFERENCE PROGRAM COMMITTEES

ACM/SIGAPP Symposium on Applied Computing (SAC), 2024, Track on "Cyber-Physical Systems"; ACM/SIGAPP Symposium on Applied Computing (SAC), 2023, Track on "Cyber-Physical Systems"; International Conference on Code Quality (ICCQ), 2023; ACM SIGPLAN International Symposium on Memory Management (ISMM), 2022; ACM/SIGAPP Symposium on Applied Computing (SAC), 2022, Track on "Cyber-Physical Systems"; IEEE/ACM International Conference on Computer-Aided Design (ICCAD), 2021; IEEE/ACM International Conference on Computer-Aided Design (ICCAD), 2020, Track on "Embedded Systems Software"; IEEE/ACM International Conference on Computer-Aided Design (ICCAD), 2018, Track on "Embedded Systems Software"; CSI Symposium on Real-Time and Embedded Systems and Technologies (RTEST), 2018; European Systems Conference (EuroSys), 2018; ACM/IEEE International Conference on Embedded Software (EMSOFT), 2017; European Systems Conference (EuroSys), 2017; ACM SIGPLAN International Symposium on Memory Management (ISMM), 2016; CSI Symposium on Real-Time and Embedded Systems and Technologies (RTEST), 2015; European Systems Conference (EuroSys), 2015; IEEE International Real-Time Systems Symposium (RTSS), 2014, Track on "Design and Verification of Embedded Real-Time Systems"; ACM/IEEE International Conference on Embedded Software (EMSOFT), 2014; IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), 2014, Track on "Hardware/Software Co-Design"; ACM/IEEE International Conference on Embedded Software (EMSOFT), 2013; ACM International Conference on Computing Frontiers, 2013, Track on "Probabilistic Computing"; Design Automation and Test in Europe (DATE), 2013, Track on "Model-Based Design and Verification for Embedded Systems"; International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS), 2012; ACM/IEEE International Conference on Formal Methods and Models for Codesign (MEMOCODE), 2012; IEEE/ACM International Conference on Computer-Aided Design (ICCAD), 2011, Track on "Embedded Systems Software"; IEEE International Real-Time Systems Symposium (RTSS), 2011, Track on "Design and Verification of Embedded Real-Time Systems"; ACM/IEEE International Conference on Embedded Software (EMSOFT), 2011; IEEE International Conference on Engineering of Complex Computer Systems (ICECCS), 2011; ACM/IEEE International Conference on Embedded Software (EMSOFT), 2010; ACM Conference on Object-Oriented Programming, Systems, Languages and Applications (OOPSLA), 2010; ACM/IEEE International Conference on Formal Methods and Models for Codesign (MEMOCODE), 2010; International Conference on Hybrid Systems: Computation and Control (HSCC), 2010; European Systems Conference (EuroSys), 2010; IEEE International Real-Time Systems Symposium (RTSS), 2009, Track on "Design and Verification of Embedded Real-Time Systems"; IEEE/ACM International Conference on Computer-Aided Design (ICCAD), 2009; IEEE/IFIP International Conference on Embedded and Ubiquitous Computing (EUC), 2009, Track on "Embedded Systems and Hardware-Software Codesign"; ACM/IEEE International Conference on Embedded Software (EMSOFT), 2009; Design Automation and Test in Europe (DATE), 2009, Track on "Model-Based Design for Embedded Systems"; ACM/IEEE International Conference on Embedded Software (EMSOFT), 2008; IEEE Conference on Automation Science and Engineering (IEEE-CASE), 2008, Track on "Hybrid and Discrete Event Systems"; ACM SIGPLAN/SIGBED Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES), 2008; IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), 2008, Track on "Real-Time and Embedded Applications / Benchmarks"; Design Automation and Test in Europe (DATE), 2008, Track on "Model-Based Design for Embedded Systems"; ACM/IEEE International Conference on Embedded Software (EMSOFT), 2007; Conference on Coordination Models and Languages (Coordination), 2007; Design Automation and Test in Europe (DATE), 2007, Track on "Model-Based Design for Embedded Systems"; European Systems Conference (EuroSys), 2007; International Conference on Software and Data Technologies (ICSOFT), 2006; Joint Modular Languages Conference (JMLC), 2006; ACM SIGPLAN/SIGBED Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES), 2006; IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), 2006, Track on "Development, Verification, and Debug Tools for Real-Time and Embedded Systems"; European Systems Conference (EuroSys), 2006; ACM Conference on Object-Oriented Programming, Systems, Languages and Applications (OOPSLA), 2005; ACM International Conference on Embedded Software (EMSOFT), 2005; ACM/USENIX Conference on Virtual Execution Environments (VEE), 2005; ACM SIGPLAN/SIGBED Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES), 2005; Joint Modular Languages Conference (JMLC), 2003.

Member of External Review Committee

Symposium on Principles of Programming Languages (POPL), 2016; International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2010.

Member of Workshop Program Committees

Workshop on Modern Language Runtimes, Ecosystems, and VMs (MoreVMs), 2020; Workshop on Modern Language Runtimes, Ecosystems, and VMs (MoreVMs), 2019; Workshop on Java Technologies for Real-time and Embedded Systems (JTRES), 2015; Workshop on Exploiting Concurrency Efficiently and Correctly (EC2), 2014; Workshop on Analytic Virtual Integration of Cyber-Physical Systems (AVICPS), 2012; Workshop on Adaptive and Reconfigurable Embedded Systems (APRES), 2012; Workshop on Java Technologies for Real-time and Embedded Systems (JTRES), 2011; Workshop on Adaptive and Reconfigurable Embedded Systems (APRES), 2011; Workshop on Java Technologies for Real-time and Embedded Systems (JTRES), 2010; Workshop on Adaptive and Reconfigurable Embedded Systems (APRES), 2009; Workshop on Adaptive and Reconfigurable Embedded Systems (APRES), 2008; Workshop on Automatic Program Generation for Embedded Systems (APGES), 2007; Workshop on Java Technologies for Real-time and Embedded Systems (JTRES), 2005.

Member of PhD Committees

Jad Hamza, *Algorithmic Verification of Concurrent and Distributed Data Structures*, Université Paris Diderot, Paris, France, 2015 (A. Bouajjani and C. Enea, Université Paris Diderot, Advisors); Christos Sofronis, *Embedded Code Generation from High-Level Heterogeneous Components*, Université Joseph Fourier, Grenoble, France, 2006 (P. Caspi and S. Tripakis, Verimag, Advisors); Claudiu Farcas, *Towards Portable Real-Time Software Components*, University of Salzburg, Salzburg, Austria, 2006 (W. Pree, University of Salzburg, Advisor).

Member of PhD Award Committees

EAPLS Best PhD Dissertation Award; Heinz Zemanek Doctoral Dissertation Award; ACM SIGBED Paul Caspi Memorial Dissertation Award.

Proposal Reviewer and Panelist

Swiss National Science Foundation (SNSF), 2018–2019; Portuguese Foundation for Science and Technology (FCT), 2013; National Science Foundation (NSF), 2009.

Journal Reviewer

Real-Time Systems; IEEE Transactions on Computers; ACM Transactions on Programming Languages and Systems; ACM Transactions on Embedded Computing Systems; Journal of Systems Architecture; Journal of Applied Logic; Journal of Logic and Computation; Science of Computer Programming; ETRI Journal; IEEE Computer Magazine; IEEE Control Systems Magazine; IEEE Transactions on Software Engineering; IEEE Transactions on Robotics and Automation; International Journal of Foundations of Computer Science; IEEE Transactions on Vehicular Technology.

Conference Reviewer

International Symposium on Distributed Autonomous Robotic Systems (DARS), 2012; ACM Symposium on Principles of Programming Languages (POPL), 2008; International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2005; International Conference on Real-Time and Embedded Computing Systems and Applications (RTCSA), 2004; IEEE International Real-Time Systems Symposium (RTSS), 2003; ACM Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES), 2003; ACM Conference on Programming Language Design and Implementation (PLDI),

2003; International Workshop on Embedded Software (EMSOFT), 2002; International Workshop on Computer Science Logic (CSL), 1999; International Conference on Automated Deduction (CADE), 1999; International Conference on Rewriting Techniques and Applications (RTA), 1998; International Workshop on Computer Science Logic (CSL), 1997; International Conference on Automated Deduction (CADE), 1997; International Conference on Rewriting Techniques and Applications (RTA), 1997.

RESEARCH GRANTS

NATIONAL (AUSTRIA)

- Co-Principal Investigator, *Teaching Digital Thinking: Strategien zur Konzeption, Vermittlung, Dynamisierung und nachhaltigen Implementierung*, Bundesministerium für Bildung, Wissenschaft und Forschung, 01/2020–12/2024, EUR 184,000.-
- Co-Principal Investigator, *Talente: Praktika für Schülerinnen und Schüler 2015*, Österreichische Forschungsförderungsgesellschaft (FFG), Summer Intern Program 851846 (A. Sokolova, University of Salzburg, co-PI), 7/2015—8/2015, EUR 8,000.-
- Co-Principal Investigator, *Rigorous Systems Engineering* (National Research Network), Austrian Science Fund (FWF), Grant S11411-N23 (A. Sokolova, University of Salzburg, co-PI; R. Bloem, TU Graz, Speaker), 3/2015–2/2019, EUR 353,500.-
- Co-Principal Investigator, *Rigorous Systems Engineering* (National Research Network), Austrian Science Fund (FWF), Grant S11404-N23 (R. Bloem, TU Graz, Speaker), 3/2011–2/2015, EUR 328,230.-
- Principal Investigator, *ArtistDesign* (Supplemental Support), Austrian Federal Ministry of Science and Research, Grant 651.394/0001-II/2/2009, 11/2009–12/2011, EUR 4,898.-
- Principal Investigator, *Embedded Systems Week 2007*, Österreichische Forschungsförderungsgesellschaft (FFG), FIT-IT Initiative, Grant 812443, 10/2006–10/2007, EUR 25,000.-
- Principal Investigator, *Concurrent Programming with Threading by Appointment*, Austrian Science Fund (FWF), Grant P18913-N15, 5/2006–4/2010, EUR 352,390.49
- Co-Principal Investigator, *DES Center—Dependable Embedded Systems Center*, Österreichische Forschungsförderungsgesellschaft (FFG), FIT-IT Initiative, Grant 809242 (H. Kopetz, TU Vienna, Co-PI), 2/2005–1/2006, EUR 20,000.-

INTERNATIONAL

- Co-Principal Investigator, *Big Code: Scalable Analysis of Massive Code Bases*, Czech Ministry of Education, Youth and Sports, Grant CZ.02.1.01/0.0/0.0/15_003/0000421 (J. Vitek, Northeastern, Boston, and CTU Prague, Co-PI), 1/2019–6/2022, CZK 56,000,000.-
- Principal Investigator, *Spear (Symbolic Execution of Multi-Language Graal/Truffle Applications)*, Oracle Inc., 4/2019–3/2020, US$ 38,000.-
- Principal Investigator, *Semantic Locality*, Google Inc., 4/2015–3/2016, EUR 80,000.-
- Co-Principal Investigator, *Logical Execution Time for Interactive and Composition Assistance Music Systems*, Österreichischer Austauschdienst (OeAD), Grant FR 05/2015 (A. Cont and F. Jacquemard, IRCAM, Paris, Co-PIs), 1/2015–12/2016, EUR 5,790.-
- Advisor, *Google PhD Fellowship for Michael Lippautz*, Google Inc., 2014–2017, US$ 180,000.-
- Principal Investigator, *ACDC4GC*, Google Inc., 7/2013–6/2014, EUR 80,000.-
- Senior Personnel, *CPS: Medium: Making Cloud Computing Sense, Act, and Move (SAM)*, National Science Foundation (NSF), Grant CNS-1136141 (R. Sengupta, UC Berkeley, PI; K. Hedrick, UC Berkeley, Co-PI), 9/2011–8/2014, US$ 1,100,000.-

- Co-Principal Investigator, *Short-term Memory Lifespan Estimation and Runtime*, Österreichischer Austauschdienst (OeAD), Grant AR 16/2011 (S. Yovine, University of Buenos Aires, Co-PI), 6/2011–5/2013, EUR 5,600.-
- Core Partner, *ArtistDesign*, European Commission, Network of Excellence (NoE), 1/2008–12/2011, EUR 78,368.-
- Principal Investigator, *The JAviator Project* (IBM Faculty Award), IBM T.J. Watson Research Center, Hawthorne, NY, USA, 2006–2007, US$ 55,000.-

REFERENCES

- Rajeev Alur, Professor, University of Pennsylvania, USA, alur@cis.upenn.edu
- Thomas A. Henzinger, Professor, Institute of Science and Technology Austria, tah@ist.ac.at
- Martin Rinard, Professor, Massachusetts Institute of Technology, USA, rinard@lcs.mit.edu
- Joseph Sifakis, Professor, Verimag, Grenoble, France, joseph.sifakis@imag.fr
- Lothar Thiele, Professor, ETH Zurich, Switzerland, thiele@ethz.ch
- Marilyn Wolf, Professor, Georgia Institute of Technology, USA, wolf@ece.gatech.edu