

# Curriculum Vitae

Javier Esparza

September 1, 2017

**Date of birth:** April 27, 1964.  
**Citizenship:** Spanish.  
**Marital Status:** Married, two children.

## 1 Academic Employment

2007	Chair of Foundations of Software Reliability and Theoretical Computer Science	Technische Universität München
2003	Chair of Software Reliability and Security	University of Stuttgart
2001	Chair of Theoretical Computer Science	University of Edinburgh
1994	Associate Professor	Technische Universität München
1993	Research Fellow	University of Edinburgh
1990	Research Assistant	University of Hildesheim (Germany)

## 2 Education

1994	Habilitation in Computer Science	University of Hildesheim (Germany)
1990	Ph. D. in Computer Science	University of Zaragoza (Spain)
1987	M.S. in (Theoretical) Physics	University of Zaragoza (Spain)

## 3 Awards and Honours

2011	Elected Member of Academia Europaea	
2011	Diploma of the Technische Universität München for excellent teaching	TU München
2010	TeachInf Award of the Student Union for the best Master course	TU München
2009	TeachInf Award of the Student Union for the best Bachelor course	TU München
2009	Doctor <i>honoris causa</i>	Masaryk University (Czech Republic)
1990	Dissertation prize	University of Zaragoza (Spain)

## 4 Research Projects

- 1.09.16 – Principal Investigator (with Jan Křetínský, Peter Lammich, and Tobias Nipkow), of the project “Verifizierte Model Checker” funded by the German Reserach Council.
- 1.06.16 – Principal investigator (with Samarjit Chakraborty, Jan Křetínský, and Majid Zamani) of the project “PARSEC: Platform-Aware Synthesis of Embedded Control Software” funded by the International Graduate School of Science and Engineering of the Technical University of Munich.
- 1.10.15 – Principal investigator of the project “Negotiations: A Model for Tractable Concurrency” funded by the German Research Council.
- 1.7.13 – 30.06.16 Principal investigator (with Christopher Broadbent) of the project “ Scalable Saturation-based Algorithms for Higher-order Pprograms” funded by the German Research Council.
- 1.5.11 – 30.04.15 Principal investigator (with Michael Luttenberger) of the project “Polynomial Systems on Semirings: Foundations, Algorithms, Applications” funded by the German Research Council.
- 1.1.10 – 31.12.14 Principal investigator (with Tobias Nipkow and Jan-Georg Smaus) of the project “Computer-supported Verification of Automata Constructions for Model Checking” funded by the German Research Council.
- 1.7.08 – Principal investigator of the Graduiertenkolleg “Programm- und Modellanalyse” of the German Research Council.
- 1.11.06 – 31.3.08 Principal investigator of the A6 subproject “Formal Methods for Modelling and Analysing Mobile Context-Aware Systems” of the Special Research Area (Sonderforschungsbereich) 627 of the German Research Council “Spatial World Models for Mobile Context-Aware Applications”.
- 1.9.04 – 31.12.08 Principal investigator (together with S. Schwoon) of the project “Algorithms for Software Model Checking” funded by the German Research Council (DFG).
- 1.9.04 – 31.08.09 Leader of the German side of the Institute Cooperation “Probabilistic Methods in Formal Verification of Infinite-state Systems” with the Faculty of Informatics of the Masaryk University in Brno, Czech Republic, funded by the Humboldt Foundation.
- 1.6.02 – 31.05.05 Principal investigator of the project “An Automata-theoretic Approach to Software Model-Checking” funded by the British Engineering and Physical Sciences Research Council.
- 1.10.01 – 30.09.04 Principal investigator of the project “Automatic Synthesis of Distributed Systems” funded by the British Engineering and Physical Sciences Research Council.

- 1.10.00 – 31.12.03 Contractor im EU-Projekt “Advanced Validation Techniques for Telecommunication Protocols”. Participants: France Télécom, University of Edinburgh, University of Grenoble, University of Liège, University of Paris VII, University of Uppsala, Weizmann Institute of Science.
- 1.9.98 – 31.8.01 Principal investigator (with W. Reisig) of the subproject “Distributed algorithms – Specification, Correctness, Synthesis” in the Ph. D. program “Cooperation and resource management in distributed systems” of the Technische Universität München.
- 1.1.98 – 31.12.00 Principal investigator (with W. Brauer) of the German side of the French-German cooperation project “Verification techniques for imperative higher order programming languages” with the INRIA Institute at Sophia Antipolis.
- 1.1.97 – 31.12.98 Principal investigator of the German side of the French-German cooperation project “Methods for the Analysis and Verification of systems with infinite state spaces”, with the VERIMAG Institute, Grenoble.
- 1.7.95 – 1.7.98 Principal investigator of the German side of the British-German cooperation project “Theory and applications of causal fixpoint logics”, with the University of Edinburgh.
- 1.4.95 – 31.3.98 Principal investigator (with W. Reisig) of the subproject “Distributed algorithms – Specification, Modelling, Correctness” in the Ph. D. program “Cooperation and resource management in distributed systems” of the Technische Universität München.
- 1.1.95 – 31.12.00 Principal investigator (with W. Brauer) of the A3 subproject “Specification, Analysis and Modelling” of the Special research Area (Sonderforschungsbereich) 342 of the German Research Council “Tools and methods for parallel computer architectures”.

## 5 Past and Current PhD students

- Dr. Richard Mayr. PhD Thesis: “Decidability and Complexity of Model-Checking Problems for Infinite State Systems”. Defence: 30.4.1998.
- Dr. Stephan Melzer. PhD Thesis: “Verifikation verteilter Systeme mittels linearer- und Constraint-Programmierung”. Defence: 24.7.1998.
- Dr. Stefan Römer. PhD Thesis: “Theorie und Praxis der Netzentfaltungen als Grundlage für die Verifikation nebenläufiger Systeme”. Defence: 9.6.2000.
- (with Davide Sangiorgi) Dr. Christine Röckl. PhD Thesis: “On the Mechanized Validation of Infinite-State and Parameterized Reactive and mobile Systems”. Defence: 12.2.2001.
- (with Tobias Nipkow) Dr. Leonor Prensa-Nieto. PhD Thesis: “Verification of Parallel Programs with the Owicki-Gries and Rely-Guarantee Methods in Isabelle/HOL”. Defence: 21.2.2002.

- Dr. Stefan Schwoon. PhD Thesis: “Model-checking Pushdown Systems”. Defence: 3.12.2002.
- Dr. Alin Stefanescu. PhD Thesis: “Automatic Synthesis of Distributed Systems”. Defence: 13.02.2006.
- Dr. Claus Schröter. PhD Thesis: “Halbordnungs- und Reduktionstechniken für die automatische Verifikation von verteilten Systemen”. Defence: 21.07.2006.
- Dr. Dejvuth Suwimonteerabuth. PhD Thesis: “Reachability in Pushdown Systems: Algorithms and Applications”. Defence: 26.05.2009.
- Dr. Stefan Kiefer. PhD Thesis: “Solving Systems of Positive Polynomial Equations”. Defence: 19.10.2009.
- Dr. Michael Luttenberger. PhD Thesis: “Solving Polynomial Systems on Semirings: A Generalization of Newton’s Method”. Defence: 8.2.2010.
- Dr. Andreas Gaiser. PhD Thesis: “Verification of Reachability Properties and Termination for probabilistic Systems”. Defence: 10.4.2013.
- Dr. Christian Kern. PhD Thesis: “Methods for the Diagnosis and Automatic Repair of Software Systems”. Defence: 28.06.13
- Dr. Jan Křetínský. PhD Thesis: “Verification of Discrete- and Continuous-Time Non-Deterministic Markovian systems”. Defence: 28.11.13.
- (with Michael Luttenberger) Dr. Maximilian Schlund. PhD Thesis: “Algebraic Systems of Fixpoint Equations over Semirings: Theory and Applications”. Defence: 23.02.16.
- Dr. René Neumann. PhD Thesis: “CAVA – A Verified Model Checker”. Defence: 16.06.17
- Dr. Philipp Hoffmann. PhD Thesis: “Workflow Nets: Reduction Rules and Games”. Defence: 15.07.17
- Salomon Sickert
- (with Michael Luttenberger) Philipp Meyer
- Stefan Jaax

## 6 Publications

### In Computer Science

#### Books

J. Esparza and K. Heljanko: *Unfoldings — a Partial-Order Approach to Model Checking*. EATCS Monographs in Computer Science, Springer (2008).

J. Desel and J. Esparza: Free Choice Petri Nets. Cambridge Tracts in Theoretical Computer Science 40, Cambridge University Press (1995).

## Software-tools

Tools that have been developed within my group.

PEP – a Programming Environment Based on Petri Nets  
In cooperation with the groups of E. Best, P. Starke, and others.  
Available at <http://sourceforge.net/projects/peptool>

The Model-Checking Kit  
Developed by C. Schröter and Stefan Schwoon.  
Available at <http://www.fmi.uni-stuttgart.de/szs/tools/mckit/>

MOPED – a Model Checker for Pushdown Systems.  
Developed by Stefan Schwoon as part of his doctoral dissertation.  
Available at <http://www.fmi.uni-stuttgart.de/szs/tools/moped/>

jMoped – a Test and Verification Environment for Java Programs.  
Developed by Dejvuth Suwimonteerabuth, Felix Berger and Stefan Schwoon.  
Available at <http://www7.in.tum.de/tools/jmoped/>

The Weighted PDS Library.  
Developed by Stefan Schwoon with contributions from Thomas Reps and Somesh Jha (University of Wisconsin).  
Available at <http://www.fmi.uni-stuttgart.de/szs/tools/wpds/>

Mole – A Petri Net Unfolder.  
Developed by Stefan Schwoon.  
Available at <http://www.lsv.ens-cachan.fr/~schwoon/tools/mole/>

Rabinizer 2 – A tool to generate small deterministic Rabin automata  
Developed by Jan Kretinsky and Ruslan Ledesma Garza  
<http://www7.in.tum.de/~kretinsk/rabinizer2.html>

## Journal Articles

J. Esparza, Ph. Hoffmann, and R. Saha. Polynomial Analysis Algorithms for Free Choice Probabilistic Workflow Nets. Performance Evaluation, to appear.

A. Durand-Gasselín, J. Esparza, P. Ganty and R. Majumdar. Model Checking Parametrized Asynchronous Shared-Memory Systems. Formal Methods in System Design 50(2-3):140–167 (2017).

- O. Saarikivi, H. Ponce de León, K. Kähkönen, K. Heljanko, J. Esparza: Minimizing Test Suites with Unfoldings of Multithreaded Programs. *ACM Transactions in Embedded Computer Systems* 16(2): 45:1-45:24 (2017).
- J. Esparza, P. Ganty, J. Leroux and R. Majumdar. Verification of Population Protocols. *Acta Informatica* 54:191-215 (2017).
- J. Esparza, J. Kretinsky, and S. Sickert. From LTL to Deterministic Automata — A Safraless Compositional Approach. *Formal Methods in System Design* 49(3):219–271 (2016).
- J. Desel and J. Esparza. Negotiation Programs. *Transactions on Petri Nets and Other Models of Concurrency* 11:203–225 (2016).
- E. Best and J. Esparza. Existence of Home States in Petri Nets is Decidable. *Information Processing Letters* 116(6), 423–427 (2016).
- J. Esparza, P. Ganty and R. Majumdar. Parametrized Verification of Asynchronous Shared-Memory Systems. *Journal of the ACM*, 63(1):10 (2016).
- J. Esparza, M. Luttenberger and M. Schlund: FPsolve: A Generic Solver for Fixpoint Equations over Semirings. *Int. J. Found. Comput. Sci.* 26(7): 805-826 (2015).
- J. Esparza and P. Ganty. Complexity of pattern-based verification for multithreaded programs. *ACM Trans. Program. Lang. Syst.* 36(3): 9 (2014).
- T. Brázdil, J. Esparza, S. Kiefer and A. Kučera. Analyzing probabilistic pushdown automata. *Formal Methods in System Design* 43(2):124–163 (2013).
- J. Esparza, A. Gaiser, S. Kiefer. A strongly polynomial algorithm for criticality of branching processes and consistency of stochastic context-free grammars. *Information Processing Letters* 113(10-11): 381-385 (2013).
- T. Brázdil, J. Esparza, S. Kiefer, and M. Luttenberger. Space-efficient scheduling of stochastically generated tasks. *Information and Computation* 210:87-110 (2012).
- J. Esparza, M. Leucker and M. Schlund. Learning Workflow Petri Nets. *Fundamenta Informaticae* 113(3-4):205-228 (2011).
- J. Esparza, S. Kiefer and M. Luttenberger. Derivation tree analysis for accelerated fixed-point computation. *Theoretical Computer Science* 412 (28):3226–3242 (2011).
- J. Esparza, P. Ganty, S. Kiefer, and M. Luttenberger: Parikh’s theorem: A simple and direct automaton construction. *Information Processing Letters* 111 (12):614–619 (2011).

- J. Esparza, S. Kiefer, and M. Luttenberger: Newtonian Program Analysis. *Journal of the ACM* 57(6):33:1 u201333:47 (2010).
- J. Esparza, S. Kiefer, and M. Luttenberger: Computing the Least Fixed Point of Positive Polynomial Systems. *SIAM Journal of Computing*, 39(6):2282-2335 (2010).
- J. Esparza, S. Kiefer, and S. Schwoon: Abstraction refinement with Craig interpolation and symbolic pushdown systems. *Journal on Satisfiability, Boolean Modeling and Computation* 5, 27–56, Special Issue on Constraints for Formal Verification (2008).
- J. Esparza, P. Jančar, and A. Miller: On the complexity of consistency and complete state coding. *Fundamenta Informaticae* 86(3), 227–253, Special Issue on Selected Papers of ACSD 2006 (2008).
- J. Esparza, P. Kanade and S. Schwoon: A Negative Result on Depth-First Unfoldings. *International Journal on Software Tools for Technology Transfer (STTT)*, 10(2), 161–166 (2008).
- J. Esparza, A. Kučera and R. Mayr: Model Checking Probabilistic Pushdown Systems. *Logical Methods in Computer Science* 2(1), Special Issue on Selected Papers of LICS 2004 (2006).
- J. Esparza: A Polynomial-Time Algorithm for Checking Consistency of Free-Choice Signal Transition Graphs. *Fundamenta Informaticae* 62(2), 197–220 (2004).
- J. Esparza, A. Kučera and S. Schwoon: Model-Checking LTL with Regular Valuations for Pushdown Systems. *Information and Computation* 186(2), 355–376 (2003).
- A. Kučera and J. Esparza: A Logical Viewpoint on Process-Algebraic Quotients. *Journal of Logic and Computation*, 13(6), 863–880 (2003).
- J. Esparza, S. Römer and W. Vogler: An Improvement of McMillan’s Unfolding Algorithm. *Formal Methods in System Design* 20, 285–310 (2002).
- J. Esparza and C. Schröter: Unfolding Based Algorithms for the Reachability Problem. *Fundamenta Informaticae* 47(3-4), 231–245 (2001).
- A. Bouajjani, J. Esparza, A. Finkel, O. Maler, P. Rossmanith, B. Willems and P. Wolper: An Efficient Automata Approach to Some Problems on Context-free Grammars. *Information Processing Letters* 74, 221–227 (2000).
- J. Esparza and S. Melzer: Verification of Safety properties Using Integer Programming: Beyond the State Equation. *Formal Methods in System Design* 16, 159–189 (2000).

- P. Jančar, J. Esparza and F. Moller: Petri Nets and Regular Behaviours. *Journal of Computer and System Sciences*, 59(3), 476–503 (1999).
- J. Esparza: Reachability in Live and 1-safe Free Choice Petri Nets is NP-complete. *Theoretical Computer Science* 198(1-2), 211-224 (1998).
- J. Esparza: Decidability of Model-checking for Infinite-state Concurrent Systems. *Acta Informatica* 34, 85–107 (1997).
- J. Esparza: Petri Nets, Commutative Context-Free Grammars, and Basic Parallel Processes. *Fundamenta Informaticae* 31, 13–26 (1997).
- J. Esparza and G. Bruns: Trapping Mutual Exclusion in the Box Calculus. *Theoretical Computer Science* 153(1), 95–128 (1996).
- O. Burkart and J. Esparza: More Infinite Results. *Electronic Notes in Theoretical Computer Science* 5 (1996).
- A. Cheng, J. Esparza and J. Palsberg: Complexity Results for 1-safe Petri Nets. *Theoretical Computer Science* 147, 117–136 (1995).
- J. Desel and J. Esparza: Shortest Paths in Reachability Graphs. *Journal of Computer and System Sciences* 51(2), 314–323 (1995).
- J. Esparza: Reduction and Synthesis of Live and Bounded Free Choice Petri Nets. *Information and Computation* 114(1), 50–87 (1994).
- J. Esparza: Model Checking Using Net Unfoldings. *Science of Computer Programming* 23, 151–195 (1994).
- J. Esparza and M. Nielsen: Decidability Issues for Petri Nets – a survey. *Journal of Information Processing and Cybernetics* 30(3), 143–160 (1994).
- J. Desel and J. Esparza: Reachability in Reversible Free-Choice Systems. *Theoretical Computer Science* 114, 93–118 (1993).
- E. Best, J. Desel and J. Esparza: Traps Characterise Home States in Free Choice Systems. *Theoretical Computer Science* 101, 161–176 (1992).
- J. Esparza: A Solution to the Covering Problem for 1-Bounded Conflict-free Petri Nets Using Linear Programming. *Information Processing Letters* 41, 313–319 (1992).
- J. Esparza and M. Silva: A Polynomial Time Algorithm to Decide Liveness of Bounded Petri Nets. *Theoretical Computer Science* 102, 185–205 (1992).



## Invited Contributions to Books, Journals, and Conferences

J. Esparza: Advances in the Verification of Population Protocols. Proceedings of CSR '17, 7–14 (2017).

J. Esparza, M. Luttenberger and M. Schlund: FPsolve: A Generic Solver for Fixpoint Equations over Semirings. Proceedings of CIAA '14, 1–15 (2014).

J. Esparza: Deterministic Negotiations: Concurrency for Free. Proceedings of CONCUR '14, 23–31 (2014).

J. Esparza. Keeping a Crowd Safe: On the Complexity of Parameterized Verification. Proceedings of STACS '14 (2014).

J. Esparza, M. Luttenberger and M. Schlund. A Brief History of Strahler Numbers. Proceedings of LATA '14, LNCS 8370, 1–13 (2014).

J. Esparza and Jörg Kreiker. Three Case Studies on Verification of Infinite-State Systems. In: Modern Applications of Automata Theory, D. d'Souza and P. Shankar (eds.), IISc Research Monographs Series, vol. 2 (2012).

J. Esparza and M. Luttenberger. Derivation Tree Analysis for the Computation of Fixed-Points. Proceedings of CALCO '11, LNCS 6859, 19–35 (2011).

J. Esparza. A False History of True Concurrency: From Petri to Tools. Proceedings of ICGT '10 and the SPIN Workshop, LNCS 6372, 1–2, and LNCS 6349, 180–186 (2010).

J. Esparza. Stochastic Process Creation. Proceedings of MFCS '09, R. Královic and D. Niwinski (eds.), LNCS 5734, 24–33 (2009).

T. Brazdil, J. Esparza, S. Kiefer and M. Luttenberger. Scheduling Stochastic Branching Processes - Perspectives in Concurrency Theory – A Festschrift for P.S. Thiagarajan. K. Lodaya, M. Mukund and R. Ramanujam (eds.), 64–85, Universities Press (2008).

J. Esparza, S. Kiefer and M. Luttenberger. Solving Monotone Polynomial Equations. Proceedings of TCS '08 (2008), vol. 273 of IFIP (2008).

J. Esparza, S. Kiefer and M. Luttenberger. Newton's Method for  $\omega$ -continuous semirings. Proceedings of ICALP '08, L. Aceto et al. (eds.), LNCS 5126, 14–26 (2008).

E. Best and J. Esparza and H. Wimmel and K. Wolf. Separability in Conflict-free Petri Nets. Proceedings of PSI '06, LNCS 4378, 1–18 (2006).

A. Bouajjani and J. Esparza. Rewriting models of Boolean Programs. Proceedings of RTA '06, F. Pfenning (ed.), LNCS 4098, 136–150 (2006).

J. Esparza and K. Etessami. Verifying Probabilistic Procedural Programs. Proceedings of FSTTCS '04, K. Lodaya and M. Mahajan (eds.), LNCS 3328, 16–31 (2004).

A. Bouajjani, J. Esparza and T. Touili. A Generic Approach to the Static Analysis of Concurrent Programs with Procedures. International Journal on Foundations of Computer Science 14(4), 551–582 (2003).

J. Esparza. Grammars as Processes. Formal and Natural Computing - Essays Dedicated to Grzegorz Rozenberg [on occasion of his 60th birthday, March 14, 2002]. W. Brauer, H. Ehrig, J. Karhumaki and A. Salomaa (eds.), LNCS 2300, 277–297 (2002).

O. Burkart and J. Esparza. More Infinite Results. In: Current Trends in Theoretical Computer Science, G. Paun, G. Rozenberg and A. Salomaa (eds.), World Scientific, Singapore (2001).

G. Delzanno, J. Esparza and A. Podelski. Constraint-based Analysis of Broadcast Protocols. Proceedings of CSL '99, J. Flum and M. Rodríguez-Artalejo (eds.), LNCS 1683, 50–66 (1999).

J. Esparza and J. Knoop. An Automata-theoretic Approach to Interprocedural Dataflow Analysis. Proceedings of FOSSACS '99, W. Thomas (ed.), LNCS 1578, 14–30 (1999).

J. Esparza and S. Römer. An Unfolding Algorithm for Synchronous Products of Transition Systems. Proceedings of CONCUR '99, J.C.M. Baeten and S. Mauw (eds.), LNCS 1664, 2–20 (1999).

J. Esparza. Decidability and Complexity of Petri Net Problems – an Introduction. Lectures on Petri Nets I: Basic Models. Advances in Petri Nets, G. Rozenberg and W. Reisig (eds.). LNCS 1491, 374–428 (1998).

J. Esparza and S. Melzer. Model Checking LTL Using Constraint Programming. Proceedings of the 18th International Conference on Applications and Theory of Petri nets, P. Azéma and G. Balbo (eds.), LNCS 1248, 1–20 (1997).

J. Esparza and M. Silva. On the Analysis and Synthesis of Free Choice Systems. Advances in Petri Nets 1990, G. Rozenberg (ed.), LNCS 483, 243–286 (1990).

J. Esparza and M. Silva. Circuits, Handles, Bridges and Nets. Advances in Petri Nets 1990, G. Rozenberg (eds.), LNCS 483, 210–242 (1990).

## Conferences and Workshops (refereed)

M. Blondin, S. Jaax, J. Esparza, and P.J. Meyer. Towards Efficient Verification of Population Protocols. Proceedings of PODC '17, 423–430.

- J. Esparza, A. Muscholl, and I. Walukiewicz. Static Analysis of Deterministic Negotiations. Proceedings of LICS '17, 1–12.
- J. Esparza, J. Kretinsky, J.F. Raskin and S. Sickert. From LTL and limit-deterministic Büchi automata to deterministic parity automata. Proceedings of TACAS '17, pp. 426–442 (2017).
- J. Esparza, P. Ganty, J. Leroux and R. Majumdar. Model Checking Population Protocols. Proceedings of FSTTCS '16, 27:1–27(14) (2016).
- J. Esparza, Ph. Hoffmann and R. Saha. Polynomial Analysis Algorithms for Free-choice Probabilistic Workflow Nets. Proceedings of QEST '16, 89–104 (2016).
- J. Esparza, D. Kuperberg, A. Muscholl and I. Walukiewicz. Soundness in negotiations. To appear in the Proceedings of CONCUR '16, 12:1-12:13 (2016).
- S. Sickert, J. Esparza, S. Jaax, and J. Kretinsky. Limit-Deterministic Büchi Automata for Linear Temporal Logic. Proceedings of CAV '16, 312–332 (2016).
- J. Esparza and Ph. Hoffmann. Reduction Rules for Colored Workflow Nets. Proceedings of FASE '16, 342-358 (2016).
- J. Esparza and Ph. Meyer. An SMT-based Approach to Fair Termination Analysis. Proceedings of FMCAD '15, 49–56 (2015)
- J. Esparza, P. Ganty, J. Leroux and R. Majumdar. Verification of Population Protocols. Proceedings of CONCUR '15, 470–482 (2015)
- A. Durand-Gasselín, J. Esparza, P. Ganty and R. Majumdar. Model Checking Parametrized Asynchronous Shared-Memory Systems. Proceedings of CAV '15, 67–84 (2015).
- H. Ponce-de-León, O. Saarikivi, K. Kähkönen, K. Heljanko and J. Esparza. Unfolding-based Minimal Test Suites for Testing Multithreaded Programs. Proceedings of ACSD '15, 40–49 (2015).
- J. Esparza and J. Desel. Negotiation and Petri Nets. Proceedings of the International Workshop on Petri Nets and Software Engineering, PNSE '15, 41–57 (2015).
- J. Esparza and J. Desel. Negotiation Programs. Proceedings of International Conference on Petri Nets and Other Models of Concurrency, Petri Nets '15, 157–178 (2015).
- M. Schlund, M. Luttenberger, and J. Esparza: Fast and Accurate Unlexicalized Parsing via Structural Annotations. Proceedings of EACL '14, 164-168 (2014).

- J. Esparza, Ruslan Ledesma-Garza, Rupak Majumdar, Philipp Meyer, and Filip Niksic. An SMT-based Approach to Coverability Analysis. Proceedings of CAV' 14, 603–619 (2014).
- J. Esparza and J. Kretinsky. From LTL to Deterministic Automata: A Safrless Compositional Approach. Proceedings of CAV '14, 192–208 (2014).
- J. Esparza and J. Desel. On Negotiation as Concurrency Primitive II: Deterministic Cyclic Negotiations. Proceedings of FOSSACS '14, 258–273 (2014).
- L. Jezequel and J. Esparza. Message-Passing Algorithms for the Verification of Distributed Protocols. Proceedings of VMCAI '14, 222–241 (2014).
- J. Esparza, L. Jezequel and S. Schwoon. Computation of Summaries Using Net Unfoldings. Proceedings of FSTTCS '13, 225–236 (2013).
- J. Esparza and J. Desel. On Negotiation as Concurrency Primitive. To appear Proceedings of CONCUR '13, 440–454 (2013).
- J. Esparza, P. Ganty and R. Majumdar. Parameterized Verification of Asynchronous Shared-Memory Systems. Proceedings of CAV '13, 124–140 (2013).
- J. Esparza, P. Lammich, R. Neumann, T. Nipkow, A. Schimpf and J.G. Smaus. A Fully Verified Executable LTL Model Checker. Proceedings of CAV '13, 463–478 (2013).
- A. Gaiser, J. Kretinsky and J. Esparza. Rabinizer: Small Deterministic Automata for LTL( $F,G$ ). Proceedings of ATVA '12, LNCS 7561, 72–76 (2012).
- J. Kretinsky and J. Esparza. Deterministic Automata for the ( $F,G$ )-fragment of LTL. Proceedings of CAV '12, LNCS 7358, 123–138 (2012).
- J. Esparza, A. Gaiser and S. Kiefer. Proving Termination of Probabilistic Programs Using Patterns. Proceedings of CAV '12, LNCS 7358, 7–22 (2012).
- J. Esparza, P. Ganty and R. Majumdar. A Perfect Model for Bounded Verification. Proceedings of LICS '12, 285–294 (2012).
- J. Esparza and C. Kern. Reactive and Proactive Diagnosis of Distributed Systems using Net Unfoldings. Proceedings of ACS D '12, 154–163 (2012).
- A. Gaiser and J. Esparza. Probabilistic Abstractions with Arbitrary Domains. Proceedings of SAS '11, LNCS 6887, 334–350 (2011).
- J. Esparza and P. Ganty. Complexity of Pattern-based Verification. Proceedings of POPL '11, 499–510 (2011).

- B. König and J. Esparza. Verification of Graph-Transformation Systems with Context-Free Specifications. Proceedings of ICGT '10, LNCS 6372, 107–122 (2010).
- T. Brázdil, J. Esparza, S. Kiefer, and M. Luttenberger. Space-efficient scheduling of stochastically generated tasks. Proceedings of ICALP '10, LNCS 6199, 539–550 (2010).
- J. Esparza, M. Leucker and M. Schlund. Learning Workflow Petri Nets. Proceedings of Petri Nets '10, LNCS 6128, 206–225 (2010).
- J. Esparza, A. Geiser and S. Kiefer. Computing least fixed points of probabilistic systems of polynomials. Proceedings of STACS '10, Leibniz International Proceedings in Informatics, <http://drops.dagstuhl.de/opus/volltexte/2010/2439/>, (2010).
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## In Physics

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## Professional Activities

### Program Chair

- FOSSACS '17, 20th International Conference on Foundations of Software Science and Computation Structures (with Andrzej Murawski).
- GandALF '15, 6th International Symposium on Games, Automata, Logics, and Formal Verification (co-chair with Enrico Tronci).
- ICALP '14, 41st International Colloquium on Automata, Logics, and Programming.
- TACAS '10, 16th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (co-chair with Rupak Majumdar).
- ICATPN '02, 22nd International Conference on Applications and Theory of Petri Nets, Adelaide, 2002 (co-chair with Charles Lakos).
- INFINITY '98, Third International Workshop on Verification of Infinite State Systems, Aalborg, 1998.

### Program Committees

- 28th International Conference on Concurrency Theory, CONCUR '17.
- 29th International Conference on Computer Assisted Verification, CAV '17.
- 21st International Symposium on Formal Methods, FM '16.
- 23rd International Static Analysis Symposium, SAS '16.
- 10th International Workshop on Reachability Problems, RP '16.
- International Conference on Networked Systems, NETYS '16.
- 10th International Conference on Language and Automata Theory and Applications, LATA '16.

- 21st International Conference on Tools and Algorithms for the Construction and Analysis of Systems, TACAS '16.
- 20th International Conference on Logic for Programming, Artificial Intelligence and Reasoning, LPAR-20.
- 9th International Workshop on Reachability Problems, RP '15
- 35th Foundations of Software Technology and Theoretical Computer Science, FSTTCS '15.
- 4th International Symposium on Games, Automata, Logics and Formal Verification, GandALF '13.
- 10th Workshop on Fixed Points in Computer Science, FICS '13.
- 25th International Conference on Computer Assisted Verification, CAV '13.
- 7th International Conference on Language and Automata Theory and Applications, LATA '13
- 34th International Conference on Applications and Theory of Petri Nets, ICATPN '13.
- 28th Annual Conference on Logic in Computer Science, LICS '13.
- 18th International Conference on Tools and Algorithms for the Construction and Analysis of Systems, TACAS '12.
- 39th International Colloquium on Automata, Languages, and Programming, ICALP '12.
- 33rd International Conference on Applications and Theory of Petri Nets, ICATPN '12.
- 31st Foundations of Software Technology and Theoretical Computer Science Conference, FSTTCS '11.
- Asian Symposium on Programming Languages and Systems, APLAS '11.
- 5th IEEE and IFIP International Symposium on Theoretical Aspects of Software Engineering, TASE '11.
- 32nd International Conference on Applications and Theory of Petri Nets, ICATPN '11.
- 22nd International Conference on Concurrency Theory, CONCUR '11.
- 17th International Conference on Tools and Algorithms for the Construction and Analysis of Systems, TACAS '11.
- 17th International Conference on Logic for Programming, Artificial Intelligence and Reasoning, LPAR-17, 2010.

- Workshop on Logics for System Analysis, LfSA '10.
- 22nd International Conference on Computer Assisted Verification, CAV '10.
- 25th Annual Conference on Logic in Computer Science, LICS '10.
- 11th International Conference on Verification, Model Checking and Abstract Interpretation, VMCAI '10.
- LIX Colloquium on Reachability Problems'09
- 12th International Conference on Foundations of Software Science and Computation Structures, FOSSACS '09.
- 35th International Conference on Current Trends in Theory and Practice of Computer Science, SOFSEM '09.
- 10th International Conference on Verification, Model Checking and Abstract Interpretation, VMCAI '09.
- 15th International Conference on Logic for Programming, Artificial Intelligence, and Reasoning, LPAR '08.
- 15th International Static Analysis Symposium, SAS '08.
- 35th International Colloquium on Automata, Languages, and Programming, ICALP '08.
- 32nd International Symposium on Mathematical Foundations of Computer Science, MFCS '07.
- 22nd Annual Conference on Logic in Computer Science, LICS '07.
- 8th International Conference on Verification, Model Checking and Abstract Interpretation, VMCAI '07.
- 26th Conference on Foundations of Software Technology and Theoretical Computer Science, FSTTCS '06.
- 13th International Conference on Logic for Programming, Artificial Intelligence, and Reasoning, LPAR '06.
- Sixth International Andrei Ershov Memorial Conference on Perspectives of System Informatics, PSI '06.
- Formal Methods Symposium 2006, FMS '06.
- 7th International Conference on Verification, Model Checking and Abstract Interpretation, VMCAI '06.
- 32th International Colloquium on Automata, Languages, and Programming, ICALP '05.

- 5th International Conference on Application of Concurrency to System Design, ACSD '05.
- 11th International Conference on Logic for Programming, Artificial Intelligence, and Reasoning, LPAR '04.
- 16th International Conference on Concurrency Theory, CONCUR '05.
- 11th International Conference on Tools and Algorithms for Construction and Analysis of Software, TACAS '05.
- Fourth International Conference on Application of Concurrency to System Design, ACSD '04.
- Workshop on Issues in Security and Petri Nets, WISP '04.
- Workshop of Automatic Verification of Infinite-State Systems, AVIS '04.
- 13th Annual Conference of the European Association for Computer Science Logic, CSL '04.
- Eleventh International SPIN Workshop on Model Checking of Software, SPIN 2004.
- International Conference on Tools and Algorithms for Construction and Analysis of Software, TACAS '04, Barcelona, 2004.
- 23rd Conference on Foundations of Software Technology and Theoretical Computer Science, FSTTCS '03, Mumbai, India, 2003.
- 24th International Conference on Applications and Theory of Petri Nets, Eindhoven, 2003.
- Tenth International SPIN Workshop on Model Checking of Software, SPIN '03, Portland, 2003
- Fourth International Workshop on Verification, Model Checking, and Abstract Interpretation, VMCAI '03, New York, 2003.
- Segundas Jornadas sobre Programación y Lenguajes, PROLE '02, El Escorial, Spain, 2002.
- Third International Workshop on Verification, Model Checking, and Abstract Interpretation, VMCAI '02, Venice, 2002.
- Symposium on Latin American Theoretical Informatics, LATIN '02, Cancun, 2002.
- 13th International Conference on Concurrency Theory, CONCUR '02, Brno, Czech, Republic, 2002.
- International Conference on Tools and Algorithms for Construction and Analysis of Software, TACAS '02, Genova, 2002.
- Primeras Jornadas sobre Programación y Lenguajes, PROLE '01, Almagro, Spain, 2001.

- 11th International Conference on Concurrency Theory, CONCUR '01, Aalborg, Denmark, 2001.
- 8th International Conference on Logic for Programming, Artificial Intelligence, and Reasoning, LPAR '01, Havana, Cuba, 2001.
- Workshop on Verification in Computational Logic, VCL '01.
- 28th International Colloquium on Automata, Languages, and Programming, ICALP '01, Barcelona, 2001. workshop of PLI '01, Florence, 2001.
- 4th International Conference on Foundations of Software Science and Computation Structures, FOSSACS '01, 2001.
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- 15th Annual Conference on Logic in Computer Science, LICS 2000, Santa Barbara, 2000.
- Workshop on Distributed Algorithms, Satellite Workshop to FCT '99, Iasi, Romania, 1999.
- 11th International Conference on Computer Assisted Verification, CAV '99, Trento, 1999.
- 16th Annual Symposium on Theoretical Aspects of Computer Science, STACS '99, Trier, 1999.
- 8th International Conference on Concurrency Theory, CONCUR '98, Nice, 1998.
- First International Conference on Application of Concurrency to System Design, Aizu (Japan), 1998.
- 7th International Conference on Concurrency Theory, CONCUR '96, Pisa, 1996.
- 16th International Conference on Applications and Theory of Petri Nets, Osaka, 1996.
- 15th International Conference on Applications and Theory of Petri Nets, Torino, 1995.
- 4th International Conference on Concurrency Theory, CONCUR '93, Hildesheim, 1993.



## Referee Work

- **Books:** Cambridge University Press, Springer Verlag.
- **Journals:** Acta Informatica, ACM Transactions on Computational Logic, The Computer Journal, Formal Aspects of Computing, Fundamenta Informaticae, IEEE Transactions in Software Engineering, Information and Computation, Information Processing Letters, Journal of the ACM, Journal of Computer and System Science, Journal of Information Processing and Cybernetics, Software Tools in Technology Transfer, Theoretical Computer Science, etc.
- **Conferences:** CAV, CONCUR, FCT, FOCS, FST&TCS, ICALP, LATIN, LICS, LPAR, MFCS, Petri Nets, POPL, STACS, STOC, TACAS, TAPSOFT, TCS (IFIP), etc.
- **Habilitations:** Petr Jančar (University of Ostrava), Ahmed Bouajjani (University of Paris VII), Antonín Kučera, (Masaryk University), Hanna Klaudel (University of Paris XIII), Karsten Schmidt (Humboldt Universität zu Berlin), Markus Müller-Olm (Universität Dortmund), Jean-Michel Couvreur (CNRS), Barbara König (Universität Stuttgart), Tomáš Vojnar (Masaryk University), Harro Wimmel (Universität Oldenburg), Stefan Haar (INRIA), Tayssir Touili (University of Paris VII), Peter Habermehl (University of Paris VII), Jérôme Leroux (CNRS), Thomas Chatain (ENS-Cachan), Stefan Schwoon (ENS-Cachan), Stefan Göller (Universität Bremen), Blaise Genest (CNRS), Alexandre Duret-Lutz (Epita).
- **Ph. D. thesis:** Valentín Valero Ruiz (Universidad Complutense de Madrid), Klaus Mayr (Technische Universität München), Luis Llana (Universidad Complutense de Madrid), Peter Kemper (Universität Dortmund), Andreas Stübinger (Universität Passau), Antonín Kučera (Masaryk University), Catherine Dufourd (École Normal Supérieur de Cachan), Cornelius Klein (Technische Universität München), Maximilian Frey (Technische Universität München), Olaf Müller (Technische Universität München), Jitka Stribrna (University of Edinburgh), Andreas Wolf (Technische Universität München), David Parker (University of Birmingham), Victor Khomenko (University of Newcastle upon Tyne), Martin Lange (University of Edinburgh), Sybille Fröschle (University of Edinburgh), Abdelwaheb Ayari (Universität Freiburg), Klaus Wich (Universität Stuttgart), Nir Piterman (Weizmann Institute), Anne Bouillard (Université Paris VI), Tobias Schüle (Universität Kaiserslautern), Tomáš Brázdil (Masaryk University, Fernando Rosa Velardo (Universidad Complutense de Madrid), Henri Hansen (Technical University of Tampere), Johannes Nowak (Technische Universität München), Matthew Hague (University of Oxford), Gérard Basler (ETH Zürich), Mohamed Faouzi Atig (Université Paris VII), Chih-hong Cheng (Technische Universität München), Gero Greiner (Technische Universität München), Johannes Hölzl (Technische Universität München), Lög Jezequel (INRIA), Rémi Bonnet (ENS Cachan), Hasan Ibne Akram (Technische Universität München), Song Fu (Université Paris VII), Andreas Reuß (Technische Universität München), Alistair Stewart (University of Edinburgh), Kalmer Apinis (Technische Universität München), Bogdan Mihaila (Technische Universität München), Jeremias Weihmann (Technische Universität München), Ondra Lengal (Brno University of

Technology), Thomas Ferrere (Université Grenoble), Sanders Leemans (TU Eindhoven).

- **Research projects, research institutions:** Referee of the National Science Foundation (USA), the Swedish Foundation for International Cooperation in Research and Higher Education, the Grant Agency of the Czech Republic, the Netherlands Organization for Scientific Research, the Israel Science Foundation, the Italian Ministry for Education, University and Research, the Spanish Ministry for Education and Science, the Science Foundation Ireland, the Engineering and Physical Sciences Research Council of the United Kingdom, the German Research Council (Deutsche Forschungsgemeinschaft), the German Academic Exchange Service (Deutscher Akademischer Austauschdienst), the Max-Planck Gesellschaft, the Alexander-von-Humboldt Stiftung, the European Research Agency (ERC), the Swiss National Fond for Scientific Research, the Austrian Science Fund, the ETH research commission, the Niedersächsisches Ministerium für Wissenschaft und Kultur, the French National Research Agency, the German-Israeli Foundation, the Royal Academy of Engineering of the United Kingdom, the French Agency for Evaluation of Research and Higher Education (AERES), the Portuguese Foundation for Science and Technology, the Regional Council of Brittany in France, the Romanian National Authority for Scientific Research, the Leverhulme Trust, the University of Oxford, the Yale-National University of Singapore Research Commission, the Belgian Fonds de la Recherche Scientifique-FNRS, the National Research Center of Poland, and the Institute Universitaire de France.

## Editorial boards

- Member of the Scientific Committee of the “Revista Matemática de la Universidad Complutense de Madrid” (1996-2008).
- Member of the Editorial Board of “Logical Methods in Computer Science” since 2004.
- Member of the Editorial Board of “Theoretical Computer Science” (2006-2010).
- Member of the Editorial Board of “RAIRO Theoretical Informatics and Applications” since 2010.
- Member of the Editorial Board of the “International Journal on Foundations of Computer Science” from 2011 to 2015.
- Member of the Editorial Board of “Acta Informatica” since 2013.

## Steering Committees

- Member of the Steering Committee of the GandALF conference series since 2010.
- Member of the Steering Committee of the CONCUR conference series since 2012.

## Memberships

- Member of the IFIP TC 2 Working Group 2.2 “Formal Description of Programming Concepts” since 1999.  
Vice-president of the group from 2012 to 2016.
- Member of the IFIP TC 1 Working Group 1.8 “Concurrency Theory” since 2016.
- Member of the EATCS Council (2001-2005).
- Member of Academia Europaea since 2011.

## Organization of events

- Co-organiser of the course “Inside Google: Algorithmics of Search Engines” at the Ferienakademie of the Universität Erlangen-Nürnberg, the Technische Universität München and the Universität Stuttgart, 2006.
- Co-organizer of the Workshop on Finite and Algorithmic Model Theory, Durham, January 2006.
- Scientific Director (with Orna Grumberg) of the Marktoberdorf Summer School 2009.
- Scientific Director (with Orna Grumberg and Tobias Nipkow) of the Marktoberdorf Summer School 2011.
- Co-organiser of the course “Programmanalyse: Theorie und Anwendungen” at the Ferienakademie of the Universität Erlangen-Nürnberg, the Technische Universität München and the Universität Stuttgart, 2013.
- Organiser of the IFIP WG 2.2. meeting in 2014.
- Scientific Director (with Orna Grumberg) of the Marktoberdorf Summer School 2015.

## Others

- Managing Director of the Institut für Informatik der Technischen Universität München (2008–2010).
- Member of the Jury for the EATCS Distinguished Dissertation Award in 2015 and 2016.

# 7 Teaching

## At the University of Hildesheim

### Courses

Computability and logic (Winter 90/91, Winter 91/92)  
Complexity theory (Summer 91)  
Semantic of sequential programs (Summer 92)

### Seminars (with E. Best)

Parallel Algorithms (Winter 92/93)  
Temporal Logic (Summer 92)

## At the Technische Universität München

### Courses

Automata theory and formal languages (Winter 96/97, 08/09, 09/10, 10/11, 11/12, 15/16)  
Automata theory, formal languages, and computability (Winter 99/00)  
Communication and concurrency (Summer 95, Summer 96, Summer 97)  
Computability (Winter 94/95, Winter 95/96)  
Complexity theory (Winter 97/98)  
Logic (Summer 98, Summer 99, Winter 07/08)  
Petri nets (Winter 95/96, Winter 96/97, Summer 13, 15, 16)  
Probability theory and statistics (Summer 00, 07, 08, 09, 12, 13)  
Verification with automata (Summer 99)  
Model Checking (Summer 14, 15) Model Checking II (Summer 08)  
Discrete Mathematics (Winter 08/09, Winter 09/10, Winter 13/14)  
Cryptography (Winter 15/16)  
Introduction to Theoretical Computer Science (Summer 16)

### Seminars

Algorithms in molecular biology (Summer 97)  
Computational models (Summer 98)  
Cryptographic protocols (Summer 00, Summer 03)  
Design of distributed systems (Winter 99/00)  
Distributed algorithms (Summer 96, Winter 97/98, Winter 98/99)  
Quantum computing (Summer 98)  
Algorithmics of search engines (Winter 05/06)  
Decision Procedures (Winter 11/12, 12/13)

### Lab courses

Automatic verification of reactive systems (Winter 96/97, 97/98, 99/00)

## At the University of Edinburgh

Communication and Concurrency (First term 2001/2002)

Language Semantics and Implementations (Second Term 2001/2002)

Computer Science I (Introductory course, Second Term 2002/2003)

## At the University of Stuttgart

### Courses

Introduction to Software Technology II (Summer 05, 06)

Fundamentals of Software Reliability (Winter 03/04, 04/05, 05/06, 06/07)

Logic (Winter 03/04, Winter 04/05, Winter 05/06, 06/07)

Model Checking (Summer 03, 05, 06)

Theoretical Computer Science I (Summer 03)

### Seminars

Cryptographic Protocols (Summer 03)

System Modelling and Verification with Petri Nets (Winter 03/04)

iInside Google: Algorithmics of search engines (Winter 05/06, 06/07)

Games in Computer Science (Summer 06)

## 8 Invited Talks and Tutorials

### At International Conferences

- *Advances in Quantitative Analysis of Free-Choice Workflow Petri Nets.*  
24th International Symposium on Temporal Representation and Reasoning, TIME '17, Mons.
- *Verification of Population Protocols.*  
Jornadas sobre Programación y Lenguajes, PROLE '17, La Laguna.
- *Advances on Verification of Population Protocols.*  
12th International Computer Science Symposium in Russia, CSR '17, Kazan.
- *Verification of Population Protocols: A Tutorial.*  
14th International Symposium on Automated Technology for Verification and Analysis, ATVA '16, Chiba.
- *Limit-Deterministic Büchi Automata for Linear Temporal Logic.*  
14th International Symposium on Automated Technology for Verification and Analysis, ATVA '16, Chiba.
- *Verification of Population Protocols.*  
30th International Symposium on Distributed Computing, DISC '16, Paris.

- *Parametrized Verification of Anonymous Crowds—Verification Meets Distributed Computing.*  
3rd International Conference on Networked Systems, NETYS '15, Agadir.
- *Deterministic Negotiations: Concurrency for Free.*  
25th International Conference on Concurrency Theory, CONCUR '14, Rome.
- *Solving Fixpoint Equations over Semirings.*  
19th International Conference Implementation and Application of Automata, CIAA 2014, Giessen.
- *A Brief History of Strahler Numbers.*  
8th International Conference on Language and Automata Theory and Applications, LATA 2014, Madrid.
- *Keeping a Crowd Safe: On the Complexity of Parameterized Verification.*  
31st Symposium on Theoretical Aspects of Computer Science, STACS '14, Lyon.
- *Fixed-Point Equations and Derivation Tree Analysis.*  
6th International Workshop Weighted Automata: Theory and Applications, WATA '12, Dresden.
- *Solving Fixed-Point Equations by Derivation Tree Analysis.*  
4th International Conference on Algebra and Coalgebra in Computer Science, CALCO '11, Winchester, UK.
- *Stochastic Process Creation: A Computer Science Perspective.*  
First International Symposium on Games, Automata, Logics and Formal Verification, GandALF '10, Minori, Italy.
- *A False History of True Concurrency: From Petri to Tools.*  
5th International Conference on Graph Transformation, UCGT '10, and 17th Spin Workshop SPIN '10 (Joint keynote talk), Enschede.
- *Newtonian Program Analysis.*  
Joint European Conferences on Theory and Practice of Software, ETAPS 2010, Paphos (impromptu keynote talk replacing Jim Larus), March 2010.
- *Analysis of Systems with Stochastic Process Creation.*  
11th International Conference on Verification, Model Checking and Abstract Interpretation, VMCAI '10, Madrid, January 2010.
- *Stochastic Process Creation.*  
33rd International Symposium on Mathematical Foundations of Computer Science, MFCS '09, High Tatras, Slovakia, August 2009.
- *Solving Monotone Systems of Polynomial Equations.*  
5th IFIP International Conference on Theoretical Computer Science, TCS '08, Milano, September 2008.

- *Newtonian Program Analysis.*  
35th International International Colloquium on Automata, Languages, and Programming, ICALP '08, Reykjavik, July 2008.
- *Rewriting Models of Boolean Programs.*  
17th International Conference on Rewriting Techniques and Applications, RTA '06, Seattle, August 2006.
- *Verification of Probabilistic Procedural Programs.*  
24th Conference on Foundations of Software Technology and Theoretical Computer Science, FST&TCS '04, Chennai, India, December 2004.
- *An Automata-theoretic Approach to Software Model Checking.*  
31st Symposium on Principles of Programming Languages, POPL '04, Venice, January 2004.
- *A False History of True Concurrency.*  
12th International Congress of Logic, Methodology and Philosophy of Science, LMPS '03, Oviedo, Spain, August 2003.
- *An Automata-theoretic Approach to Software Verification.*  
7th International Conference on Developments in Language Theory, DLT '03, Szeged, Hungary, July 2003.
- *An Algebraic Approach to the Static Analysis of Concurrent Software.*  
9th International Static Analysis Symposium, SAS '02, Madrid, September 2002.
- *Model Checking (with) Declarative Programs.*  
3rd International Conference on Principles and Practice of Declarative Programming, PPDP '01, Florence, September 2001.
- *Model Checking.*  
Tutorial at the 22nd International Conference on Applications and Theory of Petri Nets, Newcastle upon Tyne, June 2001.  
Tutorial at the 23rd International Conference on Applications and Theory of Petri Nets, Adelaide, June 2002.
- *Broadcast Protocols: A Case Study in Verification of Infinite-state Systems.*  
Annual Conference of the European Association for Computer Science Logic, CSL '99, Madrid, September 1999.
- *Verification with Unfoldings.*  
9th International Conference on Concurrency Theory, Eindhoven, CONCUR '99, August 1999.
- *Grammars as Processes.*  
International Conference on Foundations of Software Science and Computation Structures, FOSSACS '99, Amsterdam, March 1999.
- *Verification Using Unfoldings.*  
International Conference on Application of Concurrency to System Design, ACSD '98, Aizu (Japan), March 1998.

- *Verification of 1-safe Petri nets.*  
18th International Conference on Applications and Theory of Petri Nets, Toulouse, June 1997.

## At Satellite Workshops

- *Towards Efficient Verification of Population Protocols.*  
7th Young Researchers Workshop on Concurrency Theory, YR-CONCUR '17.
- *Polynomial Algorithms for Free-Choice Workflow Nets.*  
Fifth International Workshop on Verification and Program Transformation, VPT '17.
- *A Petri-net-like Model for Multiplayer, Distributed Negotiations.*  
14th International Workshop on Foundations of Coordination Languages and Self-Adaptive Systems, FOCLASA '15
- *Computing with Population Protocols.*  
2nd International Workshop on Parameterized Verification, PV '15.
- *Verification of Population Protocols.*  
2nd Workshop on the Chemistry of Concurrent and Distributed Programming, co-located with NETYS '15.
- *Time and memory consumption in systems with stochastic process creation.*  
Workshop on Games and Probabilistic Models in Formal Verification, GPMFV 2010, co-located with MFCS '10 and CSL '10.
- *Solving fixed-point equations of on  $\omega$ -continuous semirings.*  
6th Workshop on Fixed Points in Computer Science, FICS 2009, co-located with CSL '09.
- *$O(f(t))$  is not enough: Beyond Big-Oh runtime analysis in automata theory.*  
2007 Annual Meeting of the Games Network “Games and Automata for Synthesis and Validation”, co-located with CSL '07.
- *Symbolic Reachability in Boolean Programs.*  
Workshop on Reachability Problems, satellite Workshop of DLT '07, July 2007.
- *Model Checking with Unfoldings .*  
Workshop on Unfolding and Partial Order Techniques, UFO '07, satellite Workshop of Petri Nets '07, June 2007.
- *Computing rewards for probabilistic pushdown systems .*  
First International Workshop on Probabilistic Automata and Logics, PAuL '06, satellite Workshop of FLoC '06, August 2006.
- *Verifying Probabilistic Pushdown Systems.*  
Workshop of Automatic Verification of Infinite-State Systems, AVIS '05, satellite Workshop of ETAPS '05, Edinburgh, 2005.



- *Some Applications of Petri Nets to the Analysis of Parametrized Systems.*  
Workshop on Issues in Security and Petri Nets, WISP '03, satellite Workshop of ICATPN '03, Eindhoven, 2003.
- *Control-flow in Software Model Checking: An Automata-Theoretic Approach.*  
Workshop of Automatic Verification of Infinite-State Systems, AVIS '03, satellite Workshop of ETAPS '03, Warsaw, 2003.
- *On the Algorithmics of Model Checking with Unfoldings.*  
Third International Workshop on Verification, Model Checking, and Abstract Interpretation, VMCAI '02, Venice, 2002.
- *Verification of Broadcast Protocols.*  
Workshop on Verification in Computational Logic, satellite Workshop of CL '00, London, July 2000.
- *Verification with Partial Orders.*  
Workshop on Concurrency, satellite Workshop of MFCS '98, Brno, August 1998.
- *More Infinite Results.*  
Second International Workshop on the Verification of Infinite State Systems, INFINITY '96, satellite Workshop of CONCUR '96, Pisa, August 1996.

## At Schools

- *Verification of Probabilistic Infinite-State Systems.*  
1st School on Foundations of Programming and Software systems. Probabilistic programming, Braga, 2017.
- *Parameterized Verification.*  
Marktobderdorf Summer School on Verification and Synthesis of Correct and Secure Systems, 2015.
- *Unfoldings—A Partial-Order Approach to Model Checking.*  
MOVEP School, Marseille, 2012.
- *Verification of Infinite-state Systems.*  
Artist School on Quantitative Model Checking, Copenhagen 2012.
- *Automata-Theoretic Models of Software.*  
Marktobderdorf Summer School, 2011.
- *Mathematical Foundations of Program Analysis.*  
Marktobderdorf Summer School, 2009.
- *Building a Software Model Checker.*  
Marktobderdorf Summer School on Logical Aspects of Secure Computer Systems, 2007.  
Third Summer School on Verification Technology, Systems and Applications, Luxembourg, 2010.

- *Verification of Infinite-state Systems.*  
Marktobersdorf Summer School on Logical Aspects of Secure Computer Systems, 2005.  
PhDopen, University of Warsaw, 2010.
- *An Unfolding Approach to LTL Model-Checking.*  
4th Advanced Course on Petri Nets, Eichstätt, Germany, September 2003.
- *Verification Using Linear and Constraint Programming.*  
4th Advanced Course on Petri Nets, Eichstätt, Germany, September 2003.
- *Model Checking Infinite State Systems.*  
2nd International School on Formal Methods for the Design of Computer, Communication and Software Systems: Model Checking, Bertinoro, Italy, September 2002.  
4th Advanced Course on Petri Nets, Eichstätt, Germany, September 2003.
- *Model Checking Finite and Infinite State Systems.*  
Second International School on Computational Logic, Maratea, Italy, September 2002.
- *Broadcast Protocols: A Case Study in Verification of Infinite-state Systems.*  
Modelling and Verification of Parallel Processes, MOVEP '2k, Nantes, France, June 2000.
- *Decidability and Complexity of Model-Checking Problems for Infinite-State Systems.*  
European School of Computer Science Methods and Tools for the Verification of Infinite-State Systems, Grenoble, March 1997.
- *Model-Checking Petri Nets* (tutorial).  
European Summer School on Language, Logic and Computation. Copenhagen, August 1994.
- Organisation of the Workshop on Logics and True Concurrency.  
European Summer School on Language, Logic and Computation. Copenhagen, August 1994.

## At other events

- *Keeping a Crowd Safe: On the Complexity of Parameterized Verification.*  
Meeting of the Austrian Rigorous Systems Engineering Network. Pöllauberg, Austria, September 2016.
- *Limit-Deterministic Büchi Automata for Linear Temporal Logic.*  
IFIP Working Group 2.2. Meeting, Singapore, September 2016.  
Automata, Concurrency, and Timed Systems Workshop, Chennai, February 2017.
- *Verification of Population Protocols.*  
IFIP Working Group 2.2. Meeting, Lucca, Italy, September 2015.  
Workshop on Distributed Runtime Verification, Bertinoro, Italy, May 2016.  
20th Anniversary of the Laboratory for Specification and Verification, ENS-Cachan,

May 2017.

Jornadas de la Asociacion de Ingeniera del Software y Tecnologas de Desarrollo de Software, SISTEDES '17, Tenerife.

- *Stochastic Process Creation.*  
Journées de Group de Recherche Informatique et Matématique de CNRS. Paris, January 2016.
- *A Perfect Model for Bounded Verification.*  
Alpine Verification Meeting AVM' 12, Passau, May 2012.  
IFIP Working Group 2.2 Annual Meeting. Amsterdam, July 1995, September 2012.
- *Solving Fixed-Point Equations on Semirings.*  
15th Anniversary of the Laboratory for Specification and Verification, ENS-Cachan, February 2012.
- *Logik und Automaten: Von GUTTENPlag zu Sudoku.*  
Lange Nacht der Universität, TU München, November 2011.
- *Software Model Checking with Automata.*  
D-CON, Deutsche CONCUR Chapter, Münster, March 2011.  
Highlights of AutoMathA, final conference of the programme AutoMathA of the European Science Foundation, Vienna, November 2010.
- *Newtonian Program Analysis – Solving Sharir and Pnueli's equations.*  
Amir Pnueli Memorial Symposium, Courant Institute, New York University, May 2010.
- *Analysis of Systems with Stochastic Process Creation.*  
Symposium on Reactive Modeling in Science and Engineering, IST Austria, May 2010. Workshop on Quantitative Models, Expressiveness and Analysis, Schloß Dagstuhl, January 2010.
- *Probabilistic Model Checking.*  
Workshop on Statistical Methods and Models, Institute for Advanced Studies, Technische Universität München, January 2010.
- *A computer science look at stochastic branching process.*  
Workshop on Perspectives in Concurrency Theory, Chennai Mathematical Institute, December 2008.
- *SDSIRep: A Little Case Study in Going Beyond the Finite.*  
Workshop “Beyond the Finite: New Challenges in Verification and Semistructured Data”, Schloß Dagstuhl, April 2008.
- *Newtonian Program Analysis.*  
MEMICS 2007, Annual Doctoral Workshop on Mathematical and Engineering Methods in Computer Science, Znojmo, Czechia, 2007.  
IFIP Working Group 2.2. Meeting, Bologna, Italy, 2009.

- *Around Moped.*  
Alpine Verification Meeting, Lausanne, 2005.
- *Verification of probabilistic procedural programs.*  
Journées des Systemes Infinies. École Normal Superieure de Cachan, Paris, March 2005.
- *Software Model Checking: An Automata-Theoretic Approach.*  
Joint Chinese-German Workshop on Theoretical Computer Science, Shangai, October 2003.
- *Some Applications of Petri Nets to the Analysis of Parametrized Systems.*  
13 Theorietag der GI-Fachgruppe “Automaten und Formale Sprachen”, Herrsching, September 2003.
- *Logic in Automatic Verification.*  
12th International Congress of Logic, Methodology and Philosophy of Science, LMPS 2003, Oviedo, Spain, August 2003.
- *An Unfolding Approach to exploring State Spaces of Concurrent Systems.*  
Workshop on Exploration of Large State Spaces, Schloß Dagstuhl, November 2001.
- *Grammars as Processes.*  
Workshop on Model Checking and Program Analysis, Schloß Ringberg, February 2000.
- *An Automata Theoretic Approach to Dataflow Analysis.*  
Workshop on Finite Model Theory, Databases, and Computer-Aided Verification, Schloß Dagstuhl, October 1999.
- *Verification with Unfoldings.*  
Workshop on Temporal Logics for Distributed Systems - Paradigms and Algorithms, Schloß Dagstuhl, October 1999.
- *Process Rewrite Systems.*  
8. Theorietag der GI-Fachgruppe “Automatentheorie und Formale Sprachen”, Trier, September 1998.
- *Model-Checking Pushdown Automata.*  
Colloquium on Computability, Complexity and Logic, Universität Stuttgart, December 1996.  
13th British Colloquium on Theoretical Computer Science, Sheffield, March 1997.  
IFIP Working Group 2.2 Annual Meeting, Graz, 1997.
- *Decidability and Complexity of Petri Net Problems (tutorial).*  
Advanced Course on Petri Nets, Schloß Dagstuhl, October 1996.
- *An Improvement of McMillan’s Unfolding Algorithm.*  
Workshop on Semantics of Concurrent Systems, Schloß Dagstuhl, May 1996.
- *Decidability of Model Checking for Infinite State Systems.*  
IFIP Working Group 2.2 Annual Meeting. Amsterdam, July 1995.

- *Model Checking Using Net Unfoldings.*  
Workshop on: What good are partial orders?, Sheffield, June 1992. Workshop on Automata Theory, Schloß Dagstuhl, January 1993.
- *Model Checking of Persistent Petri Nets.*  
Workshop on Distributed Systems, GMD, Bonn, January 1992.
- *Reachability in Reversible Free Choice Systems.*  
Workshop on Concurrency and Compositionality, Goslar, March 1991.
- *Free Choice Systems.*  
Concurrency Day, CWI, Amsterdam, February 1991.

## At Universities and Research Institutes

- *Static Analysis of Deterministic Negotiations.*  
Colloquium of the Architecture of Information Systems Group, TU Eindhoven, May 2017.
- *Reduction Rules for Coloured Workflow Nets.*  
Colloquium of the Architecture of Information Systems Group, TU Eindhoven, December 2015.
- *An SMT-Approach to Coverability and Fair Termination Analysis.*  
Workshop of the PUMA Graduiertenkolleg, October 2015.
- *Verification of Population Protocols.*  
Graduiertenkolleg PUMA, TU München, May 2015.  
Centre Fédéré en Vérification, Brussels, April 2016.  
Universität Kassel, July 2017.
- *Keeping a Crowd Safe: On the Complexity of Parameterized Verification.*  
Distinguished Lecture Series, Academia Sinica, Taipei, March 2015.
- *Deterministic Negotiations: Concurrency for Free.*  
Graduiertenkolleg PUMA, TU München, January 2015.  
National Taiwan University, March 2015.
- *On Negotiation as Concurrency Primitive.*  
Graduiertenkolleg PUMA, TU München, May 2013.
- *Verification of parameterized shared-memory networks.*  
TU Vienna, January 2013.  
Graduiertenkolleg PUMA, TU München, May 2013.
- *A Perfect Model for Bounded Verification.*  
Labri Institute, Bordeaux, December 2012.
- *A Decision Procedure for Presburger Arithmetic.*  
TMP Excursion, Ludwig-Maximilians Universität München, February 2012.

- *Solving Fixed-Point Equations on Semirings.*  
RWTH-Aachen, June 2011.  
TU-München, Mathematisches Kolloquium, October 2014.
- *Complexity of Pattern-based Verification of Concurrent Programs*  
University of Oxford, January 2011.
- *Stochastic Process Creation*  
Universidad Complutense de Madrid, May 2010.
- *Solving Positive Polynomial Equations*  
IRISA Rennes, November 2008.  
Oxford University, April 2009.
- *SDSISep: A Reputation System Based on SDSI*  
Universität Oldenburg, December 2007.  
ETH Zürich, November 2009.
- *Newtonian Program Analysis*  
Oxford University, May 2007.  
Technische Universität München, May 2007  
University of Edinburgh, April 2009.
- *Fixed Point Equations in  $\omega$ -continuous semirings*  
RWTH-Aachen, May 2006  
Games Workshop, Newton Institute, Cambridge, July 2006  
University of Leipzig, November 2006.
- *A nugget of probable truth*  
Max-Planck-Institut für Informatik, Saarbrücken, Distinguished Speaker Series,  
January 2006
- *Verification of Probabilistic Procedural Programs*  
Technische Universität München, December 2004.
- *Model Checking Probabilistic Pushdown Systems*  
Minerva School, Tel Aviv, May 2004.  
University of Edinburgh, May 2004.  
Universität Stuttgart, November 2004.
- *Software Model Checking: Auf dem Weg zur automatischen Programmverifikation*  
Universität Stuttgart, inaugural lecture, February 2004.
- *Model Checking* (tutorial)  
Polytechnical University of Catalunya, December 2002.
- *Model Checking Pushdown Processes*  
Technical University of Helsinki, April 2002.  
Queen Mary College, University of London, May 2002.  
University Paris VII, May 2002.  
Technische Hochschule Aachen, July 2003.  
Centre Fédéré en Vérification, Brussels, November 2003.

- *Checking Consistency of Free Choice Signal Transition Graphs*  
University Paris VII, March 2000.
- *On the Algorithmics of Model Checking with Unfoldings.*  
Cambridge University, January 2002.
- *Computing  $pre^*$  and  $post^*$  for the PA-algebra, with applications to dataflow analysis.*  
University Paris VII, March 2000.
- *LTL Model-Checking with Unfoldings.*  
University Paris VII, March 2000.
- *Grammars as Processes.*  
Ludwig-Maximilian Universität, München, May 1999.  
Technische Universität Dresden, Februar 2000.  
University Paris VII, March 2000.
- *Automatische Verifikation von Systemen mit unendlichen Zustandsraeumen: Ein automatentheoretischer Ansatz.*  
Christian-Albrecht Universität zu Kiel, December 1998.  
Max-Planck-Institut für Informatik, Saarbrücken, February 1999.
- *Verification with Unfoldings.*  
University Paris XII, October 1998.  
Max-Planck-Institut für Informatik, Saarbrücken, February 1999.
- *Broadcast Protocols.*  
École Normal Supérieur de Cachan (Paris), October 1998.  
Max-Planck Institut für Informatik, Saarbrücken, February 1999.  
Bell Labs, Naperville, July 2000.
- *Verification Using Linear and Constraint Programming.*  
University of Oldenburg, April 1998.
- *Verification with 1-safe Petri Nets.*  
Universität Magdeburg, December 1997.
- *Model-Checking für Kellerautomaten.*  
Technische Hochschule Aachen, January 1997.  
Max-Planck-Institut für Informatik, February 1998.  
École Normal Supérieur de Cachan (Paris), April 1998.
- *Checking Systems Properties Using Linear Programming.*  
VERIMAG, Grenoble, September 1996.
- *Eine Verbesserung von McMillans Entfaltungsalgorithmus.*  
Universität Giessen, June 1996.  
Universität Augsburg, December 1997.
- *Ein effektives Tableau-Verfahren für den linearen  $mu$ -Kalkül.*  
University of Hildesheim, June 1996.

- *Decidability of Bisimulation Problems for Petri Nets.*  
VERIMAG, Grenoble, April 1996.
- *Verfeinerung in Petrinetzen.*  
Universität Stuttgart, November 1994.
- *Warum muß man Programme verifizieren?*  
Universität Hildesheim, May 1994.
- *Integration von Verifikationstechniken für Prozeßalgebren und Petrinetze.*  
Technische Universität München, December 1993.
- *Decidability Questions for Petri Nets.*  
University of Aarhus, November 1993.  
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