

Curriculum Vitae

Javier Esparza

April 25, 2012

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

1 Academic Employment

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

2 Education

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

3 Awards and Honours

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

4 Research Projects

- 1.5.11 – Main researcher (with Michael Luttenberger) of the project “Polynomial Systems on Semirings: Foundations, Algorithms, Applications” funded by the German Research Council.
- 1.1.10 – Main researcher (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 – Main researcher of the Graduiertenkolleg “Programm- und Modelanalyse” of the German Research Council.
- 1.11.06 – 31.3.08 Main researcher 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 Main researcher (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 Main researcher 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 Main researcher 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 Main researcher (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 Main researcher (together 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 Main researcher 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 Main researcher 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 Main researcher (together 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 Main researcher (together 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. Dejavuth 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.

- Christian Kern.
- Andreas Gaiser.
- Jan Křetínský
- René Neumann
- Maximilian Schlund

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 Winsconsin).

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/>

Journal Articles

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. Schwon: 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 and M. Luttenberger. Derivation Tree Analysis for the Computation of Fixed-Points. *Proceedings of CALCO 2011*. LNCS 6859, 19–35 (2011).

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

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, to appear.

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, 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 ω -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)

J. Kretinsky and J. Esparza. Deterministic Automata for the (F, G) -fragment of LTL. Proceedings of CAV '12, to appear (2012).

J. Esparza, A. Gaiser and S. Kiefer. Proving Termination of Probabilistic Programs Using Patterns. Proceedings of CAV '12, to appear (2012).

J. Esparza, P. Ganty and R. Majumdar. A Perfect Model for Bounded Verification. Proceedings of LICS '12, to appear (2012).

J. Esparza and C. Kern. Reactive and Proactive Diagnosis of Distributed Systems using Net Unfoldings. Proceedings of ACSD '12, to appear (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).

T. Brázdil, J. Esparza and S. Kiefer. On the Memory Consumption of Probabilistic Pushdown Automata. Proceedings of FSTTCS '09, Leibniz International Proceedings in Informatics, <http://drops.dagstuhl.de/opus/volltexte/2009/2341/>, (2009).

J. Esparza, S. Kiefer and M. Luttenberger. Derivation tree analysis for accelerated fixed-point computation. Proceedings of DLT '08, LNCS 5257, 301-313 (2008).

D. Suwimonterabuth, J. Esparza, S. Schwoon. Symbolic Context-Bounded Analysis of Multithreaded Java Programs. SPIN '08, LNCS 5156, 270-287 (2008).

J. Esparza, T. Gawlitza, S. Kiefer and H. Seidl. Approximative Methods for Monotone Systems of min-max-Polynomial Equations. Proceedings of ICALP '08, LNCS 5125, 698-

710 (2008).

A. Bouajjani, J. Esparza, S. Schwoon and D. Suwimonteerabuth. SDSIRep: A Reputation System based on SDSI. Proceedings of TACAS '08, LNCS 4963, 501–516 (2008).

J. Esparza, S. Kiefer and M. Luttenberger. Convergence Thresholds of Newton's Method for Monotone Polynomial Equations. Proceedings of STACS '08, 289–300, (2008).

D. Suwimonteerabuth, F. Berger, S. Schwoon and J. Esparza. jMoped: A Test Environment for Java programs. Proceedings of CAV '07, LNCS 4590, 164–167 (2007).

J. Esparza, S. Kiefer and M. Luttenberger. An Extension of Newton's Method to ω -continuous Semirings. Proceedings of DLT '07, LNCS 4588, 157–168 (2007).

S. Kiefer, M. Luttenberger and J. Esparza. On the Convergence of Newton's Method for Monotone Systems of Polynomial Equations. Proceedings of STOC '07, 217–226 (2007).

J. Esparza, S. Kiefer and M. Luttenberger. On Fixed Point Equations over Commutative Semirings. Proceedings of STACS '07, LNCS 4393, 296–307 (2007).

D. Suwimonteerabuth, S. Schwoon and J. Esparza. Efficient Algorithms for Alternating Pushdown Systems with an Application to the Computation of Certificate Chains. Proceedings of ATVA '06, LNCS 4128, 141–153 (2006).

G. Delzanno, J. Esparza and J. Srba. Monotonic Set-Extended Prefix Rewriting and Verification of Recursive Ping-Pong Protocols. Proceedings of ATVA '06, LNCS 4128, 415–429 (2006).

J. Esparza, P. Jančar and A. Miller. On the complexity of consistency and complete state coding. Proceedings of ACSD '06, IEEE Computer Society, 47–56 (2006).

J. Esparza, S. Kiefer and S. Schwoon: Abstraction refinement with Craig interpolation and symbolic pushdown systems. Proceedings of TACAS '06, LNCS 3920, 489–503 (2006).

A. Bouajjani, J. Esparza and S. Schwoon and J. Strejček: Reachability Analysis of Multithreaded Software with Asynchronous Communication. Proceedings of FSTTCS '05, 348–359 (2005).

T. Brázdil, J. Esparza and A. Kučera: Analysis and Prediction of the Long-run Behaviour of Probabilistic Sequential programs with Recursion. Proceedings of FOCS '05, 521–530 (2005).

J. Esparza, P. Ganty and S. Schwoon: Locality-based abstractions. Proceedings of SAS '05, LNCS 3672, 118–134 (2005).

- J. Esparza, A. Kučera and R. Mayr: Quantitative Analysis of Probabilistic Pushdown Automata: Expectations and Variances. Proceedings of LICS '05, 117–126 (2005).
- S. Schwoon and J. Esparza: A Note on On-the-Fly Verification Algorithms. Proceedings of TACAS '05, LNCS 3440, 174–190 (2005).
- D. Suwimonteerabuth, S. Schwoon and J. Esparza: jMoped: A Java Bytecode Checker Based on Moped. Proceedings of TACAS '05, LNCS 3440, 541–545 (2005).
- J. Esparza, A. Kučera and R. Mayr: Model Checking Probabilistic Pushdown Systems. Proceedings of LICS '04, 12–22 (2004).
- A. Bouajjani, J. Esparza and T. Touili: A Generic Approach to the Static Analysis of Concurrent Programs with Procedures. Conference Record of POPL '03, 62–73, ACM Press (2003).
- J. Esparza: A Polynomial-Time Algorithm for Checking Consistency of Free-Choice Signal Transition Graphs. Proceedings of the 3rd International Conference on Applications of Concurrency to System Design, ACSD 2003, IEEE Computer Society, 61–70 (2003).
- J. Esparza and M. Maidl: Simple Representative Instantiations for Multicast Protocols. Proceedings of TACAS '03, LNCS 2619, 128–143 (2003).
- C. Schöter, S. Schwoon and J. Esparza: The Model-Checking Kit. Proceedings of the 24th Conference on Application and Theory of Petri Nets, LNCS 2679, 463–472 (2003).
- A. Stefanescu, J. Esparza and A. Muscholl: Synthesis of Distributed Algorithms using Asynchronous Automata. Proceedings of CONCUR 2003, LNCS 2761, 27–41, (2003).
- J. Esparza, A. Kučera and S. Schwoon: Model-Checking LTL with Regular Valuations for Pushdown Systems. Proceedings of TACS '01, LNCS 2215 316–339 (2001).
- J. Esparza and K. Heljanko: Implementing LTL Model Checking with Net Unfoldings. Proceedings of SPIN '01, LNCS 2057, 37–56 (2001).
- J. Esparza and C. Schröter: Net Reductions for LTL Model-Checking. Proceedings of CHARME '01, LNCS 2144, 310–324 (2001).
- J. Esparza and S. Schwoon: A BBD-Based Model Checker for Recursive Programs. Proceedings of CAV '01, LNCS 2102, 324–336 (2001).
- J. Esparza and L. Prensa-Nieto: Verifying Single and Multi-mutator Garbage Collectors with Owicki-Gries in Isabelle/HOL. Proceedings of MFCS '00, LNCS 1893, 619–628 (2000).

- J. Esparza and A. Podelski: Efficient algorithms for *pre** and *post** on Interprocedural Parallel Flow Graphs. Conference Record of POPL '00, 1–11, ACM Press (2000).
- J. Esparza, D. Hansel, P. Rossmanith and S. Schwoon: Efficient Model Checking Algorithms for Pushdown Systems. Proceedings of CAV '00, LNCS 1855, 232–247 (2000).
- J. Esparza and K. Heljanko: A New Unfolding Approach to LTL Model Checking. Proceedings of ICALP '00, LNCS 1853, 475–486 (2000).
- J. Esparza, A. Finkel and R. Mayr: On the Verification of Broadcast Protocols. Proceedings of LICS'99, IEEE Computer Society, 352–359 (1999).
- A. Kučera and J. Esparza: A Logical Viewpoint on Process-algebraic Quotients. Proceedings of CSL '99, LNCS 1683, 499–514 (1999).
- C. Röckl and J. Esparza: Proof-Checking Protocols Using Bisimulations. Proceedings of CONCUR '99, LNCS 1664, 525–540 (1999).
- A. Bouajjani, J. Esparza and O. Maler: Reachability Analysis of Pushdown Automata: Application to Model-Checking. Proceedings of CONCUR '97, LNCS 1243, 135–150 (1997).
- J. Esparza and P. Rossmanith: An Automata Approach to some Problems on Context-free Grammars. Foundations of Computer Science, LNCS 1337, 143–152 (1997).
- J. Bradfield, J. Esparza and A. Mader: An Effective Tableau System for the Linear Time mu-Calculus. Proceedings of ICALP '96, LNCS 1099, 98–109 (1996).
- J. Esparza, S. Römer and W. Vogler: An Improvement of McMillan's Unfolding Algorithm. Proceedings of TACAS '96, LNCS 1055, 87–106 (1996).
- P. Jancar and J. Esparza: Deciding Finiteness of Petri Nets up to Bisimulation. Proceedings of ICALP '96, LNCS 1099, 478–489 (1996).
- A. Kovalyov and J. Esparza: A Polynomial Algorithm to Compute the Concurrency Relation of Free-choice Signal Transition Graphs. Proceedings of WODES '96, Institution of Electrical Engineers, 1–6 (1996).
- S. Melzer and J. Esparza: Checking System Properties via Integer Programming. Proceedings of ESOP '96, LNCS 1058, 250–265 (1996).
- S. Melzer, S. Römer and J. Esparza: Verification Using PEP. Proceedings of AMAST '96, LNCS 1101, 591–594 (1996).

- J. Esparza: Petri Nets, Commutative Context-free Grammars and Basic Parallel Processes. Proceedings of FCT'95, LNCS 965, 221–232 (1995).
- J. Esparza and A. Kiehn: On the Decidability of Model Checking for Branching Time Logics and Basic Parallel Processes. Proceedings of CAV '95, LNCS 939, 353–366, (1995).
- J. Esparza: On the Decidability of Model Checking for Several μ -calculi and Petri nets. Proceedings of CAAP '94, LNCS 787, 115–129 (1994).
- M. Koutny, J. Esparza and E. Best: Operational Semantics of the Box Calculus. Proceedings of CONCUR '94, LNCS 836, 210–225 (1994).
- E. Best, R. Devillers and J. Esparza : General Refinement and Recursion Operators for the Petri Box Calculus. Proceedings of STACS '93, LNCS 665, 130–140 (1993).
- A. Cheng, J. Esparza and J. Palsberg: Complexity Results for 1-safe Petri Nets. Proceedings of the Thirteenth Conference on the Foundations of Software Technology and Theoretical Computer Science, LNCS 761, 326–337 (1993).
- J. Desel and J. Esparza: Shortest Paths in Reachability Graphs. Proceedings of the 14th Conference on Application and Theory of Petri Nets, LNCS 691, 224–241 (1993).
- J. Esparza: Model Checking Using Net Unfoldings. Proceedings of TAPSOFT '93 (1993), LNCS 668, 613–628 (1993).
- J. Esparza and B. von Stengel: The Asynchronous Committee Meeting Problem. Proceedings of WG '93, 19th International Workshop on Graph-Theoretic Concepts in Computer Science, LNCS 790, 276–287 (1993).
- E. Best, L. Cherkasova, J. Desel and J. Esparza: Traps, Free Choice and Home States (extended abstract). Semantics for Concurrency, Leicester 1990. M. Kwiatowska, Workshops in Computing, Springer-Verlag, 16–21 (1991).
- E. Best and J. Esparza: Model Checking of Persistent Petri Nets. Proceedings of Computer Science Logic '91, LNCS 626, 35–52 (1991).
- J. Desel and J. Esparza: Reachability in Reversible Free Choice Systems. Proceedings of STACS '91, LNCS 480, 384–397 (1991).
- J. Esparza and M. Silva: Compositional Synthesis of Live and Bounded Free Choice Nets. Proceedings of CONCUR '91, LNCS 527, 172–187 (1991).
- J. Esparza and M. Silva: Top-Down Synthesis of Free Choice Nets. Advances in Petri Nets 1991, LNCS 524, 118–139 (1991).

J. Esparza: Synthesis Rules for Petri Nets, and How they Lead to New Results. Proceedings of CONCUR '90, LNCS 458, 182–198 (1990).

Others (non-refereed)

J. Esparza, P. Rossmanith and S. Schwoon: A Uniform Framework for Problems on Context-Free Grammars. Bulletin of the EATCS 72 (2000).

O. Burkart and J. Esparza: More Infinite Results. Bulletin of the EATCS 62 (Concurrency Column) (1997).

J. Esparza and M. Nielsen: Decidability issues for Petri nets – a survey. Bulletin of the EATCS 52 (Concurrency Column) (1994).

As Editor

Finite and Algorithmic Model Theory, J. Esparza, C. Michaux, and C. Steinhorn (eds.), London Mathematical Society, Lecture Note Series 379 (2011).

Tools and Algorithms for the Construction and Analysis of Systems, 16th International Conference, TACAS 2010, Paphos, Cyprus, March 2010, Proceedings, J. Esparza and R. Majumdar (eds.) LNCS 6015 (2010).

Applications and Theory of Petri Nets 2002, 23rd International Conference, ICATPN 2002, Adelaide, Australia, June 2002, Proceedings, J. Esparza and C. Lakos (eds.) LNCS 2360 (2002).

Workshop on the Verification of Infinite State Systems, Schloß Dagstuhl, A. Bouajjani, J. Esparza and S. Schwoon (eds.) Dagstuhl-Report 271 (2000).

Proceedings of INFINITY '98, J. Esparza (ed.). Technische Report SFB 342/09/98A, Technische Universität München (1998).

Design Methods Based on Nets. Edited Progress Report of the ESPRIT Basic Research Action 3148, E. Best und J. Esparza (eds.). GMD-Studien Nr. 198 (1991).

In Computer Science in Medicine

Journals

J.R. Iglesias, J. Esparza and B. Sánchez: Differentialdiagnosis of Lung Neuroendocrine Tumours with the Help of “MEDES”. Pathology Research and Practice 183, 85 (1997).

J.R. Iglesias, J. Esparza and B. Sánchez: MEDES (MEdical DEcision Shell Demo-
Version). *Electronic Journal of Pathology* 2; 963.06.txt (1996).

J.R. Iglesias, J. Esparza, C. Aruffo and K. Maier-Hauff: Histologische, immunohistologi-
sche and elektronmikroskopische Differentialdiagnose der Astroblastome gegenüber malignen
Astrozytomen und Glioblastomen. *Zentralblatt für allgemeine Pathologie und pathologi-
sche Anatomie* 135, 85 (1989).

J.R. Iglesias, C. Aruffo, J. Esparza and E. Kazner: Histological Grading of Brain Tu-
mours. *EDV in Medizin und Biologie* 19, 38–44 (1989).

J.R. Iglesias, J. Figols, G. Dierssen and J. Esparza: Diagnóstico diferencial de los neuroi-
nomas y meningiomas intrarraquídeos con ayuda de un sistema bayesiano. *Archivos de
Neurobiología* 51, 333-341 (1988).

Ch. Brinnel, J.R. Iglesias, J. Esparza and E. Kazner: Computergestützte Maligni-
tätsbestimmung von Astrozytomen und Oligodendrogliomen. *Zentralblatt für allge-
meine Pathologie und pathologische Anatomie* 133, 471 (1987).

J.R. Iglesias, Ch. Brinnel and J. Esparza: "TUMOR": Computermodell für das histologi-
sche Archiv der Hirntumoren (WHO-Klassifikation). Halbautomatisches Verfahren. *Verh.
der Deutschen Gesellschaft für Pathologie* 70, 527 (1986).

J.R. Iglesias, E. Kazner, C. Aruffo and J. Esparza: A model of semiautomatical type-
specific CT diagnosis of brain tumours. *Mathematical fundamentals and practical applica-
tion. British Journal of Radiology*, 59, 895–900 (1986).

J.R. Iglesias, Ch. Brinnel, J. Artigas, J. Esparza, J. Monhaupt and F. Pfannkuch: Com-
puter Model of Archive and Mathematical Diagnosis of Brain Tumours. *Pathology Re-
search and practice* 178, 132 (1983).

Conferences and Workshops (refereed)

J.R. Iglesias, J. Esparza, K. Tönnsen, C. Aruffo, Ch. Brinnel and K. Maier-Hauff: Com-
puter Assisted Diagnosis of Brain Tumours in CT-Scan Imaging. In: *Computer Assisted
Radiology. Proceedings of the International Symposium*, H.U. Lemke, M.L. Rhodes, C.C.
Jaffee, R. Felix (eds.) 423–428, Springer-Verlag, Berlin (1989).

J.R. Iglesias, C. Aruffo, J. Esparza, B. Trempenau and E. Kazner: An Expert system for
the Diagnosis of Brain Tumours. In: *Computer Assisted Radiology. Proceedings of the
International Symposium*, H.U. Lemke, M.L. Rhodes, C.C. Jaffee, R. Felix (eds.) 397–
401, Springer-Verlag, Berlin (1987).

J.R. Iglesias, E. Kazner, C. Aruffo and J. Esparza: An Expert System for the Diagnosis
of Brain Tumours in Computer Tomographic Images and Histopathologically. In: *Brain*

Oncology. Biology, diagnosis and therapy, M. Chatel, F. Darcel, J. Pecker (eds.) 223–226, Martinus Hijoff Publishers, Dordecht (1987).

J.R. Iglesias, E. Kazner, C. Aruffo and J. Esparza: CT diagnosis of brain tumours: Semi-automatrical type-specific CT diagnosis of brain tumours. Mathematical fundamentals and practical application. In: Computer Assisted Radiology. Proceedings of the International Symposium, H.U. Lemke, M.L. Rhodes, C.C. Jaffee, R. Felix (eds.) 443–448, Springer-Verlag, Berlin (1985).

In Physics

Journal Articles

J. Esparza, J.L. López and J. Sesma: Zeros of the Whittaker function associated to Coulomb Waves. IMA Journal of Applied Mathematics 63(1), 71–88 (1999).

A. Cruz, J. Esparza and J. Sesma: Zeros of the Hankel Function of Real Order out of the Principal Riemann Sheet. Journal of Computational and Applied Mathematics 37, 89–99 (1991).

Professional Activities

Program Chair

- 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 Stste Systems, Aalborg, 1998.

Program Committees

- 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 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.
- Workshop on Verification in Computational Logic, VCL '00, Satellite Workshop to CL '00, London, 2000.
- IFIP International Conference on Theoretical Computer Science, IFIP TCS 2000, Tokyo, 2000.
- 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).
- **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 Supérieure 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).

- **Research projects, evaluation committees:** 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 Austausch Dienst), the Max-Planck Gesellschaft, the Alexander-von-Humboldt Stiftung, 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, and the University of Oxford.

Others

- Member of the IFIP TC 2 Working Group 2.2 “Formal Description of Programming Concepts” since 1999.
- Member of the scientific committee of the “Revista Matemática de la Universidad Complutense de Madrid” (1996-2008).
- Member of the EATCS Council (2001-2005).
- 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” since 2011.
- 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.
- Managing Director of the Institut für Informatik der Technischen Universität München (2008–2010).

- 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.
- Member of the Steering Committee of the GandALF conference series.
- Member of Academia Europaea

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)
 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)
 Probability theory and statistics (Summer 00, Summer 07, Summer 08, Summer 09)
 Verification with automata (Summer 99)
 Discrete Mathematics (Winter 08/09)
 Model Checking II (Summer 08)
 Discrete Mathematics (Winter 08/09, Winter 09/10)
 Automata theory and formal languages (Winter 08/09, Winter 09/10, Winter 10/11)

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)

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, Summer 06)
Fundamentals of Software Reliability (Winter 03/04, Winter 04/05, Winter 05/06, Winter 06/07)
Logic (Winter 03/04, Winter 04/05, Winter 05/06, Winter 06/07)
Model Checking (Summer 03, Summer 05, Summer 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, Winter 06/07)
Games in Computer Science (Summer 06)

8 Invited Talks and Tutorials

At International Conferences

- *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

- *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 ω -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 Infinite-state Systems*.
Artist School on Quantitative Model Checking, 2012.
- *Automata-Theoretic Models of Software*.
Marktoberdorf Summer School, 2011.
- *Mathematical Foundations of Program Analysis*.
Marktoberdorf Summer School, 2009.
- *Building a Software Model Checker*.
Marktoberdorf 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.*
Marktobendorf 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

- *Solving Fixed-Point Equations on Semirings.*
15 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 Supérieure de Cachan, Paris, March 2005.
- *Software Model Checking: An Automata-Theoretic Approach.*
Joint Chinese-German Workshop on Theoretical Computer Science, Shanghai, October 2003.
- *Some Applications of Petri Nets to the Analysis of Parametrized Systems.*
13 Theorettag 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

- *A Decision Procedure for Presburger Arithmetic.*
TMP Excursion, Ludwig-Maximilians Universität München, February 2012.
- *Solving Fixed-Point Equations on Semirings.*
RWTH-Aachen, June 2011.
- *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.
- *SDSIRep: 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 ω -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 μ -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.
University of Sussex, November 1993.
- *The Asynchronous Committee Meeting Problem.*
University of Glasgow, May 1993.
- *Model Checking Using Net Unfoldings.*
Technische Universität München, December 1992.
Siemens ZFE, München, December 1992.
Universität of Oldenburg, January 1993.
Technische Hochschule Aachen, December 1993.
VERIMAG, Grenoble, April 1996.
INRIA, Sophia-Antipolis, September 1996.
- *Model Checking of Persistent Petri Nets.*
Universität Paderborn, July 1991.
- *Reachability in Reversible Free Choice Systems.*
University of Edinburgh, March 1991.
- *Free Choice Systems.*
University of Edinburgh, March 1991.
- *El sistema CSP de computación paralela (tutorial).*
Universidad de Zaragoza (Spanien), February 1991.
- *The Rank Theorem.*
Technische Universität München, October 1990.
- *Synthesis of Live and Bounded Free Choice Systems.*
Universität Hildesheim, November 1989.

- *Liveness of Bounded Free Choice Nets is Decidable in Polynomial Time.*
GMD, Bonn, March 1989.
- *Circuits, Handles, Bridges and Nets.*
GMD, Bonn, March 1989.