

Curriculum Vitae

Rom Langerak

May 26, 2010

Personal Data

Surname: Langerak
First name: Romanus (Rom)
Title: dr. ir.

Date of birth: Februari 1, 1961
Place of birth: Dordrecht (The Netherlands)
Nationality: Dutch
Sex: Male

Education

Highschool

- Athenaeum B, Het Christelijk Lyceum, Dordrecht, graduated in 1979.

Masters degree

- M.Sc. degree (with honours) in Applied Mathematics, University of Twente, August 1986.
- M.Sc. Thesis: View Updates in Relational Database Systems.
- Supervisors: prof. dr. ir. L.A.M. Verbeek, prof. dr. P.M.G. Apers.

Ph.D. degree

- Ph.D. degree in Computer Science, University of Twente, November 20, 1992.
- Dissertation: Transformations and Semantics for LOTOS.
- Supervisor: prof. dr. H. Brinksma.

Employment History

September 1986 - October 1986

Temporary research scientist
Theoretical Computer Science
Department of Mathematics
University of Twente

November 1986 - February 1988

Obligatory military service
final rank: lieutenant (infantry)

March 1988 - April 1992

Research associate
Tele-Informatics and Open Systems
Department of Computer Science
University of Twente

April 1992 - present

Assistant Professor (UD)
Formal Methods and Tools group
Department of Computer Science
University of Twente

September 2009 - present

Director of Education (Opleidingsdirecteur)
for Technische Informatica, Computer Science, and Telematics
Department of Computer Science
University of Twente

Project Experience

Projects participated in:

- ESPRIT-II project 2304, LOTOSPHERE: Software development using LOTOS, 1989-1992.
- ESPRIT-III project 6021, REACT: Building correct reactive systems, 1993-1995.
- Philips Research Laboratories project: Verifying the ACCESS.bus protocol, 1994-1995.
- Bilateral project (University of Twente, CNUCE-CNR Pisa) ESPT: Estensioni probabilistiche e temporali dell' algebra di processi LOTOS, 1994-1996.
- Validation project for BOSCH/BLAUPUNT: Validating the MCA (Mobile Communication Architecture) Protocol, 1995.
- Trilateral project (University of Twente, CNUCE-CNR, University of Erlangen): Event Structures Quantitative, Simulazione Discreta e Modelli per la Performance, 1997-1999.
- Telematics Institute project SVC: Software Verification Centre, 1999-2000. Manager of Task E: Technology transfer.
- NWO Open Competition project CASH: Compositional Analysis and Specification of Hybrid Systems, 2001-2006.
- EC Fifth Framework project AMETIST: Advanced Methods for Timed Systems, 2002-2005.
- EC Sixth Framework Network of Excellence HYCON: Hybrid Control: Taming Heterogeneity and Complexity of Networked Embedded Systems, 2004-2008.
- NWO Open Competition project AiSHA: Abstraction in Stochastic Hybrid Process Algebra, 2005-2008.
- EC Seventh Framework STREP project QUASIMODO: Quantitative System Properties in Model Driven-Design of Embedded Systems, started in 2008.

Projects submitted:

- NWO Open Competition project IMPASSE: Implementing McMillan Prefixes Against State Space Explosion, 2003-2007.
- NWO Open Competition project ADHOC: Analysis and Design of Hybrid Systems using Optimal Control, 2003-2007.
- NWO Open Competition project DARTS: Design and Analysis of Robust Timed Systems, 2005-2006.
- NWO Open Competition project CLASHES: Control and Analysis for the Stability of Hybrid and Embedded Systems, started in 2008.
- NWO Open Competition project ASPETTA: Analysis of Signaling Pathways: Exploration Tool based on Timed Automata, rejected in 2010.

Teaching Experience

- I have given the following courses:
 - Introductory Programming (1st year)
 - Software Engineering (2nd year)
 - Specification Methods (2nd year)
 - Specification Methods for Business Information Technology (3rd year)
 - Tele-Informatics (2nd year)
 - Capita Selecta Computer Networks (3rd-4th year)
 - Formal Specification and Verification of Distributed Systems (3rd-4th year)
 - Design Project (3rd year)
 - Matlab for Biomedical Studies (1st year)
 - Basic Models (1st year)
 - Formal Methods in Software Engineering (3rd year)
 - Algorithms, Datastructures and Complexity (2nd year)
 - Modelling and Analysis of Concurrent Systems (Master course)
 - Multi-disciplinary Design Project (Master course)
- I have supervised or have assisted in supervising the following Masters students:
 - Clazien Wezeman, The CO-OP method for compositional derivation of conformance testers, 1988.
 - Peter Broekroelofs, Bipartitioning of LOTOS specifications, 1992.
 - Maarten Steen, functionality extension of LOTOS specifications, 1993.
 - Eilko Nijboer, Bipartitioning of full LOTOS specifications, 1993.
 - Detlef Arnold, Optimizing protocol visualization with bundle event structures, 1993.
 - Remco Hoetmer, Formal Design of Database Protocols, 1995.
 - Enrico Quattrocchi, Formal specification of the ACCESS.bus protocol using LITE, 1995.
 - Rene de Vries, Conformance testing with Promela, 1996.
 - Mariska Aalderink, De betekenis van de wet van het uitgesloten derde en haar geldigheidsbereik, 1996.
 - Arjan de Heer, SmartNet, a case study in protocol validation, 2000.
 - Savitri Kumalasari Sihombing, Dynamically Coloured Petri Nets: Properties and their Decidability, 2005.
 - Jasper Berendsen, Reachability in Weighted Probabilistic Timed Automata, 2005.
 - Raymond Kroon, Scheduling paper transport in a copier with Timed Automata, 2006.
 - Helen Schonenberg, Discrete Simulation of Behavioural Hybrid Process Calculus, 2006.

- Frank van Es, Type Inference for Graph Transformation Systems, 2008.
- Wouter Everse, Modelling and Verification of a Shortest Path Tree Protocol for Wireless Sensor Networks, 2009.
- Wim Bos, Interactive Signaling Network Analysis Tool, 2009.
- Matthijs Ooms, Provenance Management in Practice, 2009.
- I have been a student mentor for 1st, 2nd and 3rd year students.
- I have assisted in supervising the following PhD students:
 - Jan Tretmans, A Formal Approach to Conformance Testing, 1992.
 - Arend Rensink, Models and Methods for Action Refinement, 1993.
 - Joost-Pieter Katoen, Quantitative and Qualitative Extensions of Event Structures, 1996.
 - Pim Kars, Process-algebraic Transformations in Context, 1997.
 - Lex Heerink, Ins and Outs in Refusal Testing, 1998.
 - Theo Ruys, Towards Effective Model Checking, 2001.
 - Agung Julius, On Interconnection and Equivalence of Continuous and Discrete Systems, 2005.
 - Stefan Strubbe, Compositional Modelling of Stochastic Hybrid Systems, 2005.
 - Tomas Krilavicius, Specification and simulation of hybrid systems, 2006.
 - Current PhD students: Piotr Kordy, Svetlana Polenkova.
- I have followed the following educational courses:
 - Educational orientation, 25 hours, 1988.
 - Tutoring exercise lectures, 22 hours, 1989.
 - Conversational techniques for student mentors, 25 hours, 1990.
 - Supervising Masters assignments, 16 hours, 1991.
 - Didactical preparation for design methods, 25 hours, 1992.
 - Knowledge Management and Creative Thinking, 15 hours, 2000.
 - Methodical Information Search, 15 hours, 2001.
 - Supervising PhD students, 10 hours, 2007.

Management and Other Activities

- Experience as member of the following committees at the University of Twente:
 - Chairman of the Institutional Board of the CTIT (Centre for Telematics and Information Technology)
 - Temporary chair holder of the Formal Methods and Tools Chair
 - Management Team of the Formal Methods and Tools Chair (secretary)
 - Educational committee Business Information Technology
 - Educational committee Computer Science
 - Publicity committee Business Information Technology
 - Publicity committee Computer Science
 - Research committee Computer Science
 - Examination committee Computer Science
 - Admittance committee Computer Science
 - Interfaculty committee on Art and Technology
 - Committee on mathematics education in Computer Science
 - Mentor of Students Dispute SAP
- Member of the educational committee of the Dutch IPA (Institute for Programming research and Algorithmics)
- Received the Interactief Educational Award 07/08
- Reviewer for various journals and conferences
 - **Journals:** IEEE Trans. on Software Eng., IEEE Trans. on Computers, IEEE Computer Society, Information and Computation, Information Processing Letters, Theoretical Computer Science, Formal Aspects of Computing, Formal Methods in System Design, Acta Informatica, Comp. Networks and ISDN Systems, Distributed Computing, Science of Computer Programming.
 - **Conferences:** ARTS, IPDS, TACAS, FORTE, PSTV, AMAST, CFIP, ICODP, IWPTS, FTRTFT, CONCUR, CAV, STACS, ICDCS, CSN, COMNET, FASE, FMOODS, PAPM.
- Local co-organizer of the following conferences:
 - Third Dutch Specification Day, March 21, 1996.
 - Third International Workshop TACAS'97, April 2-4, 1997.
 - Third SPIN Workshop, April 5, 1997.
 - Dutch Model Checking Day, January 30, 2001.
 - Hybrid Systems Day, January 15, 2003.

- Program committees: AMAST Workshop on Real-Time and Probabilistic Systems, International Workshop for Industrial Critical Systems, Seventh International Conference on Formal Engineering Methods, Formal Methods for Aerospace 2009, Computational Models for Cell Processes 2009, Hybrid Autonomous Systems 2011.
- Experience in writing project proposals (NWO, international bilateral projects, European Long Term Research Actions, European Information Society Technologies Programme, EC Network of Excellence, EC STREP).
- Other interests: literature, philosophy, classical guitar, pool billiards, martial arts.

Publications

Citations

Total number of citations (Google Scholar): over 500.

H-index: 15 (so 15 publications with at least 15 citations).

Journal Papers

1. P. KORDY, R. LANGERAK, J.W. POLDERMAN. Re-verification of a Lip Synchronization Protocol using Robust Reachability. *Electronic Proceedings in Theoretical Computer Science* 20, pp. 49-62, 2010.
2. D. KHUSAINOV, R. LANGERAK, AND O. KUZMYCH. Estimations of solutions convergence of hybrid systems consisting of linear equations with delay. *Nonlinear Dynamics and Systems Theory*, 7 (2), pp. 169-186, 2007.
3. E. BRINKSMA, J.-P. KATOEN, D. LATELLA, AND R. LANGERAK. Partial-order models for quantitative extensions of LOTOS. *Computer Networks and ISDN Systems*, 30(9/10):925–950, 1998.
4. J.-P. KATOEN, D. LATELLA, R. LANGERAK, E. BRINKSMA, AND T. BOLOGNESI. A consistent causality-based view on a timed process algebra including urgent interactions. *Journal on Formal Methods for System Design*, 12(2):189–216, 1998.
5. E. BRINKSMA, J.-P. KATOEN, R. LANGERAK, AND D. LATELLA. A stochastic causality-based process algebra. *The Computer Journal*, 38(7):552–565, 1995.
6. E. BRINKSMA AND R. LANGERAK. Functionality decomposition by compositional correctness preserving, transformation. *South African Computer Journal*, 13:2–13, 1995.
7. R. LANGERAK. View updates in relational databases with an independent scheme. *ACM Transactions on Database Systems*, 15(1):40–66, March 1990.

Book Contributions

1. R. LANGERAK AND J.W. POLDERMAN. Hybrid automata. In *Handbook of Hybrid Systems Control, Theory - Tools - Applications*, Cambridge University Press, Cambridge, pp. 60-65, 2008.

2. E. BRINKSMA, J.-P. KATOEN, R. LANGERAK, AND D. LAELLA. Performance analysis and true concurrency semantics. In T. Rus and C. Rattray, editors, *Theories and Experiences for Real-Time System Development*, volume 2 of *AMAST Series in Computing*, chapter 12, pages 309–337. World Scientific, Singapore, 1994.
3. T. BOLOGNESI, D. DE FRUTOS, R. LANGERAK, AND D. LAELLA. *LOTOSphere, Software Development with LOTOS*, chapter Correctness preserving transformations for the early phases of software, pages 161–180. Kluwer Academic Publishers, 1995.

Conference Contributions

1. W. BOS, J. SCHOLMA, R. LANGERAK, P. VAN DER VET. IKNAT: Interactive Modeling of Signal Transduction Networks with Timed Automata and UPPAAL. Submitted to: 8th International Conference on Formal Modelling and Analysis of Timed Systems, Vienna, September 8-10, 2010.
2. J. XING, B.D. THEELEN, R. LANGERAK, J. VAN DE POL, J. TRETSMANS, J.P.M. VOETEN. UPPAAL in Practice: Quantitative Verification of a RapidIO Network. Submitted to: 4th International Symposium On Leveraging Applications of Formal Methods, Verification and Validation, Heraclin, Crete, October 18-20, 2010.
3. J. XING, B.D. THEELEN, R. LANGERAK, J. VAN DE POL, J. TRETSMANS, J.P.M. VOETEN. From POOSL to UPPAAL: Transformation and Quantitative Analysis. In: Proceedings of the 10th International Conference on Application of Concurrency to System Design, Braga, Portugal, June 23-25, 2010.
4. S. POLENKOVA, J.W. POLDERMAN, R. LANGERAK. Stability criteria for planar linear systems with state reset. In: Proceedings of the 19th international symposium on mathematical theory of networks & systems, Budapest, Hungary, July 5-9, 2010.
5. C.F. DAWS, R. LANGERAK, AND J.W. POLDERMAN. Decision algorithm for the stability of planar switching linear systems. In: Proceedings of the 18th international symposium on mathematical theory of networks & systems, Blacksburg, Virginia, USA, 2008.
6. M.C. BUJORIANU, L.M. BUJORIANU, AND R. LANGERAK. An Interpretation of Concurrent Hybrid Time Systems over Multi-clock Systems. In: Proceedings of the 17th IFAC World Congress, Seoul, Korea, pp. 3635-3640, IFAC, 2008.
7. L.M. BUJORIANU, J. LYGEROS, AND R. LANGERAK. Reachability Analysis of Stochastic Hybrid Systems by Optimal Control. In: 11th International Workshop, HSCC 2008, 22-24 April 2008, St. Louis, USA. pp. 610-613. Lecture Notes in Computer Science 4981, Springer Verlag, 2008.
8. R. LANGERAK AND O. KUZMYCH. Estimations of solutions convergence of hybrid systems with delay. In: Conference on Differential and Difference Equations and Applications CDDEA 2006, Zilina, Slovensko, pp. 30-31, 2006.
9. R. LANGERAK AND J.W. POLDERMAN. Gain Automata and Delay Compensation. Accepted at CDC-ECC'05, Sevilla, 2005.

10. S. STRUBBE AND R. LANGERAK. A composition operator for systems with active and passive actions. Proceedings of FORTE 2005, LNCS, Taiwan, 2005.
11. R. LANGERAK, J.W. POLDERMAN, AND T. KRILAVICIUS. Stability analysis for hybrid automata using optimal Lyapunov functions. International Conference on Dynamical System Modelling and Stability Investigation, Kiev, May 27-30, 2003.
12. R. LANGERAK, J.W. POLDERMAN, AND T. KRILAVICIUS. Satability Analysis for Hybrid Automata Using Conservative Gains. Proceedings ADHS03, St. Malo, France, June 2003.
13. T. RUYS, R. LANGERAK, J.-P. KATOEN, D. LATELLA, AND M. MASSINK. Mean Runtime Analysis of Stochastic Process Algebra Using Partial Orders. Proceedings TACAS 2001, LNCS 2031, Springer Verlag, 2001.
14. R. LANGERAK. Deriving a Graph Grammar from a Complete Finite Prefix of an Unfolding. In B. Victor and I. Castellani, editors, *proceedings of the EXPRESS'99 Workshop*, Elsevier Electronic Notes in Theoretical Computer Science, 1999.
15. R. LANGERAK AND E. BRINKSMA. A complete finite prefix for process algebra. In N. Halbwachs and D. Peled, editors, *proceedings of CAV'99*, LNCS 1633, Springer, 1999.
16. R. LANGERAK, E. BRINKSMA, AND J.-P. KATOEN. Causal ambiguity and partial orders in event structures. In A. Mazurkiewicz and J. Winkowski, editors, *CONCUR'97 8th International Conference on Concurrency Theory*, pages 317–331, LNCS 1243. Springer Verlag, 1997.
17. T. RUYS AND R. LANGERAK. Validation of Bosch' Mobile Communication Network Architecture with SPIN. Participants proceedings of *Third SPIN Workshop*, 14 pages, Enschede, The Netherlands, April 5th, 1997.
18. J.-P. KATOEN, D. LATELLA, R. LANGERAK, E. BRINKSMA, AND T. BOLOGNESI. A consistent causality-based view on a timed process algebra. In D. Ionescu and A. Cornell, editors, *Proceedings 3rd AMAST Workshop on Real-Time Systems*, pages 212–227, Salt Lake City, Utah, 1996.
19. J.-P. KATOEN, D. LATELLA, R. LANGERAK, AND E. BRINKSMA. On specifying real-time systems in a causality-based setting. In B. Jonsson and J. Parrow, editors, *Formal Techniques in Real-Time and Fault-Tolerant Systems*, volume 1135 of *Lecture Notes in Computer Science*, pages 385–405, Uppsala, Sweden, 1996. Springer-Verlag.
20. J.-P. KATOEN, D. LATELLA, R. LANGERAK, AND E. BRINKSMA. Stochastic simulation of event structures. In M. Ribaud, editor, *Proceedings of the 4th Workshop on Process Algebra and Performance Modelling*, Torino, Italy, 1996. Università di Torino.
21. E. BRINKSMA, J.-P. KATOEN, R. LANGERAK, AND D. LATELLA. Performance analysis and true concurrency semantics (extended abstract). In U. Herzog and M. Rettelbach, editors, *Proceedings of the 2nd Workshop on Process Algebras and Performance Modelling*, volume Band 27(4) of *Arbeitsberichte des Instituts für Mathematische Maschinen und Datenverarbeitung*, pages 157–174. Universität Erlangen-Nürnberg, 1994.

22. B. BOTMA AND R. LANGERAK. Simulator for LOTOS to study the independence and causality of events. In D. Hogrefe and S. Leue, editors, *Formal Description Techniques VII*, Participants proceedings, pages 201–203, 1994.
23. J.-P. KATOEN, R. LANGERAK, AND D. LATELLA. Modelling systems by probabilistic process algebra: An event structures approach. In R.L. Tenney, P.D. Amer, and M.Ü. Uyar, editors, *Formal Description Techniques VI*, volume C-22 of *IFIP Transactions*, pages 253–268. North-Holland, 1994.
24. E. BRINKSMA, R. LANGERAK, AND P. BROEKROELOFS. Functionality decomposition by compositional correctness preserving transformation. In C. Courcoubetis, editor. *Computer Aided Verification*, pages 371–384. LNCS 697. Springer-Verlag, 1993.
25. R. LANGERAK. Bundle event structures: a non-interleaving semantics for LOTOS. In M. Diaz and R. Groz, editors, *Formal Description Techniques V*, volume C-10 of *IFIP Transactions*, pages 331–346. North-Holland, 1993.
26. R. LANGERAK. Event structures for design and transformation in LOTOS. In K.R. Parker and G.A. Rose, editors, *Formal Description Techniques V*, volume C-2 of *IFIP Transactions*, pages 265–280. North-Holland, 1992.
27. R. LANGERAK. Decomposition of functionality: A correctness-preserving LOTOS transformation. In L. Logrippo, R.L. Probert, and H. Ural, editors, *Protocol Specification, Testing and Verification X*, pages 229–242. North-Holland, 1990.
28. E. BRINKSMA, R. ALDERDEN, R. LANGERAK, J. TRETSMANS, AND J. VAN DE LAGE-MAAT. A formal approach to conformance testing. In J. de Meer, W. Effelsberg, and L. Mackert, editors, *Second International Workshop on Protocol Test Systems*, pages 349–363. IFIP TC 6, North-Holland, 1990.
29. R. LANGERAK. A testing theory for LOTOS using deadlock detection. In Brinksma et al., editors. *Protocol Specification, Testing, and Verification IX* pages 87–98. North-Holland, 1989.

Theses

1. R. LANGERAK. *Transformations and Semantics for LOTOS*. PhD thesis, University of Twente, The Netherlands, 1992, 170 pages.
2. R. LANGERAK. *View Updates in Relational Database Systems*. MSc thesis, University of Twente, The Netherlands, 1986, 89 pages.

Unpublished Technical Reports

1. R. LANGERAK AND D. LATELLA. A language of finite probabilistic processes and its interleaving semantics. Memoranda Informatica 93-24, University of Twente, 1993.
2. B. BOTMA AND R. LANGERAK. A Simulator for LOTOS to study the independence and causality of events. Memoranda Informatica, also abstract as position paper on *FORTE94* Conference, Bern, October 1994.

Tutorials

1. R. LANGERAK. True concurrency models for LOTOS. Tutorial FORTE'94, Bern, October 1994.
2. R. LANGERAK. Hybrid Systems for Computer Scientists. Tutorial Formal Methods 2003, Pisa, September 2003.