

Curriculum Vitae



1 Personal details

Name and title: Dr. rer. nat. Martin Georg Fränzle, Professor
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Date of birth: October 23, 1964
Nationality: German
Marital status: Married since 1989, two grown-up children (born 1992 and 1996)

2 Research interests

M. Fränzle's research interests are in modelling, verification, and synthesis of reactive, real-time, and hybrid dynamics in embedded and cyber-physical systems. He has worked on the semantics of high-level modelling and specification languages [12, 28, 31, 33, 41, 90, 91] and on decision problems and their application to verifying and synthesizing real-time and hybrid discrete-continuous systems [18, 23, 25, 27, 48, 68, 89, 70, 105, 110, 146, a.o.], including settings subject to stochastic disturbances [86, 92, 97, 119]. The complexity barrier rapidly hit by such automated verification and synthesis procedures has been attacked through extending bounded model checking to very expressive temporal logics [29, 36, 38], branching-time abstractions [64, 73, 74], and by developing SAT-modulo-theory techniques for arithmetic constraint solving and tailoring them to the specific formulae structures arising in different verification domains [45, 46, 83] and in synthesis [40, 42]. Furthermore, SAT-modulo-theory techniques for arithmetic constraint solving have been extended to the undecidable domain of arithmetic constraints involving transcendental functions [43, 53, 54] and ordinary differential equations [63, 67, 70, 120] as well as to stochastic variants facilitating the fully symbolic

analysis of probabilistic hybrid systems [59, 60, 69, 78, 93, 97, 115]. These exhaustive methods have recently been complemented by statistical evaluation methods enhanced by AI planning within both the verification [102, 119] and the synthesis [130] of probabilistic hybrid systems. Another major line of research deals with robust notions of system correctness, i.e. with the construction of correctness certificates which remain valid under the ubiquitous kinds of disturbances like, e.g., manufacturing tolerances or imperfect observation of the environment [23, 27, 41, 43, 62, 71, 90]. Recently, we have also addressed the automatic mining of formal models of rigorously guaranteed epistemological validity by means of learning [130]. Fundamental research on these topics has mostly been pursued within large collaborative research projects, like the Transregional Collaborative Research Center SFB-TR 14 AVACS (Automatic Verification and Analysis of Complex Systems, [52]), the Research Training Group DFG GRK 1765 SCARE (System Correctness under Adverse Conditions), or the interdisciplinary research center CSE (Critical Systems Engineering for Socio-Technical Systems).

Applied research within, a.o., the projects IMoST (Integrated Modelling for Safe Transportation) and CSE (Critical Systems Engineering for Socio-Technical Systems), SaLsA (Sichere autonome Logistik- und Transportfahrzeuge im Außenbereich), and MoVeS (Modeling, Verification and Control of Complex Systems), as well as within industrial research contracts with DENSO Automotive, Volkswagen, Daimler AG, and Forschungsgemeinschaft Automobiltechnik in the VDA addresses industrial application domains. These range from testing procedures for embedded software (with Daimler) and architectures for enforcing real-time behaviour in heterogeneous embedded software architectures (with Forschungsgemeinschaft Automobiltechnik) over safety of advanced driver assistance systems (IMoST [81, 99, 102], Volkswagen) and in highly automated cars (SaLsA [98], DENSO) to demand-response schemes in power supply networks (MoVeS [96, 109]). The common theme of these lines of applied research is to establish rigorous methods for the design and analysis of autonomous and socio-technical systems assuring their safety and functional adequacy, including work on future standards and regulations for their systematic safety assessment by industry and regulatory boards [134]. M. Fränzle furthermore coordinated the only industrial transfer project of the Transregional Collaborative Research Center SFB-TR 14 AVACS, where the Universities of Oldenburg and Freiburg cooperated with the Sick AG (Waldkirch) and BTC-ES AG (Oldenburg) on automated formal analysis of embedded C code [146, 151]. This project has led to industrial take-over of the constraint-solving engines developed in the two AVACS projects coordinated by M. Fränzle, with BTC-ES having licensed the technologies and currently commercializing them.

3 Employment

since 2004/10: Professor (salary scale W 2) at the Department of Computing Science at the Carl von Ossietzky Universität Oldenburg, Germany; head of research group "Hybrid Systems"

2013/10–2015/03: Dean of Faculty II: School of Computing Science, Business Administration, Economics, and Law at the Carl von Ossietzky Universität Oldenburg

2002/08–2004/09: Associate professor in Computer Science and Engineering at the Department of Informatics and Mathematical Modelling at the Technical University of Denmark, Kgs. Lyngby, Denmark.

2000/07–2002/07: "Hochschulassistent" (salary scale C 1, approx. equivalent to an assistant professor) at the Department of Computing Science at the Carl von Ossietzky Universität Oldenburg, Germany.

1997/09–2000/06: Post-doctoral researcher at the Department of Computer Science of the Carl von Ossietzky Universität Oldenburg, Germany; member of the research group "Computer Architecture".

1991/03–1997/08: Research assistant at the Institute of Informatics of the Christian-Albrechts-Universität Kiel, Germany; member of the research group "Programming Languages and Compiler Construction".

1989/06–1991/02: Student researcher in the ESPRIT basic research action 3104 “Provably Correct Systems: ProCoS” at the Dpt. of Informatics of the Christian-Albrechts-Universität Kiel.

1985/07–1989/05: Part-time programmer in the Institute of Geography of the Christian-Albrechts-Universität Kiel, designing and implementing algorithms for computer-based cartography and for statistics in geo-ecological research.

1983/06–1992/10: Voluntary service as a paramedic in the ambulance and rescue services at Preetz, Germany.

4 Other affiliations

Since mid 2016: Coordinator of the Master Study Programme “Engineering of Socio-Technical Systems” at the University of Oldenburg

Since 2014/10: Member of the supervisory board of the PhD programme “Safe Automation of Maritime Systems - SAMS” at the University of Oldenburg

Since 2013/09: Member of the working group on Harmonization of Pre-Crash Evaluation (PEARS) of the European automotive industry

Since 2013/04: Member of the Interdisciplinary Research Center Critical Systems Engineering for Socio-Technical Systems of Oldenburg University, OFFIS, and DLR Brunswick

Since 2012/10: Co-speaker of the Research Training Group (RTG) SCARE (System Correctness under Adverse Conditions) funded by the German Research Foundation (DFG GRK 1765-1 and -2).

2007–2010: Member of the Virtual Institute DESCAS (Design of Safety Critical Systems) of the Helmholtz Association of German Research Centres (http://www.dlr.de/fs/desktopdefault.aspx/tabid-4534/7430_read-11178/).

2006/01–2008/12: Velux Visiting Professor at the Technical University of Denmark, Kgs. Lyngby, Denmark

Since 2005/04: Supervisor in the DFG Graduate School on Trustworthy Software Systems (Trustsoft, <http://www.uni-oldenburg.de/trustsoft/en/>)

Since 2004/12: Member of OFFIS Institut für Informatik e.V., Oldenburg, Germany (<http://www.offis.de/>).

2004/10–2009: Member of the Interdisciplinary Research Center Safety-Critical Systems at the University of Oldenburg, Germany (http://fzsks.uni-oldenburg.de/index_en.html).

2004/08–2015/12: Project area coordinator within the transregional research center SFB-Transregio 14 “Automatic Verification and Analysis of Complex Systems” (AVACS) for project area Hybrid Systems (<http://www.avacs.org>)

Research stays: Oxford University, UK (multiple short stays between 1989 and 1995; June 2013; full winter semester 2016/17); Max-Planck-Institut für Dynamik komplexer technischer Systeme, Magdeburg, Germany (April 2000); IT University København, Denmark (Oct. 2000); Verimag, Grenoble, France (March 2001); Institut für Informatik, Universität Freiburg, Germany (multiple short stays since March 2002); Tallinn Technical University, Estonia (May 2004); Universität des Saarlands and Max-Planck-Institut für Informatik, Saarbrücken, Germany (multiple short stays since 2004); Velux Visiting Professor at the Technical University of Denmark, Kgs. Lyngby, Denmark (part-time Jan. 2006 to Dec. 2008).

5 Education

- 1970/08–1974/06: Primary school in Aachen-Haaren (August to October 1970) and Schellhorn near Kiel (from November 1970)
- 1974/08–1983/06: Friedrich-Schiller-Gymnasium Preetz
- 1983/06–1985/08: Part-time apprenticeship as “Rettungssanitäter” (standard qualification of the paramedics in the German ambulance and rescue services at that time)
- 10/1983–02/1991: Study of informatics, mathematics, and logic at the Christian-Albrechts-Universität Kiel
- 1985/09–1990/12: Part-time apprenticeship as “Rettungsassistent” (highest qualification available to paramedics in the German ambulance and rescue services)
- 1986/05: Vordiplom (approx. B.Sc.) in informatics from the Dpt. of Informatics at Christian-Albrechts-Universität Kiel; grade: 1.0¹.
- 1990/12: Granted title “Rettungsassistent” by Schleswig-Holstein’s State Ministry of Health after a formal review rated the continued voluntary service and the associated part-time apprenticeship equivalent to a 3-year full-time apprenticeship as a paramedic.
- 1991/02: Diplom (approx. M.Sc.) in informatics from Dpt. of Informatics of the Christian-Albrechts-Universität Kiel; grade: 1.0¹.
Title of diploma thesis: *Specification and verification of a translator for a recursive, OCCAM-like programming language*
- 1997/04: Doctoral degree in natural sciences (Dr. rer. nat.) from the Technical Faculty of the Christian-Albrechts-Universität Kiel; grade: “summa cum laude”.
Title of dissertation: *Controller Design from Temporal Logic: Undecidability Need Not Matter* (submitted Dec. 1996, defence April 1997; reviewers: Hans Langmaack, Wolfgang Thomas, Bengt Jonsson)

6 Awards

- 1983/02: Pupil’s research competition “Jugend Forscht”: second rank at state level (state Schleswig-Holstein, mathematics and computer science section of the competition) plus special prize for computer science research from the Datenzentrale Schleswig-Holstein.
- 1986–1989: Study grant from the Cusanuswerk e.V., Bonn.
- 1998/06: Best-dissertation award from Christian-Albrechts-Universität Kiel.
- 2006–2008 Velux Visiting Professor grant

7 Teaching experience

At Christian-Albrechts-Universität Kiel, 1991–1997

- Summer 1992: Lectures and exercise classes “Introduction to systematic programming” for students in the natural sciences
- Winter 92/93: Exercise classes in “Computer Science III”
- Summer 93: Exercise classes in “Provably correct systems I”

¹In a scale from 1 (best) to 5 (insufficient).

Winter 93/94: Seminar “Safety-critical systems” (together with H. Langmaack)

Summer 96: Seminar “Provably Correct Hardware Compilation” (together with H. Langmaack)

Summer 97: Seminar “Recent research results in programming languages and compiler construction” (together with H. Langmaack)

At Carl von Ossietzky Universität Oldenburg, 1997–2002

Summer 1998: Advanced lectures on “Automatic controller synthesis from regular languages”

Summer 1999: Lectures and exercise classes “Design of embedded systems” (together with W. Damm, K. Lüth, and B. Josko).

Summer 2000: Lectures and exercise classes “Safety-critical embedded systems” (together with W. Damm and J. Bohn).

Winter 2000/01: Advanced lectures on “Hybrid systems”.

Summer 2001: Lab course “Design of robotics systems with StateMate” (together with D. Janssen and A. Metzner).

Winter 2001/02: Lectures and exercise classes “Embedded systems I” (entry module of the curriculum in Embedded Systems at Oldenburg).

At the Technical University of Denmark, 2002–2004

Fall 2002: Lectures and exercise classes “Languages and Parsing” (together with M. R. Hansen)

Spring 2003: Lectures and exercise classes “Real-Time Systems”

Spring 2003: Ph.D. course “Advanced Analysis and Verification Techniques” (together with H. R. Nielson and F. Nielson)

Apr. 2003: Research seminar “Safe and Secure IT Systems”

Fall 2003: Lectures and exercise classes “Languages and Parsing” (together with M. R. Hansen)

Fall 2003: Lectures and exercise classes “Distributed Embedded Systems” (together with K. S. Christensen)

Jan. 2004: Lab course “Distributed Embedded Systems” (together with K. S. Christensen)

Spring 2004: Lectures and exercise classes “Real-Time Systems”

Fall 2004: Lectures and exercise classes “Distributed Embedded Systems” (together with K. S. Christensen)

At Carl von Ossietzky Universität Oldenburg, since 2004

Summer 2005: Lectures and exercise classes “Formale Methoden Eingebetteter Systeme” (Formal Methods for Embedded System design)

Summer 2005: Seminar “Hybrid diskret-kontinuierliche eingebettete Systeme” (Hybrid discrete-continuous systems)

Summer 2005: Project group “Car Platooning” (together with W. Damm, A. Metzner, A. Mikschl)

Winter 2005/06: Lectures and exercise classes “Eingebettete Systeme I” (Embedded systems I)

Winter 2005/06: Lectures and exercise classes “Modellbasierte Entwicklung eingebetteter Systeme” (Model-based Design of Embedded Systems; together with B. Josko and H. Hungar)

Winter 2005/06: Project group “Car Platooning” (together with W. Damm, A. Metzner, A. Mikschl)

Summer 2006: Lectures and exercise classes “Eingebettete Systeme II” (Embedded systems II)

Summer 2006: Lectures and exercise classes “Formale Methoden Eingebetteter Systeme” (Formal Methods for Embedded System design)

Winter 2006/07: Lectures and exercise classes “Hybrid diskret-kontinuierliche Systeme” (Hybrid discrete-continuous systems)

Summer 2007: Lectures and exercise classes “Formale Methoden Eingebetteter Systeme” (Formal Methods for Embedded System design)

Summer 2007: Seminar “An der Grenzlinie der Entscheidbarkeit: Berechnungsmodelle zwischen Echtzeit und hybrid diskret-kontinuierlichem Verhalten” (At the borderline of decidability: computational models between real-time and hybrid discrete-continuous dynamics; together with E.-R. Olderog)

Winter 2007/08: Lectures and exercise classes “Compilerbau” (Compiler construction)

Winter 2007/08: Project group “easyDrive - Einfädelungsassistent für Autobahnanschlussstellen” (easyDrive — a lane change assistant for motorway access; together with W. Damm and G. Ehmen)

Summer 2008: Lectures and exercise classes “Formale Methoden Eingebetteter Systeme” (Formal Methods for Embedded System design)

Summer 2008: Project group “easyDrive - Einfädelungsassistent für Autobahnanschlussstellen” (easyDrive — a lane change assistant for motorway access; together with W. Damm and G. Ehmen)

Winter 2008/09: Lectures and exercise classes “Technische Informatik I” (Introduction to Technical Computer Science)

Winter 2008/09: Lectures and seminar “Design of Safety-Critical Automotive Systems”

Winter 2009/10: Lectures and seminar “Mechanismen der automatischen Fahrzeugführung” (Principles of Autonomous Driving)

Winter 2009/10: Seminar “Spielen der Korrektheit wegen: Spiele im Entwurf eingebetteter Systeme” (Game Theory for Synthesis of Embedded Systems)

Summer 2010: Lecture “Formale Methoden eingebetteter Systeme” (Formal Methods for Embedded System design)

Summer 2010: Lecture “Hybride Systeme” (Hybrid Systems)

Summer 2010: Seminar “Automatisierte Techniken für die Analyse komplexer Systeme” (Automatic Analysis of Complex Systems)

Winter 2010/11: Lecture “Technische Informatik I” (Introduction to Technical Computer Science)

Winter 2010/11: Practical course “Quantitatives Model-Checking” (Quantitative Model Checking)

Winter 2010/11: Proseminar “Kooperative und mobile Systeme” (Cooperating and Mobile Ssystems)

Summer 2011: Lecture “Formale Methoden eingebetteter Systeme” (Formal Methods for Embedded System design)

Summer 2011: Lecture “Signal- und Bildverarbeitung” (Signal and Image Processing; first half of semester)

Summer 2011: Student project group “ReACT 2” (autonomous driving in protected spaces; together with A. Hahn and W. Damm)

Winter 2011/12: Lecture “Hybride Systeme” (Hybrid Systems)

Winter 2011/12: Student project group “ReACT 2” (continuation; together with A. Hahn and W. Damm)

Winter 2011/12: Lecture series “IKT zur Energieeffizienz” (IT for Energy Efficiency; together with M. Sonnenschein, S. Lehnhoff, H.-J. Appelrath et al.)

Winter 2011/12: Proseminar “Why Computerized Systems Fail”, held in English

Summer 2012: Lecture “Modellierung und Analyse eingebetteter Systeme” (Formal Methods for Embedded System design), held in English

Summer 2012: Lecture “Signal- und Bildverarbeitung” (Signal and Image Processing; first half of semester)

Winter 2012/13: Lecture “Grundlagen der Technischen Informatik” (Introduction to Technical Computer Science)

Winter 2012/13: Lecture “Hybride Systeme” (Hybrid Systems), held in English

Winter 2012/13: Proseminar “Spielen der Korrektheit wegen” (Game Theory for Design and Analysis of Embedded Systems)

Winter 2012/13: Lecture series “IKT zur Energieeffizienz” (IT for Energy Efficiency; together with M. Sonnenschein, S. Lehnhoff, H.-J. Appelrath et al.)

Summer 2013: Lecture “Modellierung und Analyse eingebetteter Systeme” (Formal Methods for Embedded System design)

Summer 2013: Lecture “Signal- und Bildverarbeitung” (Signal and Image Processing; first half of semester)

Summer 2013: Student project group “MIPSwarm” on autonomous service robotics (together with W. Damm)

Winter 2013/14: Lecture “Grundlagen der Technischen Informatik” (Introduction to Technical Computer Science)

Winter 2013/14: Lecture “Hybride Systeme” (Hybrid Systems)

Winter 2013/14: Student project group “MIPSwarm II” on autonomous service robotics (together with W. Damm)

Summer 2014: Lecture “Signal- und Bildverarbeitung” (Signal and Image Processing; first half of semester)

Winter 2014/15: Lecture “Hybride Systeme” (Hybrid Systems), held in English

Winter 2014/15: Lecture “Modellierung und Analyse eingebetteter Systeme” (Formal Methods for Embedded System Design)

Summer 2015: Lecture “Autonome Systeme” (Autonomous Systems)

Summer 2015: Lecture “Signal- und Bildverarbeitung” (Signal and Image Processing; first half of semester)

Winter 2015/16: Lecture “Eingebettete Systeme I” (Embedded Systems I)

Winter 2015/16: Student project group “RC-CARS” on autonomous model-car racing (together with W. Damm)

Summer 2016: Lecture “Modellierung und Analyse eingebetteter Systeme” (Formal Methods for Embedded System Design)

Summer 2016: Lecture “Signal- und Bildverarbeitung” (Signal and Image Processing; first half of semester)

Summer 2016: Lecture “Hybride Systeme” (Hybrid Systems), held in English

Summer 2016: Student project group “RC-CARS” on autonomous model-car racing (together with W. Damm)

Summer 2017: Lecture “Signal- und Bildverarbeitung” (Signal and Image Processing; first half of semester)

Summer 2017: Lecture “Hybride Systeme” (Hybrid Systems), held in English

Summer 2017: Student project group “RC-CARS-ng” on autonomous model-car racing (together with W. Damm)

Winter 2017/18: Lecture and Seminar “Autonome Systeme” (Autonomous Systems)

Winter 2017/18: Lecture “Fundamental Competences in Computing Science I: Signals and Dynamical Systems”; first half of semester

Winter 2017/18: Lecture “Formale Methoden eingebetteter Systeme” (Formal Methods for Embedded System Design)

Winter 2017/18: Student project group “RC-CARS-ng” on autonomous model-car racing (together with W. Damm)

plus

- a permanent group seminar, where BSc, MSc, and PhD students report on the progress of their thesis work,
- the seminar of the transregional research center SFB/TR 14 “Automatic Verification and Analysis of Complex Systems” (AVACS),
- the seminar of the DFG Graduate School on Trustworthy Software Systems (Trustsoft) or — since 2012— its successor System Correctness under Adverse Conditions (SCARE)
- the mentoring programme for BSc and MSc students in CS

throughout all the aforementioned semesters.

PhD courses and invited tutorials at various places

Nov. 2002: Norchip Tutorial “Design and Verification of Embedded Computing Systems” for Scandinavian Ph.D. students, Copenhagen, Denmark (together with J. Madsen)

May 2004: Summer school “Advanced Topics in Computer Science”, Tallinn Technical University, Tallinn, Estonia

June 2007: ARTIST2 PhD course “Automated Formal Methods for Embedded Systems”, Technical University of Denmark, Kgs. Lyngby, Denmark (together with S. Perathoner, N. Stoimenov, W. Haid, A. Hamann, R. Racu)

July 2007: Invited tutorial “Verification of Hybrid Systems” at CAV 2007, Berlin, Germany

June 2008: ARTIST2 PhD course “Automated Formal Methods for Embedded Systems”, Technical University of Denmark, Kgs. Lyngby, Denmark (together with J. Vain)

Sept. 2008: Summer school “Verification Technology, Systems & Applications” of the Université franco-allemande, Saarbrücken, Germany (together with C. Barrett, G. Barthe, R. Mateescu, G. Sutre)

Aug. 2009: Summer school “Modern Computational Science”, Oldenburg, Germany (together with colleagues from the Departments of Physics, Mathematics, Biology, and Marine Sciences)

Mar. 2010: PhD School Quantitative Model Checking (QMC '10), ITU København, Denmark (Lecture on “Automatic Analysis of Hybrid Systems”)

Mar. 2010: 1st AVACS Spring School, Oldenburg, Germany (Lecture on “From Efficient SAT Solving to Automatic Analysis of Hybrid Systems”)

June 2010: International Summer School Modelling and Verification of Parallel Processes (MoVeP 2010), RWTH Aachen, Germany (Lecture on “Bounded Model Checking of Hybrid Systems”)

Sep. 2010: Summer Camp Informatik — Entfesselte Automaten, Universität des Saarlands, Saarbrücken, Germany (Lecture on “Hybride Systeme”)

June 2012: 2nd International SAT/SMT Summer School, Fondazione Bruno Kessler, Trento, Italy (Lecture on “SAT modulo Ordinary Differential Equations”)

Aug. 2012: Summer School Modern Computational Science, Universität Oldenburg, Germany (Lecture on “Interval Methods I & II”)

Sept. 2012: Invited tutorial “SAT Modulo Ordinary Differential Equations: An Analysis Method for Hybrid Systems” at Chinese Academy of Sciences, Beijing, PR China

Oct. 2012: ROCKS Autumn School, Kloster Neustift, Varn, Italy (Lecture on “Applications of Hybrid Systems”)

Apr. 2013: Invited tutorial “Cyber-Physical Systems” at ETAPS 2013, Rome, Italy

Nov. 2014: Invited tutorial “From Reasoning with Constraints to Mining Constraints” at Beihang University, Beijing, PR China

Oct. 2015: Invited tutorial “Cyber-Physical Systems” at ATVA 2015, Shanghai, PR China

May 2016: DigiCosme Spring School 2016 on Hybrid Systems, ENSTA ParisTech, Palaiseau, France (Lecture on “Engineering Constraint Solvers for the Automatic Analysis of Hybrid Systems”)

September 2017: CSE Summer School, Oldenburg, Germany (Lecture on “Extending System Verification Across the Human-CPS Boundary”)

Oct. 2017: Invited tutorial “Indecision and Delay are the Parents of Failure” at Chinese Academy of Sciences, Beijing, PR China

8 Graduate and undergraduate students

Current Ph.D. students

1. Dipl.-Inform. Christian Rudat, “Integrating Systematic Search and Statistical Model-Checking for Stochastic Satisfiability Modulo Theory”
2. Dipl.-Inform. Sönke Eilers, “Prädiktion und Bahnplanung für sicheres autonomes Fahren”
3. MSc Peter Nazier Mossaad, “Reach Set Computation for Stochastic Delay Differential Equations” (thesis to be submitted Q2 2018)
4. MSc Stella Parisi, “Bewertung der kooperativen Situationswahrnehmung von Brückenbesetzungen”
5. Dipl.-Inform. Stefan Puch, “Co-Simulation in der modellbasierten Entwicklung von Fahrerassistenzsystemen”
6. Dipl.-Inform. Gerald Sauter, “Automatische modellbasierte Bewertung der Sicherheitskritikalität von Mensch-Maschine-Interaktionen”

7. MSc Paul Kröger, “Reconciling Formal Methods with Metrology”
8. MSc Shereif Eid, “Probably Approximately Correct Automated Formal Modelling”

Furthermore, I am currently co-supervising Mohammed Abdelaal I, Björn Engelmann, Heinrich Ody, Christoph Peuser, and Maike Schwammberger in the DFG-GRK 1765 SCARE, Man Zhu in the Graduate School “SAFE Automation of Maritime Systems”, and Mohammed Abdelaal II in the PhD College of the Interdisciplinary Research Center “Critical Systems Engineering for Socio-technical systems”, all at the University of Oldenburg.

Former Ph.D. students

1. Dr. rer. nat. Christian Herde, “Efficient Solving of Large Arithmetic Constraint Systems with Complex Boolean Structure — Proof Engines for the Analysis of Hybrid Dynamical Systems” (2010)
2. Dr.-Ing. Jens Oehlerking, “Decomposition of Stability Proofs for Hybrid Systems” (2011 , co-supervision in a thesis committee, first supervisor Oliver Theel)
3. Dr. rer. nat. Tino Teige, “Stochastic Satisfiability Modulo Theory: A Technique for the Analysis of Probabilistic Hybrid Systems” (2012)
4. Dr.-Ing. Ralph Görden, “Effiziente Integration von Hardwarebeschreibungen in Simulink/TDF-Simulationen” (2014, co-supervision in a thesis committee, first supervisor Wolfgang Nebel)
5. Dr. rer. nat. Bertram Wortelen, “Das Adaptive-Information-Expectancy-Modell zur Aufmerksamkeitssimulation eines kognitiven Fahrermodells” (2014, co-supervision in a thesis committee, first supervisor Claus Möbus)
6. Dr.-Ing. Andreas Eggers, “Integrating SAT-Modulo-Theory and Safe Integration of ODEs” (2014, grade “summa cum laude”; award of the Engineering Chamber of Lower Saxony 2015)
7. Dr. rer. nat. Christian Kuka, “Qualitätssensitive Datenstromverarbeitung zur Erstellung von dynamischen Kontextmodellen” (2015, co-supervised in a thesis committee, first supervisor Daniela Nicklas)
8. Dr. Liang Zou, “Formal verification of Simulink/Stateflow and its Application” (PhD from the Chinese Academy of Sciences 2015, co-supervised together with Najun Zhan, ISCAS, Beijing)
9. Dr. rer. nat. Mani Swaminathan, “A Framework for Efficient Symbolic Robust Safety Analysis of Timed Systems” (2015)
10. Dr.-Ing. Maher Fakhri, “State-Based Real-Time Analysis of Synchronous Data-Flow (SDF) Applications on MPSoCs with Shared Communication Resources” (2016, co-supervised in a thesis committee, first supervisor Achim Rettberg)
11. Dr.-Ing. Gao Yang, “Verification of Stochastic Systems by Stochastic Satisfiability Modulo Theories with Continuous Domain (CSSMT)” (2017)
12. Dr.-Ing. Saifullah Khan, “Geometry-Predicting Communication Protocols for Car2X Applications” (2017)
13. Dr.-Ing. Ahmed Mahdi, “Advancing Software Model-Checking by SMT Interpolation Beyond Decidable Arithmetic Theories” (2017)
14. Dr. rer. nat. Lars Weber, “Driver Modeling and Simulation of Lane Change Situations — Influence of Different Rear View Mirror Types on Gap Acceptance Behavior” (2017, co-supervision in a thesis committee, first supervisor Claus Möbus)

I furthermore served as chair or reviewer on multiple PhD committees at Oldenburg (more than 25 committees since 2004), as reviewer and committee member at Freiburg (4 committees), Saarbrücken (4 committees), Kgs. Lyngby (1 committee), Aalborg (1 committee), Delft (1 committee), Oslo (1 committee), and Newcastle (1 committee). I furthermore was committee member for the Distinguished Dissertation Competition 2013 of the BCS Academy of Computing.

BSc, MSc, and Diploma students. I am permanently supervising BSc and MSc students in the areas of theoretical computer science (especially model checking and SAT/SMT solving), technical computer science (modeling and analysis of hybrid, embedded, and real-time systems), and related applications (in particular autonomous driving, advanced driver assistance, control of power networks). The total number of theses supervised at bachelor's, master's, and diploma student level is beyond 50. Three of the master's theses received awards by engineering chambers: Anne-Sofie Nielsen and Jacob Enslev (Ingeniørforeningen i Danmark), Andreas Eggers (VDI Bremen).

Post-doctoral training. I currently supervise Dr. Mani Swmaniathan (since 2016) in his post-doctoral career development and did supervise Dr. Sebastian Gerwinn (2011–2017, now at Bosch Corporate Research) and Dr. Xue Bai (2015–2017, now Associate Professor at the Chinese Academy of Sciences). I was and am furthermore member of the selection committee for the DTU H.C. Ørsted Postdoc Programme of the Technical University of Denmark (2016, 2017, and 2018).

9 Services in the self-administration of the university, of affiliated institutes, and of collaborative research actions

2004/08–2015/12: Member of the board of the transregional research center SFB-Transregio 14 “Automatic Verification and Analysis of Complex Systems” (AVACS) for project area Hybrid Systems (<http://www.avacs.org>)

since 2004/11: Person in charge for internationalization at the Dpt. of Computing Science, Carl von Ossietzky Universität Oldenburg

2004/11 – 2009/03: Person in charge for federal student support (BAFöG) at the Dpt. of Computing Science, Carl von Ossietzky Universität Oldenburg

since 2005/03: In alternation full member or deputy member of the board of the Department of Computing Science and board of the Faculty II: School of Computing Science, Business Administration, Economics, and Law at the Carl von Ossietzky Universität Oldenburg

2007/01–2013/03: Member of the board of the collaborative research actions IMoST and IMoST II (Integrated Modeling for Safe Transportation; Universität Oldenburg, DLR Brunswick, and OFFIS Institut für Informatik)

Since 2011/03: Member of the university president's panel for advancement of internationalization, Carl von Ossietzky Universität Oldenburg

Since 2011/03: Member of the board of research division Transportation, OFFIS Institut für Informatik, Oldenburg

2011/04–2013/03: Deputy member of the academic senate, Carl von Ossietzky Universität Oldenburg

2011/05–2017/03: Member of the PhD Committee of the Dpt. f. Computing Science at Carl von Ossietzky Universität Oldenburg

Since 2012/07: Member of the board of the Interdisciplinary Research Center Safety-Critical Systems at the University of Oldenburg

Since 2012/10: Co-speaker of the Research Training Group (RTG) SCARE (System Correctness under Adverse Conditions) funded by the German Research Foundation (DFG GRK 1765).

2013/04–2013/09: Member of the academic senate, Carl von Ossietzky Universität Oldenburg

2013/10–2015/03: Dean of Faculty II: School of Computing Science, Business Administration, Economics, and Law at the Carl von Ossietzky Universität Oldenburg

since 2014/05: Member of the academic senate’s committee for the constitutional structure (Grundordnungskommission) of the Carl von Ossietzky Universität Oldenburg

2015/04–2017/03: Deputy member of the academic senate, Carl von Ossietzky Universität Oldenburg

since 2017/04: Member of the academic senate, Carl von Ossietzky Universität Oldenburg

since 2018/01: Deputy member of the committee for strategic planning and development of the university (Hochschulentwicklungsplanung), Carl von Ossietzky Universität Oldenburg

10 Projects

1. ESPRIT BRA 3014 “ProCoS I — Provably Correct Systems”: Researcher (1989–91).
2. Project “APPLY — ein bedarfsgerechtes und effizientes LISP”, funded by the German Ministry of Research and Technology: Researcher (1991–92).
3. DFG-La 426/13-1 “Echtzeitmodelle (models of real-time)”, funded by the Deutsche Forschungsgemeinschaft: Applicant and researcher (1993–95).
4. ESPRIT BRA 7071 “ProCoS II — Provably Correct Systems”: Contribution to fund-raising (1992) and association to the project (1992–95).
5. DFG-La 426/13-12 “Semantische Modelle, Verfeinerungskonzepte und Beweisregeln für Echtzeitmodelle (semantic models, refinement concepts, and proof rules for real-time models)”, funded by the Deutsche Forschungsgemeinschaft: Applicant and researcher (1993–95).
6. ESPRIT WG 8694 “ProCoS-WG”: Member (1994–97).
7. DFG-Da 206/5-1 “Events I — An event-driven approach to rapid prototyping of embedded control systems”, funded by the Deutsche Forschungsgemeinschaft: Researcher (1997–98).
8. DFG-Da 206/5-2 “Events II”, funded by the Deutsche Forschungsgemeinschaft: Contribution to fund-raising and researcher (1998–2000).
9. DFG-Da 206/5-3 “Events III”, funded by the Deutsche Forschungsgemeinschaft: Contribution to fund-raising (2000).
10. SFB/TR 14/1 “Automatic Verification and Analysis of Complex Systems” (AVACS), subproject H1 “Deduction and Automata Based Approaches”: Applicant and subproject coordinator (1.1.2004–31.12.2007)
11. SFB/TR 14/1 “Automatic Verification and Analysis of Complex Systems” (AVACS), subproject H2 “Bounded Model Checking and Inductive Verification of Hybrid Systems”: Applicant and subproject leader (1.1.2004–31.12.2007)
12. Velux Visiting Professors Programme (Velux Fonden, Søborg, Denmark, 1.1.2006–31.12.2008): grant for extended research stays at the Technical University of Denmark
13. Collaborative research action “IMoST: Integrated Modelling for Safe Transportation” funded by the State of Lower Saxony: applicant and subproject coordinator (1.1.2007–31.03.2010)

14. Virtual Institute DESCAS (Design of Safety Critical Systems) of the Helmholtz Association of German Research Centres: co-applicant and member 2007-2010 (Az. VH-VI-212)
15. INOUI “Innovative Operational UAS Integration”: scientific director at OFFIS, 9.10.2007–31.10.2009
16. go!CART “Competitive Aerial Robotic Technologies”: scientific director at OFFIS, 1.1.2008–31.12.2010
17. SFB/TR 14/2 “Automatic Verification and Analysis of Complex Systems” (AVACS), subproject H1/2 “Constraint-Based Verification for Hybrid Systems”: Applicant and subproject coordinator (1.1.2008–31.12.2011)
18. SFB/TR 14/2 “Automatic Verification and Analysis of Complex Systems” (AVACS), subproject H4 “Automatic Verification of Hybrid System Stability”: Applicant and subproject leader (1.1.2008–31.12.2011)
19. SFB/TR 14/2 “Automatic Verification and Analysis of Complex Systems” (AVACS), subproject R1 “Beyond Timed Automata”: Applicant and subproject leader (1.1.2008–31.12.2011)
20. “Sichere autonome Logistik- und Transportfahrzeuge im Außenbereich (SaLsA)” together with Götting KG, Fraunhofer Institut für Materialfluss und Logistik IML, Innotec DATA GmbH & Co. KG, IFM electronic GmbH, all Germany (German Ministry of Economics and Labour, Nov. 2009 – Oct. 2012)
21. Collaborative research action “IMoST II: Integrated Modelling for Safe Transportation” funded by the State of Lower Saxony: applicant and subproject coordinator (1.4.2010 – 31.3.2013)
22. EU FP7 STREP “Modelling, verification and control of complex systems: From foundations to power network applications (MoVeS)” under ICT Call 5, together with ETH Zurich, RWTH Aachen, TU Delft, and Politecnico di Milano (Oct. 2010–Sept. 2013)
23. SafeGrid (State of Lower Saxony, 1.4.2011–31.12.2011)
24. SFB/TR 14/3 “Automatic Verification and Analysis of Complex Systems” (AVACS), subproject H1/2 “Constraint-Based Verification for Hybrid Systems”: Applicant and subproject coordinator (1.1.2012–31.12.2015)
25. SFB/TR 14/3 “Automatic Verification and Analysis of Complex Systems” (AVACS), subproject H4 “Automatic Verification of Hybrid System Stability”: Applicant and subproject leader (1.1.2012–31.12.2015)
26. SFB/TR 14/3 “Automatic Verification and Analysis of Complex Systems” (AVACS), subproject R1 “Beyond Timed Automata”: Applicant and subproject leader (1.1.2012–31.12.2015)
27. DFG GRK 1765 “System Correctness Under Adverse Conditions” (SCARE): Applicant and Co-Speaker (1.10.2012 – 31.3.2017)
28. Interdisciplinary Research Center on “Critical Systems Engineering for Socio-Technical Systems” funded by the State of Lower Saxony: applicant and principal investigator in three sub-projects (April 2013 – March 2016)
29. Industrial research contract by DENSO Automotive concerning safety of autonomous driving (May – December 2013)
30. Industrial research contract by Volkswagen Corporate Research concerning use of ancillary information services in advanced driver assistance systems (September 2013 – May 2014, followup contract under negotiation)

31. EU FP 7 “Cooperative mobility solution for supervised platooning (COMPANION)”, together with Volkswagen Group Research, KTH Stockholm, IDIADA Automotive Technology in Spain, S&T Netherlands, and Transportes Cerezuela in Spain (1.10.2013–30.9.2016)
32. SFB/TR 14/3 “Automatic Verification and Analysis of Complex Systems” (AVACS), subproject T1 “Accurate Dead Code Detection in Embedded C Code by Arithmetic Constraint Solving”: Applicant and subproject coordinator (1.1.2014–31.12.2016)
33. Industrial research contract by DENSO Automotive concerning safety of autonomous driving (June 2014 – January 2015)
34. PhD Programme “Safe Automation of Maritime Systems — SAMS”, funded by the State of Lower Saxony: co-applicant (Oct. 2014 – Sept. 2018)
35. Industrial research contract by Daimler AG concerning complexity of embedded system testing (Oct. – Dec. 2014)
36. “PEGASUS - Projekt zur Etablierung von generell akzeptierten Gütekriterien, Werkzeugen und Methoden sowie Szenarien und Situationen zur Freigabe hochautomatisierter Fahrfunktionen” (Federal Ministry for Economic Affairs and Energy, Jan. 2016–Dec. 2018)
37. “ENABLE-S3 — European Initiative to Enable Validation for Highly Automated Safe and Secure Systems” (Ecsel JU and Federal Ministry of Education and Research, May 2016– Apr. 2019)
38. Industrial research contract “MULTIC — Design Paradigms for Multi-Layer Time Coherency in ADAS and Automated Driving” by Forschungsgemeinschaft Automobiltechnik (May 2016 – April 2017)
39. Interdisciplinary Research Center on “Critical Systems Engineering for Socio-Technical Systems 2” funded by the State of Lower Saxony (January 2017 – June 2018)
40. “Gestaltung und Regelung städtischer Knotenpunkte für sicheres und effizientes automatisiertes Fahren im gemischten Verkehr (Digitaler Knoten 4.0)” (Federal Ministry of Transport and Digital Infrastructure, January 2017 – May 2019)
41. DFG GRK 1765-2 “System Correctness Under Adverse Conditions” (SCARE 2): Applicant and Co-Speaker (1.4.2017 – 30.9.2021)

11 Services to the scientific community

Recent program committees (last 5 years)

- FORMATS (16th International Conference on Formal Modelling and Analysis of Timed Systems) 2018
- HSCC (ACM International Conference on Hybrid Systems: Computation and Control) 2018
- ADHS (6th IFAC Conference on Analysis and Design of Hybrid Systems), 2018
- SNR (4th International Workshop on Symbolic and Numerical Methods for Reachability Analysis) 2018 (PC co-chair)
- FM (22nd International Symposium on Formal Methods) 2018
- FM 2018 Industry Day

- MEMOCODE (15th ACM/IEEE International Conference on Formal Methods and Models for System Design) 2017
- SETTA (Symposium on Dependable Software Engineering: Theories, Tools and Applications) 2017
- CyPhy17 (17th Workshop on Design, Modeling and Evaluation of Cyber Physical Systems) 2017
- FORMATS (15th International Conference on Formal Modeling and Analysis of Timed Systems) 2017
- SNR (3rd International Workshop on Symbolic and Numerical Methods for Reachability Analysis) 2017
- TACAS (23' International Conference on Tools and Algorithms for the Construction and Analysis of Systems) 2017
- ICTAC (The 14th International Colloquium on Theoretical Aspects of Computing) 2017
- FORMATS (14th International Conference on Formal Modeling and Analysis of Timed Systems) 2016 (PC co-chair)
- HSCC(ACM International Conference on Hybrid Systems: Computation and Control) 2016
- ICTAC (International Colloquium on Theoretical Aspects of Computing) 2016
- MEMOCODE (Fourteenth ACM/IEEE International Conference on Formal Methods and Models for System Design) 2016
- SETTA (Symposium on Dependable Software Engineering: Theories, Tools and Applications) 2016 (PC co-chair)
- SNR (2nd International Workshop on Symbolic and Numerical Methods for Reachability Analysis) 2016
- TIME (23rd International Symposium on Temporal Representation and Reasoning) 2016
- QUEST (12th International Conference on Quantitative Evaluation of SysTems) 2015
- FORMATS (13th International Conference on Formal Modeling and Analysis of Timed Systems) 2015
- SIMUL (The Seventh International Conference on Advances in System Simulation) 2015
- SEFM (13th International Conference on Software Engineering and Formal Methods) 2015
- SETTA (Symposium on Dependable Software Engineering: Theories, Tools and Applications) 2015 (Publications chair)
- FFM (Young Researchers' Conference "Frontiers of Formal Methods") 2015
- SKILL (Studierendenkonferenz Informatik) 2015
- HSCC(ACM International Conference on Hybrid Systems: Computation and Control) 2015
- SNR (1st International Workshop on Symbolic and Numerical Methods for Reachability Analysis) 2015
- 2nd International AVACS School 2015 (PC chair and organizing chair)
- ECAI (21st European Conference on Artificial Intelligence) 2014

- FORMATS (12th International Conference on Formal Modeling and Analysis of Timed Systems) 2014
- SIMUL (The Sixth International Conference on Advances in System Simulation) 2014
- MoVeP (School for young researchers about Modelling and Verifying Parallel processes) 2014
- SEFM (12th International Conference on Software Engineering and Formal Methods) 2014
- HSCC(ACM International Conference on Hybrid Systems: Computation and Control) 2014 (PC Co-Chair)
- TACAS (Tools and Algorithms for the Construction and Analysis of Systems) 2014
- SIMUL (5th International Conference on Advances in System Simulation) 2013
- EMSOFT (13th International Conference on Embedded Software) 2013
- ICTAC (10th International Colloquium on Theoretical Aspects of Computing) 2013
- 3rd Workshop on Hybrid Autonomous Systems, ETAPS 2013
- SEFM (11th International Conference on Software Engineering and Formal Methods) 2013

Recent responsibilities as chair or organizer:

- PC chair and organizing chair of the 1st International AVACS Spring School 2010
- PC co-chair of the 1st Workshop on Hybrid Autonomous Systems, 2011
- PC chair and organizing chair of the 5th Small Workshop on Interval Methods 2012
- Demo and exhibition chair of CPS Week 2014
- PC co-chair of HSCC 2014 (together with John Lygeros)
- Co-organizer of Dagstuhl Seminar 14441 “Modeling, Verification, and Control of Complex Systems for Energy Networks”, Oct. 26–31, 2014 (together with Alessandro Abate, Ian Hiskens, Martin Strelec)
- Publications chair of SETTA 2015
- PC chair and organizing chair of the 2nd International AVACS School 2015
- Co-organizer of Dagstuhl Seminar 16362 “Robustness in Cyber-Physical Systems”, Sept. 4–9, 2016 (together with Pavithra Prabhakar and Jim Kapinski)
- PC co-chair of FORMATS 2016 (together with Nicolas Markey)
- PC co-chair of SETTA 2016 (together with Naijun Zhan and Deepak Kapur)
- Co-organizer of Dagstuhl Seminar 16491 “Symbolic-Numeric Methods for Reliable and Trustworthy Problem Solving in Cyber-Physical Domains”, Dec. 4–9, 2016 (together with Sergiy Boglomow, Kyoko Makino, Nacim Ramdani)
- PC co-chair of SNR 2018 (together with Taylor Johnson)

Steering committees

Member of the steering committee of SETTA (Symposium on Dependable Software Engineering: Theories, Tools and Applications) since 2013; member/head of the steering committee of FORMATS (International Conference on Formal Modeling and Analysis of Timed Systems) since 2016/2017, member of the steering committee of HSCC (ACM International Conference on Hybrid systems: Computation and Control) from 2018.

Reviews for journals

Reviews for numerous journals, among them

- Information and Computation
- Formal Methods in System Design
- Formal Aspects of Computing
- Automatica
- Information Processing Letters
- International Journal of Software and Informatics
- Theory of Computing Systems
- Theoretical Computer Science
- Information Sciences
- Journal of Computer and Systems Sciences
- IEEE Transactions on CAD
- Acta Informatica
- European Journal in Control
- International Journal of Applied Mathematics & Computer Science
- Science of Computer Programming
- Journal of Selected Topics in Signal Processing
- Artificial Intelligence Journal
- Nonlinear Analysis: Hybrid Systems
- Software Tools for Technology Transfer
- Transactions on Computer-Aided Design of Integrated Circuits and Systems

Member of editorial board of the Leibniz International Transactions on Embedded Systems.

Project reviews for national and European science foundations

- Deutsche Forschungsgemeinschaft (DFG), Germany
- Netherlands Organisation for Scientific Research (NWO), The Netherlands
- Agence Nationale Recherche (ANR), France
- EU FP 7
- European Research Council (ERC Starting/Consolidator Grants)
- Icelandic Research Fund
- Swiss National Science Foundation

12 Publications

Chronological list

- [1] Martin Fränzle. Verification of compilers for recursive occam-like languages. ProCoS Technical Report Kiel MF 8/1, Christian-Albrechts-Universität Kiel, Germany, 1990.
- [2] Martin Fränzle. Operational failure approximation. In Dines Bjørner, Hans Langmaack, and C. A. R. Hoare, editors, *Monograph of the ESPRIT BRA 3104 ProCoS (Provably Correct Systems)*, pages 165–206. Technical Report, Dept. of Computer Science, Technical University of Denmark, 1992.
- [3] B. Buth, K.-H. Buth, M. Fränzle, B. von Karger, Y. Lakhneche, H. Langmaack, and M. Müller-Olm. Provably correct compiler development and implementation. In U. Kastens and P. Pfahler, editors, *Compiler Construction*, volume 641 of *Lecture Notes in Computer Science*, pages 141–155. Springer-Verlag, 1992.
- [4] Jonathan P. Bowen, Martin Fränzle, Ernst-Rüdiger Olderog, and Anders P. Ravn. Developing correct systems. In *Proc. 5th Euromicro Workshop on Real-Time Systems, Oulu, Finland*, pages 176–189. IEEE Computer Society Press, June 1993.
- [5] Martin Fränzle and Markus Müller-Olm. Drift and granularity of time in real-time system implementation. ProCoS Technical Report Kiel MF 10/2, Christian-Albrechts-Universität Kiel, Germany, August 1993.
- [6] Martin Fränzle and Burghard von Karger. Proposal for a programming language core for ProCoS II. ProCoS Technical Report Kiel MF 11/3, Christian-Albrechts-Universität Kiel, Germany, August 1993.
- [7] M. R. Hansen, E.-R. Olderog, M. Schenke, M. Fränzle, B. von Karger, M. Müller-Olm, and H. Rischel. A Duration Calculus semantics for real-time reactive systems. ProCoS II document [OLD MRH 1/1], Oldenburg Universität, Germany, September 1993.
- [8] Martin Fränzle and Markus Müller-Olm. Towards provably correct code generation for a hard real-time programming language. In Peter A. Fritzson, editor, *Compiler Construction (CC '94)*, volume 786 of *Lecture Notes in Computer Science*, pages 294–308. Springer Verlag, 1994.

- [9] He Jifeng, C. A. R. Hoare, Martin Fränzle, Markus Müller-Olm, Ernst-Rüdiger Olderog, Michael Schenke, Michael R. Hansen, Anders P. Ravn, and Hans Rischel. Provably correct systems. In H. Langmaack, W.-P. de Roever, and J. Vytupil, editors, *Formal Techniques in Real-Time and Fault-Tolerant Systems (FTRTFT '94)*, volume 863 of *Lecture Notes in Computer Science*, pages 288–335. Springer Verlag, 1994.
- [10] Jonathan Bowen, C. A. R. Hoare, Michael R. Hansen, Anders P. Ravn, Hans Rischel, Ernst-Rüdiger Olderog, Michael Schenke, Martin Fränzle, Markus Müller-Olm, He Jifeng, and Zheng Jianping. Provably correct systems. ProCoS Technical Report COORD JB 7/1, Oxford University Computing Laboratory, September 1994. Tutorial material for the 1994 Formal Techniques in Real-Time and Fault-Tolerant Systems conference (FTRTFT'94).
- [11] Martin Fränzle. Test preorder and refinement. ProCoS Technical Report Kiel MF 16/2, Christian-Albrechts-Universität Kiel, Germany, December 1994.
- [12] Martin Fränzle, Bernhard von Stengel, and Arne Wittmüss. A generalized notion of semantic independence. *Information Processing Letters*, 53:5–9, 1995.
- [13] Martin Fränzle. A discrete model of VLSI dynamics in hybrid control applications. ProCoS Technical Report Kiel MF 17/3, Christian-Albrechts-Universität Kiel, Germany, April 1995.
- [14] Martin Fränzle. From continuity to discreteness — five views of embedded control hardware. ProCoS Technical Report Kiel MF 18/1, Christian-Albrechts-Universität Kiel, Germany, August 1995.
- [15] Martin Fränzle. Duration calculus on time-wise discrete models. ProCoS Technical Report Kiel MF 19/1, Christian-Albrechts-Universität Kiel, Germany, March 1996.
- [16] Martin Fränzle. Decidability of duration calculi on restricted model classes. ProCoS Technical Report Kiel MF 21/1, Christian-Albrechts-Universität Kiel, Germany, July 1996.
- [17] Martin Fränzle. Hardware synthesis from temporal logic: Undecidability need not matter. Position paper, Hardware Synthesis and Verification Workshop, Cornell University, Ithaca, USA, August 1996.
- [18] Martin Fränzle. Synthesizing controllers from duration calculus. In Bengt Jonsson and Joachim Parrow, editors, *FTRTFT '96*, volume 1135 of *Lecture Notes in Computer Science*, pages 168–187. Springer Verlag, 1996.
- [19] Martin Fränzle. *Controller Design from Temporal Logic: Undecidability need not matter*. Dissertation, Technische Fakultät der Christian-Albrechts-Universität Kiel, Germany, 1997.
- [20] Martin Fränzle. Model-checking dense-time duration calculus. In Michael R. Hansen, editor, *Duration Calculus: A Logical Approach to Real-Time Systems*, Workshop proceedings of the 10th European Summer School in Logic, Language and Information, pages 31–40. DFKI Saarbrücken, Germany, August 1998.
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- [23] Martin Fränzle. Analysis of hybrid systems: An ounce of realism can save an infinity of states. In Jörg Flum and Mario Rodríguez-Artalejo, editors, *Computer Science Logic (CSL'99)*, volume 1683 of *Lecture Notes in Computer Science*, pages 126–140. Springer Verlag, 1999.

- [24] Martin Fränzle, Wolfgang Goerigk, Burghard von Karger, and Markus Müller-Olm. Beyond ProCoS at Kiel: A synopsis of recent research. In *ProCoS WG Workshop at FM'99*, pages 1–17. Springer electronic media, September 1999. Available from the FM'99 CD-Rom.
- [25] Martin Fränzle and Markus Müller-Olm. Compilation and synthesis for real-time embedded controllers. In Ernst-Rüdiger Olderog and Bernhard Steffen, editors, *Correct System Design — Recent Insights and Advances*, volume 1710 of *Lecture Notes in Computer Science*, pages 256–287. Springer Verlag, 1999.
- [26] Herman Ågren, Martin Fränzle, and Rainer Lochmann. Prover-based bounded model-checking and inductive verification of SMI models. Confidential technical report, Universität Oldenburg and Prover AB, 2000.
- [27] Martin Fränzle. What will be eventually true of polynomial hybrid automata. In Naoki Kobayashi and Benjamin C. Pierce, editors, *Theoretical Aspects of Computer Software (TACS 2001)*, volume 2215 of *Lecture Notes in Computer Science*, pages 340–359. Springer Verlag, 2001.
- [28] Martin Fränzle and Karsten Lüth. Visual temporal logic as a rapid prototyping tool. *Computer Languages*, 27(1–3):93–113, 2001.
- [29] Martin Fränzle. Take it NP-easy: Bounded model construction for duration calculus. In Ernst-Rüdiger Olderog and Werner Damm, editors, *International Symposium on Formal Techniques in Real-Time and Fault-Tolerant systems (FTRTFT 2002)*, volume 2469 of *Lecture Notes in Computer Science*, pages 245–264. Springer Verlag, 2002.
- [30] Martin Fränzle and Christian Herde. Efficient SAT engines for concise logics: Accelerating proof search for zero-one linear constraint systems. In M. Vardi and A. Voronkov, editors, *Logic for Programming, Artificial Intelligence, and Reasoning (LPAR 2003)*, volume 2850 of *Lecture Notes in Computer Science (subseries LNAI)*. Springer Verlag, 2003.
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- [32] Bernd Becker, Markus Behle, Fritz Eisenbrand, Martin Fränzle, Marc Herbstritt, Christian Herde, Jörg Hoffmann, Daniel Kröning, Bernhard Nebel, Ilia Polian, and Ralf Wimmer. Bounded model checking and inductive verification of hybrid discrete-continuous systems. In Dominik Stoffel and Wolfgang Kunz, editors, *GI/ITG/GMM Workshop “Methoden und Beschreibungssprachen zur Modellierung und Verifikation von Schaltungen und Systeme”*, pages 65–75. Universität Kaiserslautern, Shaker Verlag, February 2004.
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- [34] Martin Fränzle. Towards a model for project area H — a blend of minutes from various discussions. AVACS technical report, Informatics and Mathematical Modelling, Technical University of Denmark, February 2004.
- [35] Martin Fränzle. A draft model for project area H. AVACS technical report, Informatics and Mathematical Modelling, Technical University of Denmark, March 2004.
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- [45] Martin Fränzle and Christian Herde. HySAT: An efficient proof engine for bounded model checking of hybrid systems. *Formal Methods in System Design*, 30:179–198, 2007.
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