MINGSHUAI CHEN

Formal Verification Group · College of Computer Science and Technology · Zhejiang University
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Employment

College of Computer Science and Technology, Zhejiang University Jan. 2023 - present
Assistant Professor of Computer Science leading the Formal Verification Group

Dept. of Computer Science, RWTH Aachen University Sep. 2019 - Nov. 2022
Postdoctoral Researcher at Software Modeling and Verification Group Head: Prof. Dr. Joost-Pieter Katoen

Education

Institute of Software, Chinese Academy of Sciences Sep. 2013 - Jun. 2019
Ph.D. in Computer Science (with honour) at St. Key Lab. Comput. Sci. Advisor: Prof. Dr. Naijun Zhan

- Dissertation: Verification and Synthesis of Time-Delayed Dynamical Systems
- Award: CAS-President Special Award

Dept. of Computing Science, Carl von Ossietzky Universität Oldenburg Fall, 2015 - 2018
Visiting scholar at Hybrid Systems Group Advisor: Prof. Dr. Martin Fränzle

College of Computer Science and Technology, Jilin University Sep. 2009 - Jun. 2013
B.Sc. in Computer Science (with honour)

Research Interests

My primary research interest lies in the general scope of *formal verification* and *synthesis*, broadly construed in *mathematical logic* and *theoretical computer science. I develop formal reasoning techniques for programs and hybrid discrete-continuous systems for ensuring the reliability and effectiveness of safety-critical cyber-physical systems, and aim to push the limits of automation as far as possible.* This is an interdisciplinary subject that spans the realms of mathematics, computer science, and control theory. Topic-wise, I am interested in semantics and qualitative/quantitative verification of computer programs; modelling, verification, and synthesis of hybrid systems; reachability analysis; invariant/interpolant/controller synthesis; probabilistic/quantum/time-delayed systems; and cyber-physical systems. The formal techniques that I am interested in include computer algebra, symbolic computation, quantitative inference, automated/interactive theorem proving, (non-)convex optimization, SAT/SMT-solving, abstract interpretation, differential dynamics, algorithmic game theory, process algebra, temporal logic, etc. Recently, I took an interest in the principles of probabilistic programming, with the main focus on automatic verification and semi-automated generation of loop invariants for infinite-state probabilistic programs and techniques for determining termination properties.

Academic Services

Lecturing

The Principles of Compilers, B.Sc., ZJU SS 24

Teaching Assistant

Trends in Computer-Aided Verification, B.Sc./M.Sc., Seminar in Theoretical CS, RWTH Aachen SS 21/22

Concurrency Theory, M.Sc., RWTH Aachen WS 21-22

Probabilistic Programming, B.Sc./M.Sc., Seminar in Theoretical CS, RWTH Aachen WS 20-21

Theoretical Foundations of the UML, M.Sc., RWTH Aachen SS 20

Theories of Programming, M.Sc., UCAS WS 17-18/18-19

Editor & Committee Chair

Guest Editor of Special Issue on Formal Methods and Applications of Journal of Software Nov. 2024

Co-Chair of Forum on Formal Methods and Applications at ChinaSoft 2024 Nov. 2024

Co-Chair of Forum on Theor. Eng. Software under Uncertainty at ChinaSoft 2024 — Nov. 2024

Committee Member

Corresponding Member of CCF Technical Committee on Formal Methods — Jul. 2023 - present

Member of CCF Technical Committee on Theoretical Computer Science — Jul. 2023 - present

Reviewer Panel of Mathematical Reviews — Oct. 2021 - present

Program Committee Member of TACAS 2025 — May 2025

Program Committee Member of FSEN 2025 — Apr. 2025

Program Committee Member of SETTA 2024 — Nov. 2024

Program Committee Member of RTCSA 2024/2021 — Aug. 2024/2021

Program Committee Member of ICWS 2024 (SRG Workshop) — Jul. 2024

Program Committee Member of SYNASC 2022 (Logic and Programming Track) — Sep. 2022

Repeatability Evaluation Program Committee Member of ADHS 2021 — Jul. 2021

Artifact Evaluation Committee Member of VMCAI 2021 — Jan. 2021

External Reviewer

FM '24, EMSOFT '24/19, VMCAI '24, TACAS '23/21, POPL '23, ICALP '22, TASE '22/15, SAFECOMP '22, CAV '21/20, ADHS '21/18, ECC '21/16, HSCC '20, FORMATS '20, RTSS '19, MEMOCODE '18, ATVA '18/15, ICECCS '17, TIME '16, VSTTE '16, UTP '16, ACM Trans. Cyber-Phys. Syst., Sci. Comput. Program., Form. Asp. Comput., Nonlinear Anal.: Hybrid Syst., C. Zhou's Festschrift, Royal Society Open Science

Honors & Awards

Recipient of the NSFC Excellent Young Scientists Fund Program (Overseas) — Oct. 2023

High-Impact Publication [22] in CS by Chinese Researchers across from Springer Nature — Feb. 2021

Nomination for the CAS Excellent Doctoral Dissertation Award [1] — Mar. 2020

CAS-President Special Award (1st awardee from ISCAS ever since its inception in 1985) — Jul. 2019

Best Paper Award [22] at FMAC 2019 — Dec. 2019

Distinguished Paper Award [25] at ATVA 2018 — Oct. 2018

National Scholarship — Oct. 2018/2010

Selected Attendee of the 6th Heidelberg Laureate Forum — Sep. 2018

Outstanding Student Award of UCAS Scientific Research Project — Dec. 2013

Grants

[PI] ZJNSF Major Program: Hybrid Comput. Models and Theories for Heterogeneous Comput. — 2024 - 2027

[PI] NSFC Excellent Young Scientists Fund (Overseas): Formal Design of Safety-Critical CPS — 2024 - 2027

[Co-I] ZJNSF Major Program: Theory of Generative Operating Systems — 2024 - 2027

[Co-I] ZJDST R&D Program: Adaptive Operating Systems Against Complex Environments — 2024 - 2027

[Co-I] ZJDST R&D Program: Quantum Key Distribution Systems: Terminals and Protocols — 2024 - 2027

[PI] CCF-Huawei Populus Grove Fund: Self-Adaptive Abstract Interpretation for C Programs — 2023 - 2024

[PI] ZJU 100 Young Professor: Foundations of Cyber-Physical Systems — 2023 - 2029

[PI] Qizhen Scholar: Talent program funded by ZJU Education Foundation — 2023 - 2026

[Co-I] National Key R&D Program: General Theory and Tech. of Service Intelligent Supervision — 2022 - 2025

[Co-I] NSFC General Program: Formal Verification of Delayed Dynamical and Hybrid Systems — 2019 - 2022

FM '24 Proving Functional Program Equivalence via Directed Lemma Synthesis
Y. Sun, R. Ji, J. Fang, X. Jiang, M. Chen, and Y. Xiong
26th Int. Symp. on Formal Methods (FM 2024)

OOPSLA '24 Exact Bayesian Inference for Loopy Probabilistic Programs
L. Klinkenberg, C. Blumenthal, M. Chen✉, D. Haase, and J.-P. Katoen
The OOPSLA 2024 issue of the Proc. of the ACM on Programming Languages (PACMPL)

OOPSLA '23 Lower Bounds for Possibly Divergent Probabilistic Programs
S. Feng, M. Chen✉, H. Su, B. L. Kaminski, J.-P. Katoen, and N. Zhan
The OOPSLA 2023 issue of the Proc. of the ACM on Programming Languages (PACMPL)

TACAS '23 Probabilistic Program Verification via Inductive Synthesis of Inductive Invariants
K. Batz, M. Chen✉, S. Junges, B. L. Kaminski, J.-P. Katoen, and C. Matheja
29th Int. Conf. on Tools and Algorithms for Construction and Analysis of Systems (TACAS 2023)

Inf. Com. Encoding Inductive Invariants as Barrier Certificates
Q. Wang, M. Chen✉, B. Xue, N. Zhan, and J.-P. Katoen
Information and Computation, 2022

CAV '22 Does a Program Yield the Right Distribution?
M. Chen✉, J.-P. Katoen, L. Klinkenberg, and T. Winkler
34th Int. Conf. on Computer Aided Verification (CAV 2022)

Acta Inf. Indecision and Delays Are the Parents of Failure
M. Chen✉, M. Fränzle, Y. Li, P. N. Mosaad, and N. Zhan
Acta Informatica, 2021

CAV '21 Latticed k-Induction with an Application to Probabilistic Programs
K. Batz, M. Chen✉, B. L. Kaminski, J.-P. Katoen, C. Matheja, and P. Schröer
33rd Int. Conf. on Computer Aided Verification (CAV 2021)

CAV '21 Synthesizing Invariant Barrier Certificates via Difference-of-Convex Programming
Q. Wang, M. Chen✉, B. Xue, N. Zhan, and J.-P. Katoen
33rd Int. Conf. on Computer Aided Verification (CAV 2021)

CAV '20 Unbounded-Time Safety Verification of Stochastic Differential Dynamics
S. Feng, M. Chen✉, B. Xue, S. Sankaranarayanan, and N. Zhan
32nd Int. Conf. on Computer Aided Verification (CAV 2020)

TACAS '20 Learning One-Clock Timed Automata **Best Paper Award at FMAC 2019**
J. An, M. Chen, B. Zhan, N. Zhan, and M. Zhang
26th Int. Conf. on Tools and Algorithms for Construction and Analysis of Systems (TACAS 2020)

CAV '19 Taming Delays in Dynamical Systems
S. Feng, M. Chen✉, N. Zhan, M. Fränzle, and B. Xue
31st Int. Conf. on Computer Aided Verification (CAV 2019)

CADE '19 NIL: Learning Nonlinear Interpolants
M. Chen✉, J. Wang, J. An, B. Zhan, D. Kapur, and N. Zhan
27th Int. Conf. on Automated Deduction (CADE 2019)

ATVA '18 What's to Come Is Still Unsure **Distinguished Paper Award**
M. Chen✉, M. Fränzle, Y. Li, P. N. Mosaad, and N. Zhan
16th Int. Symp. on Automated Technology for Verification and Analysis (ATVA 2018)

IEEE TAC Reachability Analysis for Solvable Dynamical Systems
T. Gan, M. Chen, Y. Li, B. Xia, and N. Zhan
IEEE Trans. Automat. Contr., 2018

IJCAR '16 Interpolant Synthesis for Quadratic Polynomial Inequalities and Combination with *EUF*
T. Gan, L. Dai, N. Zhan, D. Kapur, and M. Chen
8th Int. Joint Conf. on Automated Reasoning (IJCAR 2016)

FM '16 Validated Simulation-Based Verification of Delayed Differential Dynamics
M. Chen, M. Fränzle, Y. Li, P. N. Mosaad, and N. Zhan
21st Int. Symp. on Formal Methods (FM 2016)

Selected Tools/Prototypes

• **Prodigy**: A tool that decides whether a given probabilistic loop agrees with an (invariant) specification encoded as a loop-free program; it supports exact inference and efficient queries on posterior distributions.

• **cegispro2**: A tool that proves upper- and/or lower bounds on expected outcomes of possibly infinite-state probabilistic programs by synthesizing piecewise linear quantitative inductive invariants.

• **kipro2**: A tool that performs in parallel latticed k-induction and BMC to fully automatically verify upper bounds on expected values of possibly infinite-state probabilistic programs.

• **BMI-DC**: A prototype that proves unbounded-time safety of differential dynamical systems by synthesizing invariant barrier certificates via difference-of-convex programming.

• **NIL**: A learning-based tool that automatically synthesizes non-trivial (reverse) Craig interpolants for the quantifier-free theory of nonlinear arithmetic.

• **DGame**: A tool that automatically synthesizes finite-memory controllers (a.k.a. winning strategies) for safety games under delayed information.

• **MPPs**: A procedure for deciding termination by computing the set of non-terminating inputs for multi-path polynomial programs with equality conditions.

• **MARS**: A toolchain for modelling, analyzing and verifying hybrid systems, which has been successfully applied in the verification of the Chinese lunar lander Chang'e-3 and the high-speed rail in China.

Selected Talks

Dissertation Defence

• Verification & Synthesis of Time-Delayed Dynamics, *Doctoral Dissertation Defence at ISCAS*, Beijing, China, May 2019.

Tutorials

• Taming Delays in Cyber-Physical Systems, *ESWEEK*, Shanghai, China, Oct. 2022. [Tutorial co-presented with Naijun Zhan].

• Formal Analysis, Verification and Design of Safety-Critical CPS, *RTSS*, Houston, USA, Dec. 2020. [Tutorial co-presented with Lei Bu, Qixin Wang and Naijun Zhan].

Conferences, Workshops, Seminars & Visits

• Reasoning about Loopy Probabilistic Programs, *Colloquium Talk at Seminar on Software Engineering and Programming Languages*, *Hong Kong University of Science and Technology*, Hong Kong, China, Jan. 2024.

• Lower Bounds for Possibly Divergent Probabilistic Programs, *MOVES' Colloquium at Schloss Dagstuhl*, Saarbrücken, Germany, Apr. 2022 & *ROCKS*, Nijmegen, Netherlands, May 2022 & *OOPSLA*, Lisbon, Portugal, Oct. 2023.

• Latticed k-Induction with an Application to Probabilistic Programs, *Information Sciences Seminar & Youth Forum*, *Peking University*, Beijing, China, Oct. 2021 & *ISCAS Seminar*, *ISCAS*, Beijing, China, Dec. 2022.

• Synthesizing Invariant Barrier Certificates via Difference-of-Convex Programming, *Seminar on Cyber-Physical Systems*, *University of Southampton*, Southampton, UK, Apr. 2021 & *CAV*, Los Angeles, USA, Jul. 2021.

• On ∞-Safety of Stochastic Differential Dynamics, *MOVES Seminar*, *RWTH Aachen University*, Aachen, Germany, Apr. 2020 & *CAV*, Los Angeles, USA, Jul. 2020.

• (In-)Variant Synthesis for Probabilistic Programs [Immature Idea], *MOVES' Winter Colloquium at Kleinwalsertal*, Kleinwalsertal, Austria, Feb. 2020.

• Interpolation over Nonlinear Arithmetic - Towards Program Reasoning and Verification, *PKU Seminar on Programming Languages*, *Peking University*, Beijing, China, Sep. 2019 & *MOVES Seminar*, *RWTH Aachen University*, Aachen, Germany, Nov. 2019 & *FACAS*, La Falda, Córdoba, Argentina, Mar. 2022.

• Taming Delays in Dynamical Systems - Unbounded Verification of Delay Differential Equations, *CAV*, New York City, USA, Jul. 2019.

• Modelling · Verification · Synthesis - A Peek into the Blueprint of Hybrid Systems, *RWTH Aachen University*, Aachen & *Technische Universität München*, München, Germany, Oct. 2018.

• What's to Come is Still Unsure - Synthesizing Controllers Resilient to Delayed Interaction, *ATVA*, Los Angeles, USA, Oct. 2018 & *CAP*, Beijing, China, Sep. 2018 & *MISSION@INVAP*, San Carlos de Bariloche, Argentina, Feb. 2022.

• Towards Delays in Dynamical and Control Systems - Verification & Synthesis, *Universität des Saarlandes*, Saarbrücken, Germany, Jul. 2016 & *LEDS*, Shanghai, China, Dec. 2016.

• Validated Simulation-Based Verification of Delayed Differential Dynamics, *FM*, Limassol, Cyprus, Nov. 2016.

• Computing Reachable Sets of Linear Vector Fields Revisited, *ECC*, Aalborg, Denmark, Jun. 2016.

• A Two-Way Path between Formal and Informal Design of Embedded Systems, *UTP* & *iFM*, Reykjavík, Iceland, Jun. 2016.

• HHL Prover: An Improved Interactive Theorem Prover for Hybrid Systems, *ICFEM*, Paris, France, Nov. 2015.

• Decidability of Reachability for a Family of Linear Vector Fields, *ATVA*, Shanghai, China, Oct. 2015.

Visits & Participations

Academic Visits

ALPACAS Research Group, Hong Kong University of Science and Technology, Hong Kong, China Jan. 2024

Software Modeling and Verification Group, RWTH Aachen University, Aachen, Germany Oct. 2023/2018

St. Key Lab. Comput. Sci., Institute of Software, Chinese Academy of Sciences, Beijing, China Dec. 2022

Hybrid Systems Group, C. v. Ossietzky Universität Oldenburg, Oldenburg, Germany Fall, 2015 - 2018

Chair of Robotics, AI and Real-time Syst., Technische Universität München, München, Germany Oct. 2018

Dependable Systems and Software Group, Universität des Saarlandes, Saarbrücken, Germany Jul. 2016

Conferences & Workshops

ChinaSoft '24, SPLASH '23, ESWEEK '22, ROCKS '22, FACAS '22, MISSION '22, RP '21, LPP '21, CPS-IoT Week '21, VSOW03 '21, CAV '21/20/19/17, RTSS '20, ETAPS '20, ATVA '18/15, HLF '18, CONFESTA '18, CAP '18/17, SETTA '17, FMAC '17/16, FM '16, ECC '16, iFM&UTP '16, LEDS '16/14, ICFEM '15, CDZ '14, SAVE '14

Summer/Autumn Schools

The Summer School on Formal Methods, Beijing, China Aug. 2019/2018

The 3rd School on Engineering Trustworthy Software Systems, Chongqing, China Apr. 2017

The 2nd AVACS Autumn School, Oldenburg, Germany Oct. 2015

The 4th Summer School in Symbolic Computation, Beijing, China Aug. 2015

The 5th Summer School on Formal Techniques, Atherton, CA, USA May 2015

The 4th SAT/SMT Summer School, Semmering, Austria Jul. 2014

Technical Skills

Programming Languages	C/C++, Python, Mathematica, Maple, Matlab/Simulink, LaTeX
Operating Systems	macOS, Unix/Linux, Windows (dedicated to video games)
Software Tools	ARCH toolset, ATP/ITP, model checkers, SDP solvers, algebra systems

Languages

English: working-language | German: for survival only | Chinese: mother-tongue

Complete List of Publications

Dissertation

[1] M. Chen✉. Verification and synthesis of time-delayed dynamical systems. *PhD Dissertation*, Institute of Software, Chinese Academy of Sciences, China, 2019. [Nomination for the CAS Excellent Doctoral Dissertation Award].

Book Chapters

[2] M. Chen✉, X. Han, T. Tang, S. Wang, M. Yang, N. Zhan, H. Zhao, and L. Zou. MARS: A toolchain for modelling, analysis and verification of hybrid systems. In *Provably Correct Systems*, pages 39–58. Springer, 2017.

Journal Articles

[3] L. Klinkenberg, C. Blumenthal, M. Chen✉, D. Haase, and J. Katoen. Exact Bayesian inference for loopy probabilistic programs. *Proc. ACM Program. Lang.*, number OOPSLA1, (OOPSLA1), 2024. [To appear, Arfifact Evaluated].

[4] J. Chen, F. Wang, S. Pang, M. Chen✉, M. Xi, T. Zhao, and J. Yin. A privacy policy text compliance reasoning framework with large language models for healthcare services. *Tsinghua Sci. Tech.*, 2024. [To appear].

[5] S. Feng, M. Chen✉, H. Su, B. L. Kaminski, J.-P. Katoen, and N. Zhan. Lower bounds for possibly divergent probabilistic programs. *Proc. ACM Program. Lang.*, 7(OOPSLA1):696–726, 2023.

[6] Q. Wang, M. Chen✉, B. Xue, N. Zhan, and J.-P. Katoen. Encoding inductive invariants as barrier certificates: Synthesis via difference-of-convex programming. *Inf. Comput.*, 289:104965, 2022.

[7] M. Chen✉, M. Fränzle, Y. Li, P. N. Mosaad, and N. Zhan. Indecision and delays are the parents of failure - Taming them algorithmically by synthesizing delay-resilient control. *Acta Informatica*, 58(5):497–528, 2021.

[8] J. Wang, J. An, M. Chen, N. Zhan, L. Wang, M. Zhang, and T. Gan. From model to implementation: A network-algorithm programming language. *Sci. China Inf. Sci.*, 63(7), 2020.

[9] M. Fränzle, M. Chen, and P. Kröger. In memory of Oded Maler: Automatic reachability analysis of hybrid-state automata. *ACM SIGLOG News*, 6(1):19–39, 2019.

[10] T. Gan, M. Chen, Y. Li, B. Xia, and N. Zhan. Reachability analysis for solvable dynamical systems. *IEEE Trans. Automat. Contr.*, 63(7):2003–2018, 2018.

Peer-Reviewed Conference Papers

[11] M. Yang, K. Batz, M. Chen, J.-P. Katoen, Z. Wu, and J. Yin. Latticed craig interpolation with an application to probabilistic verification. In *CIBD '24*, 2024. [Extended Abstract].

[12] S. Tan, H. Zhang, J. Yu, C. Lang, Y. Shang, X. Zhao, M. Chen, Y. Liang, L. Lu, and J. Yin. QuFEM: Fast and accurate quantum readout calibration using the finite element method. In *Proc. of ASPLOS '24*. ACM, 2024. [To appear].

[13] S. Tan, D. Xiang, L. Lu, J. Lu, Q. Jiang, M. Chen, and J. Yin. MorphQPV: Exploiting isomorphism in quantum programs to facilitate confident verification. In *Proc. of ASPLOS '24*. ACM, 2024. [To appear].

[14] Y. Sun, R. Ji, J. Fang, X. Jiang, M. Chen, and Y. Xiong. Proving functional program equivalence via directed lemma synthesis. In *Proc. of FM '24*, 2024. [To appear].

[15] Y. Sun, M. Chen✉, K. Zhao, and J. Chen. HORAE: A domain-agnostic modeling language for automating multimodal service regulation. In *Proc. of ICWS (SRG) '24*, 2024. [Work-in-Progress Paper, To appear].

[16] L. Klinkenberg, T. Winkler, M. Chen, and J.-P. Katoen. Exact probabilistic inference using generating functions. In *LAFI '23*, 2023. [Extended Abstract].

[17] K. Batz, M. Chen✉, S. Junges, B. L. Kaminski, J.-P. Katoen, and C. Matheja. Probabilistic program verification via inductive synthesis of inductive invariants. In *Proc. of TACAS '23*, pages 410–429, 2023. [Arfifact Evaluated].

[18] M. Chen✉, J.-P. Katoen, L. Klinkenberg, and T. Winkler. Does a program yield the right distribution? Verifying probabilistic programs via generating functions. In *Proc. of CAV '22*, pages 79–101, 2022. [Arfifact Evaluated].

[19] Q. Wang, M. Chen✉, B. Xue, N. Zhan, and J.-P. Katoen. Synthesizing invariant barrier certificates via difference-of-convex programming. In *Proc. of CAV '21*, pages 443–466, 2021. [Arfifact Evaluated].

[20] K. Batz, M. Chen✉, B. L. Kaminski, J.-P. Katoen, C. Matheja, and P. Schröer. Latticed k-induction with an application to probabilistic programs. In *Proc. of CAV '21*, pages 524–549, 2021. [Arfifact Evaluated].

[21] S. Feng, M. Chen✉, B. Xue, S. Sankaranarayanan, and N. Zhan. Unbounded-time safety verification of stochastic differential dynamics. In *Proc. of CAV '20*, pages 327–348, 2020. [Arfifact Evaluated].

[22] J. An, M. Chen, B. Zhan, N. Zhan, and M. Zhang. Learning one-clock timed automata. In *Proc. of TACAS '20*, pages 444–462, 2020. [Arfifact Evaluated · Best Paper Award at FMAC 2019].

[23] S. Feng, M. Chen✉, N. Zhan, M. Fränzle, and B. Xue. Taming delays in dynamical systems - Unbounded verification of delay differential equations. In *Proc. of CAV '19*, pages 650–669, 2019. [Arfifact Evaluated].

[24] M. Chen✉, J. Wang, J. An, B. Zhan, D. Kapur, and N. Zhan. NIL: Learning nonlinear interpolants. In *Proc. of CADE '19*, pages 178–196, 2019.

[25] M. Chen✉, M. Fränzle, Y. Li, P. N. Mosaad, and N. Zhan. What's to come is still unsure - Synthesizing controllers resilient to delayed interaction. In *Proc. of ATVA '18*, pages 56–74, 2018. [Distinguished Paper Award].

[26] B. Xue, P. N. Mosaad, M. Fränzle, M. Chen, Y. Li, and N. Zhan. Safe over- and under-approximation of reachable sets for delay differential equations. In *Proc. of FORMATS '17*, pages 281–299, 2017.

[27] T. Gan, L. Dai, B. Xia, N. Zhan, D. Kapur, and M. Chen. Interpolant synthesis for quadratic polynomial inequalities and combination with *EUF*. In *Proc. of IJCAR '16*, pages 195–212, 2016.

[28] T. Gan, M. Chen, Y. Li, B. Xia, and N. Zhan. Computing reachable sets of linear vector fields revisited. In *Proc. of ECC '16*, pages 419–426, 2016.

[29] M. Chen, A. P. Ravn, S. Wang, M. Yang, and N. Zhan. A two-way path between formal and informal design of embedded systems. In *Proc. of UTP '16*, pages 65–92, 2016.

[30] M. Chen, M. Fränzle, Y. Li, P. N. Mosaad, and N. Zhan. Validated simulation-based verification of delayed differential dynamics. In *Proc. of FM '16*, pages 137–154, 2016.

[31] T. Gan, M. Chen, L. Dai, B. Xia, and N. Zhan. Decidability of the reachability for a family of linear vector fields. In *Proc. of ATVA '15*, pages 482–499, 2015.

Manuscripts under Review

[32] Y. Li, N. Zhan, M. Chen✉, H. Lu, G. Wu, and J.-P. Katoen. On termination of polynomial programs with equality conditions. 2024. Under submission.

[33] S. Feng, M. Chen, H. Wu, H. Su, and N. Zhan. Tolerant barrier certificates for stochastic systems. 2024. Under submission.

[34] Z. Zhang, C. Yu, H. Huang, R. Chang, M. Chen, Q. Dai, W. Shen, Y. Zhao, and K. Ren. PA-Boot: A formally verified authentication protocol for multiprocessor secure boot. 2023. Under submission.