Igor KONNOV

Vienna, Austria
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Born in 1981. Married, with one child. Citizen of Russia, permanent resident of Austria
Languages: English (fluent), German (ÖSD Zertifikat B2), Russian (mother tongue), French (beginner)
Research interests: model checking, parameterized verification, verification of distributed algorithms, fault tolerance, blockchains, temporal logic of actions (TLA$^+$)

Appointments

Informal Systems Canada/Switzerland/Austria (spin-off of Interchain Foundation), Vienna, Austria:

Jan 2020 – present. Principal Researcher

Interchain Foundation (Switzerland), location in Vienna, Austria:

Oct 2019 – Dec 2020. Senior Research Scientist

INRIA Nancy — Grand Est, Nancy, France:

Mar 2018 – Sep 2019 (leave of absence). Researcher (permanent, chargé de recherche de classe normale)

Vienna University of Technology (TU Wien), Faculty of Informatics, Austria:

Jan 2016 – Feb 2018. Postdoctoral researcher, principal investigator in the WWTF project APALACHE

Dec 2011 – Dec 2015. Postdoctoral assistant professor (Universitätsassistent, limited contract)

Jul 2011 – Dec 2011. Postdoctoral researcher (Projektassistent)

Moscow State University (MSU), Faculty of Computational Mathematics and Cybernetics, Russia:

Jan 2010 – Jun 2011. Junior research fellow (m.n.s.)

Dec 2006 – Jan 2010. Pre- and postdoctoral research and teaching assistant

Sytech LLC, Russia: **2006–2010,** Part-time systems architect, **2004–2006,** Software developer

IFirst LLC, Russia: **01.09.2002–15.09.2003,** Part-time programmer

Higher education, degrees, and titles

Dec 2019. Vienna University of Technology (TU Wien), Austria: Privatdozent — Habilitation in Computer Science

Oct 2003– Nov 2008. Moscow State University, Russia: Ph.D. in Computer Science (awarded in **Feb 2009**)

Sep 1998– Jul 2003. Moscow State University, Russia: Specialist (approx. MSc) in Applied Math. & Informatics

With distinction, 97% are the best score: avg. score 1.06 (German scale) = avg. score 4.87 (Russian scale)

Project acquisition and participation

2016–2019. WWTF: Vienna Science and Technology Fund. Project ICT15–103 APALACHE **539k€**
Abstraction-based Parameterized TLA Checker TU Wien
Role: principal investigator, **with**: J.Widder (co-PI), H. Veith (core team)
Acceptance rate: 10 out of 137 proposals (approx. 7%)

2015–2018. FWF: Austrian National Research Network S11403-N23 SHiNE
Systematic Methods in Systems Engineering TU Wien
Role: researcher, **Coordinator**: R. Bloem (**3.7 Mio.€**), **PI**: H. Veith **625k€**

2011–2014. WWTF: Vienna Science and Technology Fund. Project PROSEED **598k€**
Proof Seeding for Software Verification TU Wien
Role: researcher, **PI**: H. Veith

2010–2014. FWF: Austrian National Research Network S11403-N23 RiSE
Rigorous Systems Engineering TU Wien
Role: researcher, **Coordinator**: R. Bloem (**3.7 Mio.€**), **PI**: H. Veith **582.8k€**

2010–2012. Russian Federal Special-Purpose Programme, Project 14.740.11.0399 approx. **200k€**
Developing a Prototype for Computer Simulation of Real-Time Distributed Systems MSU
Role: responsible for coordination, research agenda, and report writing, **PI**: R.L. Smeliansky

2009–2011. RFBR: Russian Fund for Basic Research, Project Nr. 09–01–00277-a approx. **32k€**
Structural and Semantic Analisys Using Formal Models of Sequential and Parallel Processes MSU
Role: researcher, **PI**: R.I. Podlovchenko

2006–2009. INTAS: EU research cooperation with the New Independent States, Project Nr. 05–1000008–8144
Practical Formal Verification Using Automated Reasoning and Model Checking MSU
Role: researcher, **Coordinator**: T. Jebelian, **PI**: V.E. Plisko

2006–2008. RFBR: Russian Fund for Basic Research, Project Nr. 06–01–00106-a approx. **52k€**
Formal Models of Sequential and Parallel Processes and the Analysis of Their Semantic Properties MSU
Role: researcher, **PI**: R.I. Podlovchenko

R&D projects with industry and state companies

2009–2010. *Obfuscation techniques on intermediate code representation* Computer Systems Lab/MSU
Role: team lead of 1 master student and 1 PhD student, **PI:** R.L. Smeliansky

2007–2008. *Obfuscation techniques for C++* Computer Systems Lab/MSU
Role: team lead of 1 master student and 1 PhD student, **PI:** R.L. Smeliansky

2008. *Teachable static analysis workbench* The Open Web Application Security Project (OWASP)
Role: developer, **PI:** D.D. Kozlov

2007–2008. *Static analysis of python web applications for vulnerabilities* Computer Systems Lab/MSU
Role: developer, **PI:** R.L. Smeliansky

Selected invited talks & lectures

FORTE20, ~~Valletta/Malta~~ – online
tutorial *Parameterized Verification with Byzantine Model Checker* **June 2020**

VMCAI Winter School, New Orleans, LA/USA
tutorial *Model checking of distributed algorithms: from classics towards Tendermint blockchain* **Jan 2020**

Dagstuhl Seminar 18211: "Formal Methods and Fault-Tolerant Distributed Computing: Forging an Alliance"
Dagstuhl/Germany, invited tutorial *What my computer can find about your distributed algorithm* **May 2018**

Bertrand Meyer's Vericlub seminar, U. Toulouse, Toulouse/France **Nov 2016**
invited seminar talk *Model checking of threshold-guarded distributed algorithms: beyond reachability*

Rigorous System Design Laboratory, EPFL, Lausanne/Switzerland **Sep 2016**
invited seminar talk *Model checking of fault-tolerant distributed algorithms: safety and liveness*

Workshop on Program Semantics, Specification & Verification at CSR'16, St. Petersburg/Russia **Jun 2016**
invited talk *Model checking of threshold-based fault-tolerant distributed algorithms*

Spring School Logic & Verification, Vienna/Austria **Apr 2016**
lectures on *Complete parameterized & bounded model checking of threshold-based fault-tolerant distributed algorithms*

Amazon, Herndon, VA/USA **Jun 2015**
invited talk *Model checking of threshold-based fault-tolerant distributed algorithms*

Dagstuhl Seminar: "Distributed Cloud Computing", Dagstuhl/Germany **Feb 2015**
talk *Model checking of threshold-based fault-tolerant distributed algorithms*

Tools & Methods of Program Analysis'14, Kostroma/Russia **Nov 2014**
invited talk *Parameterized model checking of fault-tolerant distributed algorithms by abstraction*

Summer School'14: "Verification Technology, Systems & Applications", Luxembourg **Oct 2014**
lectures on *Model checking of fault-tolerant distributed algorithms* (together with Helmut Veith)

Dagstuhl Seminar: "Formal Verification of Distributed Algorithms", Dagstuhl/Germany **Apr 2013**
invited talk *Counter attack on Byzantine generals*

Concurrency Seminar, Computing Laboratory, Oxford/UK **Feb 2011**
invited talk *An invariant-based approach to the verification of asynchronous parameterized networks*

Teaching experience

Vienna University of Technology (TU Wien)

2013–2017. Computer Aided Verification Master students, compulsory, lectures & practicals, 3 ECTS
In 2017, held the lecture course. Until 2017, read parts of the lecture course, teaching assistance.

2013–2017. Program & Systems Verification Bachelor students, compulsory, lectures & practicals, 6 ECTS
Teaching assistance

2011–2015. Formal Methods of Informatics Master students, compulsory, lectures & practicals, 6 ECTS
Teaching assistance

Moscow State University (MSU)

2008–2010. Software model checking (Dr. Savenkov) 8th semester, compulsory, lectures & seminars, 32 hrs.
Designed the course together with K. Savenkov, read parts of the lecture course, teaching assistance

2004. Seminars on The C Programming Language and UNIX — 3rd semester, compulsory, 32 hrs.
Instructed at all seminars (approx. 20 students)

2005. Seminars on Syntax Analysis and C++ — 4th semester, compulsory, 32 hrs.
Instructed at all seminars (approx. 20 students)

2004. Operating Systems (Prof. Terekhov) — 3rd semester, compulsory, lectures, 54 hrs.
Teaching assistance

2003–2011. Computer Networks (Prof. Smeliansky) — 6th semester, compulsory, lectures, 64 hrs.
Teaching assistance

2003–2004. The Java Programming Language — optional, lectures, 32 hrs.
Read parts of the lecture course, teaching assistance

2003–2004. MSU *math entrance exams* — compulsory
Corrected written math exams, participated in the oral math exams

Kazakhstan branch of Moscow State Univ., Astana/Kazakhstan

2011. Software model checking — 8th semester, compulsory, lectures & seminars, 32 hrs.
held the lecture course and the seminars

Tashkent University, Tashkent/Uzbekistan

2011–2013. Participated in EU project CANDI: Teaching Competency & Infrastructure for e-Learning and Retraining

Advising

PhD students (TU Wien): Associated Faculty of Doctoral College LogiCS [`logic-cs.at`]

2016–present. Thanh Hai Tran (advising) — with Priv.-Doz. Dr. Josef Widder

2016–present. Jure Kukovec (advising) — with Priv.-Doz. Dr. Josef Widder

2015–2019. Frau Dr. Marijana Lazić (co-advising) — with Priv.-Doz. Dr. Josef Widder
Reduction techniques for parameterized model checking and synthesis of fault-tolerant distributed algorithms

2011–2014. Frau Dr. Annu Gmeiner (informal co-advising) advisors: Prof. Helmut Veith and PD. Dr. Josef Widder
Parameterized model checking of fault-tolerant distributed algorithms

Master students:

2019. Viktor Sergeev (Univ. of Lorraine)
Bounded Model Checking of Liveness Properties of TLA+ Specifications — co-advised with Stephan Merz

2016. Jure Kukovec (Univ. Ljubljana)
Extensions of Threshold Automata for Reachability in Parameterized Systems — co-advised with Prof. Andrej Bauer

2015–2016. Thanh Hai Tran (TU Wien)
User-guided Predicate Abstraction of TLA+ Specifications — co-advised with Prof. Helmut Veith

2009–2011. Alexander Mischenko (MSU)
Static Type Analysis of Python Programs on Bytecode Level

2007–2009. Denis Sigaev (MSU)
Detection of Programs Protected from Reverse Engineering — co-advised with A. Kachalin

2008. Alexey Schevchenko (MSU)
Application of Regular Model Checking to Infinite State Systems

2007. Peter Bulychev (MSU)
Game-Theoretic Methods of Protocol Verification co-advised with Prof. Vladimir Zakharov

Bachelor students:

2013. Sebastian Neumaier (TU Wien) *A Simple Simulation Language for Distributed Algorithms*

2011. Andrey Babak and Anton Artyomov (MSU) *Static Analysis of Python Programs*

Community service

Conference organization:

PC co-chair of CONCUR 2020 ~~in Vienna~~ – online (owing to COVID19) [concur2020.forsyte.at]

Artifact evaluation chair: Computer-Aided Verification (CAV'18) [cavconference.org/2018]

Workshop chair: Computer-Aided Verification (CAV'13) [cav2013.forsyte.at]

Program Committees:

2nd workshop on Formal Methods for Blockchains 2020 ~~Los Angeles, CA, USA~~ – online

ACM Symposium on Principles of Distributed Computing (PODC'18) London/UK

Formal Methods in Computer-Aided Design (FMCAD) 2017 & 2018 Vienna/Austria & Austin/TX, US

Computer Aided Verification'16 (External Reviewer Committee) Toronto/Canada

Symbolic and Numeric Algorithms for Scientific Computing 2013, 2016, and 2017 Timisoara/Romania

Stabilization, Safety, and Security of Distributed Systems'15 Edmonton/Canada

Intl. Conf. on Verification & Evaluation of Computer & Comm. Systems (VECoS'18) Grenoble/France

Intl. Symposium on Formal Approaches to Parallel and Distributed Systems (4PAD) 2018 & 2019 Orléans/France & Dublin/Ireland

Workshop on Methods and Tools for Rigorous System Design (MeTRiD'18) Thessaloniki/Greece

Tools & Methods of Program Analysis 2015 & 2017 St. Petersburg & Moscow/Russia

Workshop on Program Semantics, Specification, and Verification 2017–2019 Russia

Parallel, Distributed, and Network-based Processing'17 (Formal approaches track) St. Petersburg/Russia

Journal and book chapter reviews: FMSD (2018), Computing (2018), LMCS (2017), ACM ToCL (2017), MAIS (2017), MiCS (2017), TIME (2015),
Handbook of Model Checking (eds. E. Clarke, T. Henzinger, H. Veith)

Guest editor: Special issue on Computer Aided Verification'13 in Formal Methods in System Design (Springer) (with Helmut Veith and Natasha Sharygina)

Editorial board: Proceedings of the Institute for System Programming of the Russian Academy of Sciences since 2016 [`www.ispras.ru/en/proceedings`]

External reviewer: ISOLA'20, FSTTCS'17, QEST'17, TACAS'17, STACS'17, VMCAI'17, MARS'17, ICFEM'16, CONCUR'16, IJCAR'16, LICS'16, EuroPar'16, AAMAS'16, CAV'15, FMCAD'15, TACAS'15, FoSSaCS'15, CAV'14, SAS'14, GandALF'14, ESOP'14, HVC'14, CAV'13, LATA'13, SSS'13, CAV'12, NFM'12, SPIN'12, VMCAI'12, FMICS'11, CSL'11

Student Award Committee. VCLA International Student Awards 2014–2015

Tools

2016–present. APALACHE: symbolic model checker for TLA$^+$ [forsyte.at/software/apalache]

2012–present. BYMC: model checker of parameterized fault-tolerant distributed algorithms [forsyte.at/software/bymc]

2004–2009. CHEAPS: model checker of parameterized asynchronous distributed systems [lvk.cs.msu.su/~konnov/cheaps]

Scholarships & sponsored summer schools

2009–2010. Fellowship for young researchers: Faculty of Computational Mathematics and Cybernetics, MSU

2009. Marktoberdorf Summer School *Engineering Methods and Tools for Software Safety and Security*

2008. Marktoberdorf Summer School *Logics and Languages for Reliability and Security*

2005. Microsoft Summer School *Mathematics and Programming: from Theory Towards Practice*

2003–2005. PhD student scholarship: LSI Logic

Publications and talks

Book

[1] R. Bloem, S. Jacobs, A. Khalimov, I. Konnov, S. Rubin, H. Veith, and J. Widder. *Decidability of Parameterized Verification*. Vol. 6. 1. Morgan & Claypool, 2015, pp. 1–170. DOI: 10.2200/S00658ED1V01Y201508DCT013.

PhD and Habilitation

[2] I. Konnov. "Techniques and Tools for Automated Verification of Fault-tolerant and Parameterized Distributed Systems". Habilitation in computer science. Technische Universitaet Wien (TU Wien), Faculty of Informatics, Dec. 2018, pp. 1–235. URL: https://konnov.github.io/doc/konnov-habil19.pdf.

[3] I. V. Konnov. "Parameterized Model Checking of Distributed Systems". In Russian. PhD thesis in Computer Science (Kandidat physiko-matematitcheskih nauk 05.13.11). PhD thesis. Lomonosov Moscow State University, Faculty of Computational Mathematics and Cybernetics, Nov. 2008, pp. 1–198. URL: http://lvk.cs.msu.su/~konnov/publications/konnov_phd_thesis.pdf.

Proceedings Editor

[4] I. Konnov and L. Kovács, eds. *31st International Conference on Concurrency Theory, CONCUR 2020, September 1-4, 2020, Vienna, Austria (Virtual Conference)*. Vol. 171. LIPIcs. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2020.

Book chapter

[5] A. Gmeiner, I. Konnov, U. Schmid, H. Veith, and J. Widder. "Tutorial on Parameterized Model Checking of Fault-Tolerant Distributed Algorithms". In: *Formal Methods for Executable Software Models*. LNCS. Springer, 2014, pp. 122–171. DOI: 10.1007/978-3-319-07317-0_4.

Invited papers

[6] I. Konnov, M. Lazic, I. Stoilkovska, and J. Widder. "Tutorial: Parameterized Verification with Byzantine Model Checker". In: *FORTE 2020*. 2020, pp. 189–207. DOI: 10.1007/978-3-030-50086-3_11. URL: https://doi.org/10.1007/978-3-030-50086-3%5C_11.

[7] I. Konnov and J. Widder. "ByMC: Byzantine Model Checker". In: *Leveraging Applications of Formal Methods, Verification and Validation. Distributed Systems*. Cham: Springer International Publishing, 2018, pp. 327–342. DOI: 10.1007/978-3-030-03424-5_22. URL: https://hal.inria.fr/hal-01909653.

[8] I. Konnov, H. Veith, and J. Widder. "What You Always Wanted to Know About Model Checking of Fault-Tolerant Distributed Algorithms". In: *Perspectives of System Informatics: PSI 2015, in Memory of Helmut Veith, Revised Selected Papers*. Springer, 2016, pp. 6–21. DOI: 10.1007/978-3-319-41579-6_2.

Journal articles

[9] J. Kukovec, T.-H. Tran, and I. Konnov. "Extracting symbolic transitions from TLA+ specifications". In: *Science of Computer Programming* 187 (2020), p. 102361. DOI: https://doi.org/10.1016/j.scico.2019.102361.

[10] I. Konnov. "**Review**: Edmund M. Clarke, Thomas A. Henzinger, Helmut Veith, and Roderick Bloem (eds): Handbook of model checking - Springer International Publishing AG, Cham, Switzerland, 2018". In: *Formal Asp. Comput.* 31.4 (2019), pp. 455–456. DOI: 10.1007/s00165-019-00486-z.

[11] I. Konnov, J. Kukovec, and T. Tran. "TLA+ model checking made symbolic". In: *PACMPL* 3.OOPSLA (2019), 123:1–123:30. URL: https://doi.org/10.1145/3360549.

[12] I. V. Konnov, H. Veith, and J. Widder. "On the completeness of bounded model checking for threshold-based distributed algorithms: Reachability". In: *Information and Computation* 252 (2017). **(Extended version of the conference paper** I. Konnov, H. Veith, J. Widder. "On the Completeness of Bounded Model Checking for Threshold-Based Distributed Algorithms: Reachability". In Concurrency Theory – 25th International Conference, CONCUR, 2014, pp. 125–140**)**, pp. 95–109. DOI: 10.1016/j.ic.2016.03.006.

[13] I. Konnov, M. Lazic, H. Veith, and J. Widder. "Para^2: Parameterized Path Reduction, Acceleration, and SMT for Reachability in Threshold-Guarded Distributed Algorithms". In: *Formal Methods in System Design* (2017). **(Extended version of the conference paper** I. Konnov, H. Veith, J. Widder. "SMT and POR Beat Counter Abstraction: Parameterized Model Checking of Threshold-Based Distributed Algorithms". In Computer-Aided Verification, vol. 9206, LNCS, 2015, pp. 85–102.**)** DOI: 10.1007/s10703-017-0297-4. URL: https://link.springer.com/article/10.1007/s10703-017-0297-4.

[14] R. Bloem, S. Jacobs, A. Khalimov, I. Konnov, S. Rubin, H. Veith, and J. Widder. "Decidability in Parameterized Verification". In: *ACM SIGACT News* 47.2 (2016), pp. 53–64. DOI: 10.1145/2951860.2951873.

[15] D. Y. Volkanov, V. A. Zakharov, D. A. Zorin, V. V. Podymov, and I. V. Konnov. "A combined toolset for the verification of real-time distributed systems". In: *Programming and Computer Software* 41.6 (2015), pp. 325–335. DOI: 10.1134/S0361768815060080.

[16] I. Konnov, V. Podymov, D. Volkanov, V. Zakharov, and D. Zorin. "How to Make a Simple Tool for Verification of Real-Time Systems". In: *Automatic Control and Computer Sciences* 48.7 (2014), pp. 534–542. DOI: 10.3103/S0146411614070232.

[17] I. V. Konnov. "On application of weaker simulations to parameterized model checking by network invariants technique". In: *Automatic Control and Computer Sciences* 44.7 (2010), pp. 378–386. DOI: 10.3103/S0146411610070035.

[18] I. V. Konnov and V. A. Zakharov. "An invariant-based approach to the verification of asynchronous parameterized networks". In: *Journal of Symbolic Computation* 45.11 (2010), pp. 1144–1162. DOI: 10.1016/j.jsc.2008.11.006.

[19] I. V. Konnov and V. A. Zakharov. "Using Adaptive Symmetry Reduction for LTL Model Checking". In Russian. In: *Modelling and Analysis of Information Systems* 17.4 (2010), pp. 78–87. URL: http://www.mathnet.ru/php/archive.phtml?wshow=paper&jrnid=mais&paperid=38&option_lang=eng.

[20] I. V. Konnov and V. A. Zakharov. "An Approach to the Verification of Symmetric Parameterized Distributed Systems". In: *Programming and Computer Software* 31.5 (2005), pp. 225–236. DOI: 10.1007/s11086-005-0034-4.

Peer-reviewed conference proceedings

[21] N. Bertrand, I. Konnov, M. Lazic, and J. Widder. "Verification of Randomized Consensus Algorithms Under Round-Rigid Adversaries". In: *CONCUR 2019*. Vol. 140. LIPIcs. 2019, 33:1–33:15. DOI: 10.4230/LIPIcs.CONCUR.2019.33.

[22] I. Stoilkovska, I. Konnov, J. Widder, and F. Zuleger. "Verifying Safety of Synchronous Fault-Tolerant Algorithms Bounded Model Checking". In: *TACAS*. 2019, pp. 357–374. DOI: 10.1007/978-3-030-17465-1_20.

[23] J. Kukovec, I. Konnov, and J. Widder. "Reachability in Parameterized Systems: All Flavors of Threshold Automata". In: *29th International Conference on Concurrency Theory, CONCUR 2018, September 4-7, 2018, Beijing, China*. 2018, 19:1–19:17. DOI: 10.4230/LIPIcs.CONCUR.2018.19. URL: https://doi.org/10.4230/LIPIcs.CONCUR.2018.19.

[24] J. Kukovec, T. Tran, and I. Konnov. "Extracting Symbolic Transitions from TLA$^+$ Specifications". In: *Abstract State Machines, Alloy, B, TLA, VDM, and Z*. 2018, pp. 89–104. DOI: 10.1007/978-3-319-91271-4_7. URL: http://forsyte.at/wp-content/uploads/abz2018_full.pdf.

[25] I. V. Konnov, M. Lazic, H. Veith, and J. Widder. "A short counterexample property for safety and liveness verification of fault-tolerant distributed algorithms". In: *Proceedings of the 44th ACM SIGPLAN Symposium on Principles of Programming Languages, POPL 2017, Paris, France, January 18-20, 2017*. 2017, pp. 719–734. URL: http://dl.acm.org/citation.cfm?id=3009860.

[26] I. V. Konnov, J. Widder, F. Spegni, and L. Spalazzi. "Accuracy of Message Counting Abstraction in Fault-Tolerant Distributed Algorithms". In: *Verification, Model Checking, and Abstract Interpretation - 18th International Conference, VMCAI 2017, Paris, France, January 15-17, 2017, Proceedings*. 2017, pp. 347–366. DOI: 10.1007/978-3-319-52234-0_19.

[27] M. Lazic, I. Konnov, J. Widder, and R. Bloem. "Synthesis of Distributed Algorithms with Parameterized Threshold Guards". In: *OPODIS*. Vol. 95. LIPIcs. 2017, 32:1–32:20. URL: https://doi.org/10.4230/LIPIcs.OPODIS.2017.32.

[28] I. Konnov, T. Kotek, Q. Wang, H. Veith, S. Bliudze, and J. Sifakis. "Parameterized Systems in BIP: Design and Model Checking". In: *27th International Conference on Concurrency Theory, CONCUR 2016, August 23-26, 2016, Québec City, Canada*. Vol. 59. LIPIcs. 2016, 30:1–30:16. DOI: 10.4230/LIPIcs.CONCUR.2016.30.

[29] I. Konnov, H. Veith, and J. Widder. "SMT and POR beat Counter Abstraction: Parameterized Model Checking of Threshold-Based Distributed Algorithms". In: *CAV (Part I)*. Vol. 9206. LNCS. 2015, pp. 85–102. DOI: 10.1007/978-3-319-21690-4_6.

[30] I. Konnov, H. Veith, and J. Widder. "On the Completeness of Bounded Model Checking for Threshold-Based Distributed Algorithms: Reachability". In: *CONCUR 2014*. Vol. 8704. LNCS. 2014, pp. 125–140. DOI: 10.1007/978-3-662-44584-6_10.

[31] A. John, I. Konnov, U. Schmid, H. Veith, and J. Widder. "Brief announcement: parameterized model checking of fault-tolerant distributed algorithms by abstraction". In: *PODC*. 2013, pp. 119–121. DOI: 10.1145/2484239.2484285.

[32] A. John, I. Konnov, U. Schmid, H. Veith, and J. Widder. "Parameterized model checking of fault-tolerant distributed algorithms by abstraction". In: *Formal Methods in Computer-Aided Design, FMCAD 2013, Portland, OR, USA, October 20-23, 2013*. 2013, pp. 201–209. DOI: 10.1109/FMCAD.2013.6679411.

[33] A. John, I. Konnov, U. Schmid, H. Veith, and J. Widder. "Towards Modeling and Model Checking Fault-Tolerant Distributed Algorithms". In: *Model Checking Software - 20th International Symposium, SPIN 2013, Stony Brook, NY, USA, July 8-9, 2013*. Vol. 7976. LNCS. 2013, pp. 209–226. DOI: 10.1007/978-3-642-39176-7_14.

[34] I. V. Konnov. "Application of CHEAPS System to Parameterized Model Checking of Distributed Systems". In Russian. In: *Proc. 3rd All-Russia Conf. on Methods and Techniques of Information Processing*. Moscow, 2009, pp. 116–122. ISBN: 978-5-89407-373-3.

[35] V. A. Zakharov and I. V. Konnov. "On the Verification of Asynchronous Parameterized Distributed Programs". In Russian. In: *Proc. 2nd All-Russia Conf. on Methods and Techniques of Information Processing*. MAKS Press, Moscow, 2005, pp. 267–372. ISBN: 5-89407-230-1.

[36] I. V. Konnov and V. A. Zakharov. "On the Verification of Parameterized Symmetric Distributed Programs". In Russian. In: *Proc. 1st All-Russia Conf. on Methods and Techniques of Information Processing*. MAKS Press, Moscow, 2003, pp. 395–400. ISBN: 5-89407-163-1.

Invited speaker at conferences and workshops

[37] I. Konnov. *Model Checking of Threshold-based Fault-Tolerant Distributed Algorithms*. Invited talk at the 7th Workshop on Program Semantics, Specification & Verification, St. Petersburg, Russia, June. 2016. URL: http://pssv-conf.ru/en/2016/program.

[38] I. Konnov. *Parametrized Model Checking of Fault-tolerant Distributed Algorithms by Abstraction*. Tutorial at the International Conference Tools and Methods of Program Analysis, Kostroma, Russia, November. 2014. URL: http://tmpaconf.org/pasteventsmaterialsen/keynote-speakersen#2014.

Tutorials

[39] I. Konnov. *Model checking of distributed algorithms: from classics towards Tendermint blockchain*. Tutorial at VMCAI Winter School, New Orleans, LA, USA, January. 2020. URL: https://popl20.sigplan.org/home/VMCAI-2020.

[40] I. Konnov. *What my computer can find about your distributed algorithm*. Tutorial at the Dagstuhl seminar 18211 "Formal Methods and Fault-Tolerant Distributed Computing: Forging an Alliance", Dagstuhl, Germany, May. 2018. URL: https://www.dagstuhl.de/en/program/calendar/semhp/?semnr=18211.

[41] I. Konnov. *Model Checking of Fault-tolerant Distributed Algorithms*. Tutorial at the Spring School Logic and Verification, Vienna, April. 2016. URL: http://forsyte.at/events/love2016/.

[42] H. Veith and I. Konnov. *Model Checking of Fault-tolerant Distributed Algorithms*. Tutorial at the Summer School on Verification Technology, Systems & Applications, Luxembourg, Luxembourg, October. 2014. URL: http://resources.mpi-inf.mpg.de/departments/rg1/conferences/vtsa14/.

Peer-reviewed workshop contributions

[43] I. Konnov, J. Kukovec, and T.-H. Tran. *BmcMT: Bounded Model Checking of TLA+ Specifications with SMT*. Contribution to TLA+ Community Meeting, Oxford, UK, July. 2018. URL: http://tla2018.loria.fr/contrib/konnov.pdf.

[44] I. Konnov and S. Merz. *Model Checking of Fault-Tolerant Distributed Algorithms: from Classics towards Contemporary*. Contribution to DSN Workshop on Byzantine Consensus and Resilient Blockchains, Luxembourg City, Luxembourg, June. 2018. URL: https://bcrb18.fim.uni-passau.de/shortpapers/bcrb18-konnov-merz.pdf.

[45] I. Konnov, H. Veith, and J. Widder. *Challenges in Model Checking of Fault-tolerant Designs in TLA+*. Contribution to the 8th International Workshop on Exploiting Concurrency Efficiently and Correctly, San Francisco, CA, USA, July. 2015. URL: http://multicore.doc.ic.ac.uk/events/ec2/KonnovVeithWidder.pdf.

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Conference contributions

[49] V. V. Antonenko and I. V. Konnov. "On the Choice of a Simulation Run-Time Infrastructure based on High-Level Architecture". In Russian. In: *17th International Conference on Computational Mechanics and Contemporary Application Software Systems 2011 (VMSPPS'2011), Alushta, Ukraine*. 2011, pp. 36–38. ISBN: 978-5-7035-2269-1.

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[51] I. V. Konnov. "The system for verfication of parameterized models of asynchronous distributed systems (CHEAPS)". In Russian. In: *Proc. 5th All-Russia Scientific and Technical Conf. Microsoft technologies in theory and practice of programming*. 2008.

Workshop contributions

[52] I. Konnov. *Making TLA+ model checking symbolic*. Talk at VeriDis + Matryoshka workshop, Amsterdam, Netherlands. June 2019. URL: http://matryoshka.gforge.inria.fr/matryoshka2019/index.html.

[53] I. Konnov. *Towards symbolic model checking of fault-tolerant designs in TLA+*. Talk at the Helmut Veith Memorial Workshop, Obertauern, Austria, January. 2018. URL: http://hvw2018.cs.uni-salzburg.at/schedule.

[54] I. Konnov. *Verifying Safety and Liveness of Threshold-guarded Fault-Tolerant Distributed Algorithms*. Talk at the Helmut Veith Memorial Workshop, Obergurgl, Austria, February. 2017. URL: http://cbr.uibk.ac.at/events/hvw/schedule.php.

[55] I. Konnov. *SMT and POR beat Counter Abstraction: Parameterized Model Checking of Threshold-based Distributed Algorithms*. Workshop contribution at Alpine Verification Meeting, Attersee, Austria, May. 2015.

[56] A. B. Glonina, I. Konnov, V. V. Podymov, D. Y. Volkanov, V. A. Zakharov, and D. A. Zorin. *An experience on using simulation environment DYANA augmented with UPPAAL for verification of embedded systems defined by UML statecharts*. Contribution to the CAV workshop VES13, St. Petersburg, Russia, July. 2013. URL: `http://forsyte.at/wp-content/uploads/ves13-gkpvzz.pdf`.

[57] I. Konnov. *Parameterized Model Checking by Network Invariants: the Asynchronous Case*. Contribution to: LICS Workshop AISS, Dubrovnik, Croatia, June 2012. 2012. URL: `http://forsyte.at/wp-content/uploads/12konnov-aiss.pdf`.

[58] I. Konnov, H. Veith, and J. Widder. *Who is afraid of Model Checking Distributed Algorithms?* Contribution to the 5th International Workshop on Exploiting Concurrency Efficiently and Correctly, Berkeley, CA, USA, July 2012. 7 citations excl. self-citations. 2012. URL: `http://forsyte.at/wp-content/uploads/2012/07/ec2-konnov.pdf`.

[59] I. V. Konnov and O. Letichevsky. "Model Checking GARP Protocol using Spin and VRS". In: *International Workshop on Automata, Algorithms, and Information Technologies*. 2010. DOI: `10.1007/s10559-010-9244-8`.

Invited Seminar Talks

[60] I. Konnov. *Bounded Model Checking of TLA+ Specifications with SMT*. Invited talk at ANR "FREDDA" meeting, Univ. Paris-Diderot, Paris, France. 2019. URL: `https://www.irif.fr/~fredda/meetings.html`.

[61] I. Konnov. *Making TLA+ model checking symbolic*. Talk at NETYS workshop on Verification of Distributed Systems, Marrakech, Morocco. June 2019. URL: `http://goto.ucsd.edu/~gleissen/vds-test/`.

[62] I. Konnov. *TLA+ Model Checking Made Symbolic*. Talk at LARA seminar, EPFL, Lausanne, Switzerland, November. 2019.

[63] I. Konnov. *Synthesizing Distributed Algorithms with Parameterized Threshold Guards*. Talk at the NETYS Workshop on Verification of Distributed Systems, Essaouira, Morocco, May. 2018. URL: `http://netys.net/VDS2018.html`.

[64] J. Widder and I. Konnov. *Logical Methods for the Correctness of Distributed Algorithms*. RISE PI talk at "Alpine Verification Meeting", Wagrain, Austria, September. 2018. URL: `https://avm2018.iaik.tugraz.at/program/`.

[65] I. Konnov. *Model checking of distributed algorithms for LARGE-scale systems*. Interview talk at INRIA (awarded 1 of 4 researcher positions (CR1) at INRIA), Paris, France, May. 2017.

[66] I. Konnov. *Verifying Safety and Liveness of Threshold-guarded Fault-Tolerant Distributed Algorithms*. Talk at LORIA/INRIA seminar, Nancy, France, May. 2017.

[67] I. Konnov. *Model Checking of Fault-tolerant Distributed Algorithms: Safety and Liveness*. Invited talk at the Seminar of Rigorous System Design Laboratory, Lausanne, Switzerland, September. 2016.

[68] I. Konnov. *Model Checking of Threshold-based Fault-tolerant Distributed Algorithms*. Invited talk at the Seminar on Foundations of Mathematics and Theoretical Computer Science, Ljubljana University, Ljubljana, Slovenia, May. 2016.

[69] I. Konnov. *Model Checking of Threshold-Guarded Distributed Algorithms: Beyond Reachability*. Invited talk at the Vericlub Seminar (Bertrand Meyer), Toulouse, France, November. 2016.

[70] I. Konnov. *Model Checking of Threshold-based Fault-tolerant Distributed Algorithms*. Invited talk at Amazon, Herndon, VA, USA, June. 2015.

[71] I. Konnov. *Model checking of threshold-based fault-tolerant distributed algorithms*. Talk at the Dagstuhl Seminar on Distributed Cloud Computing, Dagstuhl, Germany, February. 2015. URL: `https://www.dagstuhl.de/en/program/calendar/semhp/?semnr=15072`.

[72] I. Konnov. *SMT and POR beat Counter Abstraction*. Invited talk at the RiSE Seminar at Institute of Science and Technology Austria, Klosterneuburg, Austria, April. 2015.

[73] I. Konnov. *On Completeness of Bounded Model Checking for Threshold-based Distributed Algorithms: Reachability*. Talk at the Seminar on Theoretical Problems in Programming, Moscow State University, Moscow, Russia, February. 2014.

[74] I. Konnov. *Counter Attack on Byzantine Generals*. Talk at the Dagstuhl Seminar on Formal Verification of Distributed Algorithms, Dagstuhl, Germany, April. 2013. URL: `https://www.dagstuhl.de/de/programm/kalender/semhp/?semnr=18211`.

[75] I. Konnov. *Counter Attack on Byzantine Generals*. Talk at the Seminar on Theoretical Problems in Programming, Moscow State University, Moscow, Russia, February. 2013.

[76] I. Konnov. *Who is Afraid of Model Checking Distributed Algorithms*. Talk at the PUMA/RiSE Seminar, Goldegg, Austria, September. 2012.

[77] I. Konnov. *An invariant-based approach to the verification of asynchronous parameterized networks*. Talk at the Concurrency Seminar, Computing Laboratory, Oxford University, Oxford, UK, February. 2011.

[78] I. Konnov. *Two Techniques of Parameterized Model Checking and Symmetry Reduction*. Talk at the RiSE Seminar, TU Vienna, Vienna, Austria, April. 2011.

[79] I. V. Konnov. *CheAPS: Parameterized Model Checking Tool*. Joint Workshop of Microsoft Research and Institute for System Programming Russian Academy of Sciences, Moscow, June 2009. 2009.

Technical reports

[80] N. Bertrand, I. Konnov, M. Lazic, and J. Widder. *Verification of Randomized Distributed Algorithms under Round-Rigid Adversaries*. Nov. 2018. URL: `https://hal.inria.fr/hal-01925533`.

[81] I. Konnov, M. Lazic, H. Veith, and J. Widder. *A Short Counterexample Property for Safety and Liveness Verification of Fault-Tolerant Distributed Algorithms*. Extended version of the POPL'17 paper including the proofs. 2016. URL: `http://arxiv.org/abs/1608.05327`.

[82] A. John, I. Konnov, U. Schmid, H. Veith, and J. Widder. *Counter Attack on Byzantine Generals: Parameterized Model Checking of Fault-tolerant Distributed Algorithms*. Oct. 2012. URL: `http://arxiv.org/abs/1210.3846`.

[83] A. John, I. Konnov, U. Schmid, H. Veith, and J. Widder. *Starting a Dialog between Model Checking and Fault-tolerant Distributed Algorithms*. Oct. 2012. URL: `http://arxiv.org/abs/1210.3839`.

[84] P. Bulychev, I. V. Konnov, and V. A. Zakharov. "Computing (bi)simulation relations preserving CTL^*_{-X} for ordinary and fair Kripke structures". In: *Mathemathical Methods and Algorithms, Institute of Systems Programming of the Russian Academy of Sciences*. Vol. 12. 2006, pp. 59–76. URL: `http://discopal.ispras.ru/pdfs/issue-2006-12/cs-isp-sbornik.pdf`.

[85] I. Konnov and V. Zakharov. "On the verification of asynchronous parameterized networks of communicating processes by model checking". In: *Mathemathical Methods and Algorithms, Institute of Systems Programming of the Russian Academy of Sciences*. Vol. 12. 2006, pp. 37–58. URL: `http://discopal.ispras.ru/pdfs/issue-2006-12/cs-isp-sbornik.pdf`.