# 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

Interchain Foundation (Switzerland), Vienna office, Austria:

**Oct 2019 − present**. 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 and degrees

**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

**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 | [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:**

| | |
|---|---|
| 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:** 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.

### Book chapter

[2]  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 paper

[3]  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

[4]  I. Konnov, J. Kukovec, and T.-H. Tran. "TLA+ Model Checking Made Symbolic". In: *Proc. ACM Program. Lang OOPSLA 2019 (PACMPL)* 3 (2019). accepted for publication. URL: https://forsyte.at/wp-content/uploads/kkt-oopsla19.pdf.

[5]  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.

[6]  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.

[7]  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.

[8]  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.

[9]  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.

[10] 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.

[11] 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.

[12] 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.

[13] 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

[14] 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.

[15] 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.

[16] 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.

[17] 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.

[18] 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.

[19] 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.

[20] 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.

[21] 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.

[22] 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.

[23] 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.

[24] 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.

[25] 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.

[26] 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.

[27] 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.

[28]   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.

[29]   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.

[30]   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

[31]   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`.

[32]   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

[33]   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`.

[34]   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/`.

[35]   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

[36]   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`.

[37]   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`.

[38]   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`.

[39]   I. Konnov. "CheAPS: a Checker of Asynchronous Parameterized Systems". In: *WING 2010*. Ed. by A. Voronkov, L. Kovacs, and N. Bjorner. Vol. 1. EPiC Series. EasyChair, 2012, pp. 128–129. URL: `http://www.easychair.org/publications/?page=355792421`.

[40]   I. V. Konnov and V. A. Zakharov. "Using Adaptive Symmetry Reduction for LTL Model Checking". In: *Proc. International Workshop on Program Semantics, Specification and Verification (PSSV 2010) affiliated with CSR 2010*. 2010, pp. 5–11. URL: `http://csr2010.ksu.ru/PSSV.html`.

[41]   V. Zakharov and I. Konnov. "An Invariant-based Approach to the Verification of Asynchronous Parameterized Networks". In: *International Workshop on Invariant Generation (WING'07)*. 2007, pp. 41–55. URL: `http://www.risc.uni-linz.ac.at/publications/download/risc_3128/proceedings.pdf`.

## Conference contributions

[42]   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.

[43] G. A. Klimov, D. D. Kozlov, and I. V. Konnov. "Static analysis for security of web applications developed in Python". In Russian. In: *Proc. 5th All-Russia Scientific and Technical Conf. Microsoft technologies in theory and practice of programming*. 2008.

[44] 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

[45] 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`.

[46] 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`.

[47] 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`.

[48] 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.

[49] 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`.

[50] 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`.

[51] 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`.

[52] 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

[53] 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`.

[54] 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/`.

[55] 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`.

[56] 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/`.

[57] 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.

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

[59] 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.

[60] 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.

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

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

[63] 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.

[64] 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.

[65] 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.

[66] 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.

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

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

[69] 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.

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

[71] 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

[72] 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.

[73] 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.

[74] 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.

[75] 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.

[76] 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.

[77] 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.