

Publications of Nikolay Kosmatov¹

Publications in Computer Science

Patent Applications

- [1] Paul Dubrulle, Stéphane Louise, Christophe Gaston, Mathieu Jan, Nikolai Kosmatov, and Arnault Lapitre. *Outil et procédé de conception et de validation d'un système flots de données par un modèle formel (Tool and procedure for design and validation of a dataflow system by a formal model)*. Patent application. In French. Submitted on August 31, 2018 to INPI (French Patent Office). 2018.
- [2] Kostyantyn Vorobyov, Nikolai Kosmatov, and Julien Signoles. *A computer-implemented method and a system for encoding a heap application memory state using shadow memory*. Patent application. Submitted on September 27, 2016 to European Patent Office. Submitted on September 15, 2017 to US Patent Office. 2016. URL: <https://goo.gl/qkzGKp>.
- [3] Kostyantyn Vorobyov, Nikolai Kosmatov, and Julien Signoles. *A computer-implemented method and a system for encoding a stack application memory state using shadow memory*. Patent application. Submitted on December 7, 2016 to European Patent Office. Submitted on November 29, 2017 to US Patent Office. 2016. URL: <https://goo.gl/hBt7MB>.

Edited Conference Proceedings and Special Journal Issue

- [4] Akram Idani and Nikolai Kosmatov, eds. *Actes des 16èmes journées AFADL: Approches Formelles dans l'Assistance au Développement de Logiciels (AFADL 2017)*. Published online. URL: http://afadl2017.imag.fr/AFADL_Procs_2017.pdf.
- [5] Jasmin Christian Blanchette, Francis Bordeleau, Nikolai Kosmatov, Alfonso Pierantonio, Gabi Taentzer, and Manuel Wimmer, eds. *Revised Selected Papers of STAF 2015, Special Issue, Software & Systems Modeling (SoSyM)*. Springer. DOI: 10.1007/s10270-018-0686-1. Rank B.
- [6] Jasmin Christian Blanchette and Nikolai Kosmatov, eds. *Proc. of the 9th International Conference on Tests and Proofs (TAP 2015), Held as Part of STAF 2015*. Vol. 9154. LNCS. Springer, 2015. ISBN: 978-3-319-21214-2. DOI: 10.1007/978-3-319-21215-9. Rank B.

Peer-reviewed Book Chapters

- [7] Nikolai Kosmatov. “Chapter XI: Concolic Test Generation and the Cloud: Deployment and Verification Perspectives”. In: *Software Testing in the Cloud: Perspectives on an Emerging Discipline*. Ed. by Scott Tilley and Tauhida Parveen. IGI Global, 2013. ISBN: 978-1-46662-536-5. DOI: 10.4018/978-1-4666-2536-5.ch011.
- [8] Nikolai Kosmatov. “Chapter XI: Constraint-Based Techniques for Software Testing”. In: *Artificial Intelligence Applications for Improved Software Engineering Development: New Prospects*. Ed. by Farid Meziane and Sunil Vadera. IGI Global, 2010, pp. 231–251. ISBN: 978-1-60566-758-4. DOI: 10.4018/978-1-60566-758-4.ch011.

¹Updated on Jan. 31, 2019. All publications are signed with the following spelling: “Nikolai Kosmatov”. Ranks of journals and conferences are given when known according to ERA2010/CORE2018 ranking databases. Only publications [91, 92, 94, 93, 95] are related to my PhD work in Mathematics.

Peer-reviewed International Journals

- [9] Allan Blanchard, Nikolai Kosmatov, and Frédéric Loulergue. “MMFilter: A CHR-Based Solver for Generation of Executions under Weak Memory Models”. In: *Computer Languages, Systems & Structures* 53 (2018), pp. 121–142. ISSN: 1477-8424. DOI: 10.1016/j.cl.2018.03.002. Rank C.
- [10] Guillaume Petiot, Nikolai Kosmatov, Bernard Botella, Alain Giorgetti, and Jacques Julliand. “How Testing Helps to Diagnose Proof Failures”. In: *Formal Asp. Comput.* 30.6 (2018), pp. 629–657. ISSN: 0934-5043. DOI: 10.1007/s00165-018-0456-4. Rank A.
- [11] Jean-Christophe Léchenet, Nikolai Kosmatov, and Pascale Le Gall. “Cut branches before looking for bugs: certifiably sound verification on relaxed slices”. In: *Formal Asp. Comput.* 30.1 (2018), pp. 107–131. ISSN: 0934-5043. DOI: 10.1007/s00165-017-0439-x. Rank A.
- [12] Arvid Jakobsson, Nikolai Kosmatov, and Julien Signoles. “Fast as a shadow, expressive as a tree: Optimized memory monitoring for C”. In: *Sci. Comput. Program.* 132 (2016). Special Issue, Revised Selected Papers of SAC-SVT 2015, pp. 226–246. ISSN: 0167-6423. DOI: 10.1016/j.scico.2016.09.003. Rank A.
- [13] Florent Kirchner, Nikolai Kosmatov, Virgile Prevosto, Julien Signoles, and Boris Yakobowski. “Frama-C: A software analysis perspective”. In: *Formal Asp. Comput.* 27.3 (2015), pp. 573–609. ISSN: 0934-5043. DOI: 10.1007/s00165-014-0326-7. Rank A.
- [14] Omar Chebaro, Pascal Cuoq, Nikolai Kosmatov, Bruno Marre, Anne Pacalet, Nicky Williams, and Boris Yakobowski. “Behind the scenes in SANTE: a combination of static and dynamic analyses”. In: *Autom. Softw. Eng.* 21.1 (2014), pp. 107–143. ISSN: 0928-8910. DOI: 10.1007/s10515-013-0127-x. Rank A.

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- [15] Allan Blanchard, Frédéric Loulergue, and Nikolai Kosmatov. “Towards Full Proof Automation in Frama-C using Auto-Active Verification”. In: *Proc. of the 11th NASA Formal Methods Symposium (NFM 2019)*. LNCS. To appear. Springer, May 2019.
- [16] Allan Blanchard, Nikolai Kosmatov, and Frédéric Loulergue. “Logic against Ghosts: Comparison of two Proof Approaches for a List Module”. In: *Proc. of the 34th Annual ACM/SIGAPP Symposium on Applied Computing, Software Verification and Testing Track (SAC-SVT 2019)*. To appear. ACM, Apr. 2019. ISBN: 978-1-4503-5933-7. DOI: 10.1145/3297280.3297495. Rank B.
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- [18] Virgile Robles, Nikolai Kosmatov, Virgile Prevosto, Louis Rilling, and Pascale Le Gall. “MetAcsl: Specification and Verification of High-Level Properties”. In: *Proc. of the 25th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2019), Held as Part of the European Joint Conferences on Theory and Practice of Software (ETAPS 2019)*. Vol. 11427. LNCS. Springer, Apr. 2019, pp. 358–364. ISBN: 978-3-030-17461-3. DOI: 10.1007/978-3-030-17462-0_22. URL: https://doi.org/10.1007/978-3-030-17462-0_22. Rank A.
- [19] Dara Ly, Nikolai Kosmatov, Julien Signoles, and Frédéric Loulergue. “Soundness of a Dataflow Analysis for Memory Monitoring”. In: *Proc. of the 5th International Workshop on Languages and Tools for Ensuring Cyber-Resilience in Critical Software-Intensive Systems (HILT 2018), part of the ACM SIGPLAN Conference on Systems, Programming, Languages and Applications: Software for Humanity (SPLASH 2018)*. To appear. Nov. 2018.
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- [21] Lionel Blatter, Nikolai Kosmatov, Pascale Le Gall, Virgile Prevosto, and Guillaume Petiot. “Static and Dynamic Verification of Relational Properties on Self-Composed C Code”. In: *Proc. of the 12th International Conference on Tests and Proofs (TAP 2018), Held as Part of STAF 2018*. Vol. 10889. LNCS. Springer, June 2018, pp. 44–62. ISBN: 978-3-319-92993-4. DOI: 10.1007/978-3-319-92994-1_3. Rank B.
- [22] Frédéric Loulergue, Allan Blanchard, and Nikolai Kosmatov. “Ghosts for Lists: from Axiomatic to Executable Specifications”. In: *Proc. of the 12th International Conference on Tests and Proofs (TAP 2018), Held as Part of STAF 2018*. Vol. 10889. LNCS. Springer, June 2018, pp. 177–184. ISBN: 978-3-319-92993-4. DOI: 10.1007/978-3-319-92994-1_11. Rank B.
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- [25] Allan Blanchard, Frédéric Loulergue, and Nikolai Kosmatov. “Ghosts for Lists: A Critical Module of Contiki Verified in Frama-C”. In: *Proc. of the 10th NASA Formal Methods Symposium (NFM 2018)*. Vol. 10811. LNCS. Springer, Apr. 2018, pp. 37–53. ISBN: 978-3-319-77934-8. DOI: 10.1007/978-3-319-77935-5.
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- [39] Balázs Kiss, Nikolai Kosmatov, Dillon Pariente, and Armand Puccetti. “Combining Static and Dynamic Analyses for Vulnerability Detection: Illustration on Heart-bleed”. In: *Proc. of the 11th International Haifa Verification Conference (HVC 2015)*. Vol. 9434. LNCS. Springer, Nov. 2015, pp. 39–50. ISBN: 978-3-319-26286-4. DOI: 10.1007/978-3-319-26287-1_3.
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- [77] Nikolai Kosmatov, Claude Marché, Yannick Moy, and Julien Signoles. “Static versus Dynamic Verification in Why3, Frama-C and SPARK 2014”. In: *Proc. of the 7th International Symposium On Leveraging Applications of Formal Methods, Verification and Validation (ISOLA 2016)*. Vol. 9952. LNCS. Springer, Oct. 2016, pp. 461–478. ISBN: 978-3-319-47165-5. DOI: 10.1007/978-3-319-47166-2_32. Rank C.
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- [96] Nikolai Kosmatov. *The Resolut program to compute projective resolutions*. 2002. URL: <http://nikolai.kosmatov.free.fr/resolut/>.

Selected² Communications

Recent Invited Talks and Seminars

- [97] Nikolai Kosmatov. “Towards Formal Verification of Contiki OS with Frama-C”. In: *Seminar at IRISA – INRIA Rennes*. March 30, 2018. Rennes, Mar. 2018.
- [98] Allan Blanchard and Nikolai Kosmatov. “Towards Formal Verification of Contiki OS with Frama-C”. In: *Seminar at CEA List*. March 6, 2018. Palaiseau, Mar. 2018.
- [99] Nikolai Kosmatov. “Advanced Test Coverage Criteria: Specify and Measure, Cover and Unmask”. In: *Seminar at FEMTO-ST/DISC, University of Besançon*. February 27, 2018. Besançon, Feb. 2018.
- [100] Nikolai Kosmatov. “Specification and proof of relational properties with Frama-C”. In: *the 2017 JML Workshop*. December 18, 2017. Orlando, Florida, USA, Dec. 2017.
- [101] Nikolai Kosmatov. “Advanced Test Coverage Criteria: Specification and Support in Automatic Testing Tools”. In: *the 13th Summer School on Software Testing, Verification & Validation (TAROT 2017)*. June 26, 2017. Naples, Italy, June 2017.
- [102] Nikolai Kosmatov. “Combinations of Static and Dynamic Analyses in Frama-C: An Overview”. In: *Seminar at SnT, University of Luxembourg*. February 11, 2016. Luxembourg, Feb. 2016.
- [103] Nikolai Kosmatov. “Fast as a Shadow, Expressive as a Tree: Hybrid Memory Monitoring for C”. In: *Séminaire de Saclay sur les Méthodes Formelles (SASEFOR)*. November 24, 2015. Orsay, France, Nov. 2015.
- [104] Nikolai Kosmatov and Julien Signoles. “Combinations of Static and Dynamic Analyses in Frama-C: An Overview”. In: *Seminar at VERIMAG*. September 10, 2015. Grenoble, France, Sept. 2015.
- [105] Nikolai Kosmatov. “Applications of formal verification for secure Cloud environments at CEA LIST”. In: *Premier Atelier sur la Sécurité dans le Cloud (SEC 2015), co-localisé avec la Conférence d’informatique en Parallélisme, Architecture et Système (COMPAS 2015)*. June 30, 2015. Lille, France, June 2015.

²Presentations of regular conference or workshop papers already listed above and some older talks are not included.

- [106] Sébastien Bardin and Nikolai Kosmatov. “Combining Static and Dynamic Approaches to Software Verification in Frama-C”. In: *Seminar at Imperial College London*. July 1, 2015. London, UK, July 2015.
- [107] Nikolai Kosmatov. “Combinations of Static and Dynamic Analyses in Frama-C: An Overview”. In: *Seminar at Fraunhofer FOKUS*. June 1, 2015. Berlin, Germany, June 2015.
- [108] Nikolai Kosmatov. “Symbolic Execution and Advanced Test Coverage Criteria”. In: *the 1st International Workshop on Usages of Symbolic Execution (USE 2016), co-located with the 20th International Symposium on Formal Methods (FM 2015)*. June 23, 2015. Oslo, Norway, June 2015.

Tutorials at International Conferences

- [109] Allan Blanchard, Nikolai Kosmatov, and Frédéric Loulergue. “Formal Verification of IoT Software with Frama-C”. In: *the 3rd World Congress on Formal Methods (FM 2019)*. October 7–11, 2019 (Upcoming). Porto, Portugal, Apr. 2019.
- [110] Allan Blanchard, Nikolai Kosmatov, and Frédéric Loulergue. “Formal Verification for an Internet of Secured Things”. In: *the 34th ACM/SIGAPP Symposium On Applied Computing, Software Verification and Testing Track (SAC 2019)*. April 08, 2019 (Upcoming). Limassol, Cyprus, Apr. 2019.
- [111] Nikolai Kosmatov. “Advanced Test Coverage Criteria: Specify and Measure, Cover and Unmask”. In: *TestCon 2019*. April 3–4, 2019 (Upcoming). Moscow, Russia, Apr. 2019.
- [112] Allan Blanchard and Nikolai Kosmatov. “Cybersecurity and Internet of Things: Verify Your Code Today!” In: *the 2019 International Cybersecurity Forum*. January 22, 2019. Lille, France, Jan. 2018.
- [113] Allan Blanchard, Nikolai Kosmatov, and Frédéric Loulergue. “Towards Reliable Things: Formal Verification of IoT Software with Frama-C”. In: *the 29th IEEE International Symposium on Software Reliability Engineering (ISSRE 2018)*. October 16, 2018. Memphis, TN, USA, Oct. 2018.
- [114] Allan Blanchard, Nikolai Kosmatov, and Frédéric Loulergue. “Secure Your Things: Secure Development of IoT Software with Frama-C”. In: *the IEEE Cybersecurity Development Conference (SecDev 2018)*. September 30, 2018. Cambridge, MA, USA, Sept. 2018.
- [115] Allan Blanchard, Nikolai Kosmatov, and Frédéric Loulergue. “Secure Your Things: Verification of IoT Software with Frama-C”. In: *the 2018 International Conference on High Performance Computing and Simulation (HPCS 2018)*. July 16, 2018. Orléans, France, July 2018.
- [116] Sébastien Bardin and Nikolai Kosmatov. “Specify and Measure, Cover and Unmask: A Proof-Friendly View of Advanced Test Coverage Criteria”. In: *the 12th International Conference on Tests and Proofs (TAP 2018)*. June 28, 2018. Toulouse, France, June 2018.
- [117] Allan Blanchard, Nikolai Kosmatov, and Frédéric Loulergue. “Towards Secure Things, or How to Verify IoT Software with Frama-C”. In: *the Zooming Innovation in Consumer Electronics International Conference (ZINC 2018)*. May 30, 2018. Novi Sad, Serbia, May 2018.

- [118] Nikolai Kosmatov. “Combined static and dynamic analyses in Frama-C: An Overview”. In: *the 2nd ARVI COST School on Runtime Verification*. March 20, 2018. Praz sur Arly, France, Mar. 2018.
- [119] Nikolai Kosmatov and Julien Signoles. “Frama-C, a Collaborative Framework for C Code Verification”. In: *the 28th IEEE International Symposium on Software Reliability Engineering (ISSRE 2017)*. October 26, 2017. Toulouse, France, Oct. 2017.
- [120] Sébastien Bardin and Nikolai Kosmatov. “Advanced Test Coverage Criteria: Specify and Measure, Cover and Unmask”. In: *the 29th IFIP International Conference on Testing Software and Systems (ICTSS 2017)*. October 10, 2017. St. Petersburg, Russia, Oct. 2017.
- [121] Nikolai Kosmatov and Julien Signoles. “Frama-C, a Collaborative Framework for C Code Verification”. In: *the 16th International Conference on Runtime Verification (RV 2016)*. September 27, 2016. Madrid, Spain, Sept. 2016.
- [122] Nikolai Kosmatov and Julien Signoles. “Runtime Assertion Checking and its Combinations with Static and Dynamic Analyses”. In: *the 8th International Conference on Tests and Proofs (TAP 2014), Held as Part of STAF 2014*. July 25, 2014. York, UK, June 2014.
- [123] Nikolai Kosmatov, Virgile Prevosto, and Julien Signoles. “Specification and Proof of Programs with Frama-C”. In: *Proc. of the 28th Annual ACM Symposium on Applied Computing, Software Verification and Testing Track (SAC-SVT 2013)*. March 18, 2013. Coimbra, Portugal, Mar. 2013.
- [124] Nikolai Kosmatov and Julien Signoles. “A Lesson on Runtime Assertion Checking with Frama-C”. In: *the 4th International Conference on Runtime Verification (RV 2013)*. Septmeber 24, 2013. Rennes, France, Sept. 2013.
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- [126] Nikolai Kosmatov, Virgile Prevosto, and Julien Signoles. “Specification and Proof of Programs with Frama-C”. In: *the 10th International Conference on Integrated Formal Methods (iFM 2013)*. June 11, 2013. Turku, Finland, June 2013.
- [127] Nicky Williams and Nikolai Kosmatov. “Automatic Structural Unit Testing of C Code”. In: *Proc. of the 27th IEEE/ACM International Conference on Automated Software Engineering (ASE 2012)*. September 3, 2012. Xi’an, China, Sept. 2012.
- [128] Nikolai Kosmatov and Nicky Williams. “Structural Testing with PathCrawler”. In: *the 12th International Conference on Quality Software (QSIC 2012)*. August 27, 2012. Xi’an, China, Aug. 2012.
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- [130] Nikolai Kosmatov and Nicky Williams. “Automated Structural Testing with PathCrawler”. In: *the 6th International Conference on Tests and Proofs (TAP 2012)*. May 31, 2012. Prague, Czech Republic, May 2012.

Other Recent Talks

- [131] Nikolai Kosmatov. “A Memory Allocation Module of Contiki Formally Verified with Frama-C. A Case Study”. In: *the 2016 Computer & Electronics Security Applications Rendez-vous (C&ESAR 2016)*. November 22, 2016. Rennes, France, Nov. 2016.
- [132] Nikolai Kosmatov. “Cut Branches Before Looking for Bugs: Sound Verification on Relaxed Slices”. In: *the Digicosme Research Days 2016*. April 12, 2016. Orsay, France, 2016.
- [133] Nikolai Kosmatov. “Sound and Quasi-Complete Detection of Infeasible Test Requirements”. In: *14èmes Journées Approches Formelles dans l’Assistance au Développement Logiciel (AFADL 2015)*. June 10, 2015. Bordeaux, France, June 2015.
- [134] Nikolai Kosmatov. “Exécution symbolique et critères de test avancés”. In: *13èmes Journées Approches Formelles dans l’Assistance au Développement Logiciel (AFADL 2014)*. June 12, 2014. Paris, France, June 2014.