

Curriculum Vitae

Long version

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Personal

Born in 1987. Married, three children: Léa (2019), Noé (2021), Éva (2024).

Research Positions and Education

Habilitation

French degree allowing me to supervise PhD students

University of Bordeaux

11 Feb 2022

Current.....

Researcher

Chargé de recherche

CNRS, LaBRI, Bordeaux

Since Jan 2018

Past.....

Visiting Researcher

University of Warsaw, Poland

Sept. 2022 – July 2023

Research Fellow

Logical Foundations of Data Science

Mentored by Ranko Lazić (University of Warwick)

The Alan Turing Institute, London

Jan 2017 – Aug. 2022

Research Fellow

Theoretical Foundations of Computer Systems

Mentored by Ras Bodik (University of Washington)

Simons Institute, Berkeley

Jan 2021 – May 2021

Research Fellow

Logical Structures in Computation

Mentored by Prakash Panangaden (McGill University)

Simons Institute, Berkeley

Aug 2016 – Dec 2016

Research Assistant

Dynamical Systems

Jointly supervised by Joël Ouaknine and James Worrell

University of Oxford

Nov 2015 – July 2016

Education.....

PhD in Computer Science

Counting and Randomising in Automata Theory

Jointly supervised by Mikołaj Bojańczyk and Thomas Colcombet

Paris 7 & Warsaw

Sept 2012 – Oct 2015

Normalien

Majoring in Computer Science

École Normale Supérieure de Cachan

Sept 2008 – Aug 2012

M.Sc. MPRI (Computer Science)

with high honours

Specialisation in Automata Theory and Logics

Paris 7

2010 – 2012

M.Sc. LMFI (Mathematical Logics)

with high honours

Paris 7

2009 – 2011

B.Sc. Computer Science and Mathematics

with high honours

Paris 7

2008 – 2009

Classes Préparatoires aux Grandes Écoles

Lycée Charlemagne and Louis-le-grand

Paris

2006 – 2008

Admitted in ÉNS Lyon (ranked 27th) and ÉNS Cachan (ranked 16th)

Publications

In computer science, it is (unfortunately!) customary to publish mainly in conference proceedings, and some of the most prestigious venues are peer-reviewed international conferences. In theoretical computer science the order of authors is typically alphabetical; this is not the case in artificial intelligence venues. The listing below respects the authors' order from the respective publication. Free versions of all articles can be found on my webpage.

Books

- [1] Nathanaël Fijalkow, Nathalie Bertrand, Patricia Bouyer, Romain Brenguier, Arnaud Carayol, John Fearnley, Hugo Gimbert, Florian Horn, Rasmus Ibsen-Jensen, Nicolas Markey, Benjamin Monmege, Petr Novotný, Mickael Randour, Ocan Sankur, Sylvain Schmitz, Olivier Serre, and Mateusz Skomra. *Games on Graphs*. 2023. URL: <https://arxiv.org/abs/2305.10546>.
- [2] Nathanaël Fijalkow. *Habilitation: The Game of Synthesis*. University of Bordeaux, 2022. URL: <https://tel.archives-ouvertes.fr/tel-03720575>.
- [3] Nathanaël Fijalkow. *PhD Thesis: Counting and Randomising in Automata Theory*. University of Paris 7 and University of Warsaw, 2015. URL: <https://tel.archives-ouvertes.fr/tel-03720617>.

Peer-Reviewed Journals

- [1] Nathanaël Fijalkow, Engel Lefauchaux, Pierre Ohlmann, Joël Ouaknine, Amaury Pouly, and James Worrell. "On the Monniaux Problem in Abstract Interpretation". In: *Journal of the ACM, JACM* (2024). DOI: 10.1145/3704632.
- [2] Antonio Casares, Thomas Colcombet, Nathanaël Fijalkow, and Karoliina Lehtinen. "From Muller to Parity and Rabin Automata: Optimal Transformations Preserving (History-)Determinism". In: *TheoretCS 3* (2024). URL: <https://doi.org/10.46298/theoretics.24.12>.
- [3] Thomas Colcombet, Nathanaël Fijalkow, and Florian Horn. "Playing Safe, Ten Years Later". In: *Logical Methods in Computer Science, LMCS* (2024). URL: <https://arxiv.org/abs/2212.12024>.
- [4] Corentin Barloy, Nathanaël Fijalkow, Nathan Lhote, and Filip Mazowiecki. "A Robust Class of Linear Recurrence Sequences". In: *Information and Computation, IC* (2022). URL: <https://arxiv.org/abs/1908.03890>.
- [5] Thomas Colcombet, Nathanaël Fijalkow, Pawel Gawrychowski, and Pierre Ohlmann. "The Theory of Universal Graphs for Infinite Duration Games". In: *Logical Methods in Computer Science, LMCS* (2022). URL: <https://arxiv.org/abs/2104.05262>.

- [6] Thomas Colcombet, Nathanaël Fijalkow, and Pierre Ohlmann. “Controlling a Random Population”. In: *Logical Methods in Computer Science, LMCS (special issue by invitation of FoSSaCS’20)* (2021). URL: [https://doi.org/10.46298/lmcs-17\(4:12\)2021](https://doi.org/10.46298/lmcs-17(4:12)2021), <https://arxiv.org/abs/1911.01195>.
- [7] Nathanaël Fijalkow, Guillaume Lagarde, Pierre Ohlmann, and Olivier Serre. “Lower Bounds for Arithmetic Circuits via the Hankel Matrix”. In: *Computational Complexity* (2021). URL: <https://doi.org/10.1007/s00037-021-00214-1>.
- [8] Raphaël Berthon, Nathanaël Fijalkow, Emmanuel Filiot, Shibashis Guha, Bastien Maubert, Aniello Murano, Laureline Pinault, Sophie Pinchinat, Sasha Rubin, and Olivier Serre. “Alternating Tree Automata with Qualitative Semantics”. In: *ACM Transactions on Computational Logic, ToCL* 22.1 (2021), 7:1–7:24. URL: <https://doi.org/10.1145/3431860>, <https://arxiv.org/abs/2002.03664>.
- [9] Nathanaël Fijalkow, Cristian Riveros, and James Worrell. “Probabilistic Automata of Bounded Ambiguity”. In: *Information and Computation, IC* (2020). URL: <https://doi.org/10.1016/j.ic.2020.104648>, <http://arxiv.org/abs/2205.08175>.
- [10] Alexander Clark and Nathanaël Fijalkow. “Consistent Unsupervised Estimators for Anchored PCFGs”. In: *Transactions of the Association for Computational Linguistics, TACL* 8 (2020). URL: https://doi.org/10.1162/tac1_a_00323.
- [11] Nathanaël Fijalkow. “Lower bounds for the state complexity of probabilistic languages and the language of prime numbers”. In: *The Journal of Logic and Computation (special issue by invitation of LFCS’16)* 30.1 (2020). URL: [10.1093/logcom/exaa007](https://doi.org/10.1093/logcom/exaa007).
- [12] Nathanaël Fijalkow, Stefan Kiefer, and Mahsa Shirmohammadi. “Trace Refinement in Labelled Markov Decision Processes”. In: *Logical Methods in Computer Science, LMCS* 16.2 (2020). URL: [https://doi.org/10.23638/LMCS-16\(2:10\)2020](https://doi.org/10.23638/LMCS-16(2:10)2020), <https://arxiv.org/abs/1510.09102>.
- [13] Florence Clerc, Nathanaël Fijalkow, Bartek Klin, and Prakash Panangaden. “Expressiveness of Probabilistic Modal Logics: A Gradual Approach”. In: *Information and Computation, IC* 267 (2019). URL: <https://doi.org/10.1016/j.ic.2019.04.002>.
- [14] Nathanaël Fijalkow, Pierre Ohlmann, Joël Ouaknine, Amaury Pouly, and James Worrell. “Complete Semialgebraic Invariant Synthesis for the Kannan-Lipton Orbit Problem”. In: *Theory of Computing Systems (special issue by invitation of STACS’17)* 63.5 (2019). URL: <https://doi.org/10.1007/s00224-019-09913-3>, <https://arxiv.org/abs/1701.02162>.
- [15] Nathanaël Fijalkow. “Profinite techniques for probabilistic automata and the Markov Monoid algorithm”. In: *Theoretical Computer Science, TCS* 680 (2017). URL: <https://doi.org/10.1016/j.tcs.2017.04.006>, <https://arxiv.org/abs/1501.02997>.
- [16] Nathanaël Fijalkow and Charles Paperman. “Monadic Second-Order Logic with Arbitrary Monadic Predicates”. In: *ACM Transactions on Computational Logic, ToCL* 18.3 (2017). URL: <https://doi.org/10.1145/3091124>.
- [17] Nathanaël Fijalkow, Hugo Gimbert, Edon Kelmendi, and Youssef Oualhadj. “Deciding the value 1 Problem for Probabilistic Leaktight Automata”. In: *Logical Methods in Computer Science, LMCS* 11.1 (2015). URL: [https://doi.org/10.2168/LMCS-11\(2:12\)2015](https://doi.org/10.2168/LMCS-11(2:12)2015), <https://arxiv.org/abs/1504.04136>.

- [18] Nathanaël Fijalkow and Martin Zimmermann. “Cost-Parity and Cost-Streett Games”. In: *Logical Methods in Computer Science, LMCS* 10.2 (2014). URL: [https://doi.org/10.2168/LMCS-10\(2:14\)2014](https://doi.org/10.2168/LMCS-10(2:14)2014), <https://arxiv.org/abs/1207.0663>.
- [19] Nathanaël Fijalkow and Florian Horn. “Les jeux d'accessibilité généralisée”. In: *Technique et Science Informatiques* 32.9-10 (2013). Journal paper in French, technical report in English. URL: <https://doi.org/10.3166/tsi.32.931-949>, <https://arxiv.org/abs/1010.2420>.

Proceedings of Peer-Reviewed International Conferences.....

- [1] Théo Matricon, Nathanaël Fijalkow, and Guillaume Lagarde. “Eco Search: A No-delay Best-First Search Algorithm for Program Synthesis”. In: *AAAI Conference on Artificial Intelligence, AAAI (invited for oral presentation)*. 2025. URL: <https://arxiv.org/abs/2412.17330>.
- [2] Marius Belly, Nathanaël Fijalkow, Hugo Gimbert, Florian Horn, Guillermo A. Pérez, and Pierre Vandenhove. “Revelations: A Decidable Class of POMDPs with Omega-Regular Objectives”. In: *AAAI Conference on Artificial Intelligence, AAAI (invited for oral presentation)*. 2025. URL: <https://arxiv.org/abs/2412.12063>.
- [3] Mojtaba Valizadeh, Nathanaël Fijalkow, and Martin Berger. “LTL learning on GPUs”. In: *International Conference on Computer Aided Verification, CAV*. 2024. URL: <https://arxiv.org/abs/2402.12373>.
- [4] Ritam Raha, Rajarshi Roy, Nathanaël Fijalkow, Daniel Neider, and Guillermo A Pérez. “Synthesizing Efficiently Monitorable Formulas in Metric Temporal Logic”. In: *International Conference on Verification, Model Checking, and Abstract Interpretation, VMCAI*. 2024. URL: <https://arxiv.org/abs/2310.17410>.
- [5] Patricia Bouyer, Nathanaël Fijalkow, Mickael Randour, and Pierre Vandenhove. “How to Play Optimally for Regular Objectives?”. In: *International Colloquium on Automata, Languages, and Programming, ICALP*. 2023. URL: <https://arxiv.org/abs/2210.09703>.
- [6] Théo Matricon, Nathanaël Fijalkow, and Gaëtan Margueritte. “WikiCoder: Learning to Write Knowledge-Powered Code”. In: *International Symposium on Model Checking of Software, SPIN*. 2023. URL: <https://arxiv.org/abs/2303.08574>.
- [7] Nathanaël Fijalkow, Bastien Maubert, Aniello Murano, Sasha Rubin, and Moshe Vardi. “Private and public affairs in strategic reasoning”. In: *Principles of Knowledge Representation and Reasoning, KR*. 2022. URL: <https://proceedings.kr.org/2022/14/>.
- [8] Ritam Raha, Roy Rajarshi, Nathanaël Fijalkow, and Daniel Neider. “Scalable Anytime Algorithms for Learning Formulas in Linear Temporal Logic”. In: *International Conference on Tools and Algorithms for the Construction and Analysis of Systems, TACAS*. 2022. URL: <https://arxiv.org/abs/2110.06726>, <https://scarlet.labri.fr/>, <https://github.com/rajarshi008/scarlet>.
- [9] Nathanaël Fijalkow, Guillaume Lagarde, Théo Matricon, Kevin E. Ellis, Pierre Ohlmann, and Akarsh Potta. “Scaling Neural Program Synthesis with Distribution-based Search”. In: *AAAI Conference on Artificial Intelligence, AAAI (invited for oral presentation)*. 2022. URL: <https://ojs.aaai.org/index.php/AAAI/article/view/20616>, <https://arxiv.org/abs/2110.12485>.

- [10] Ashwani Anand, Nathanaël Fijalkow, Aliénor Goubault-Larrecq, Jérôme Leroux, and Pierre Ohlmann. "New Algorithms for Combinations of Objectives using Separating Automata". In: *International Symposium on Games, Automata, Logics, and Formal Verification, GandALF*. 2021. URL: <https://doi.org/10.4204/EPTCS.346.15>, <https://arxiv.org/abs/2109.08322>.
- [11] Nathanaël Fijalkow and Guillaume Lagarde. "The Complexity of Learning Linear Temporal Formulas from Examples". In: *International Conference on Grammatical Inference, ICGI*. 2021. URL: <https://proceedings.mlr.press/v153/fijalkow21a.html>, <https://arxiv.org/abs/2102.00876>.
- [12] Théo Matricon, Marie Anastacio, Nathanaël Fijalkow, Laurent Simon, and Holger Hoos. "Statistical Comparison of Algorithm Performance Through Instance Selection". In: *International Conference on Principles and Practice of Constraint Programming, CP*. 2021. URL: <https://drops.dagstuhl.de/opus/volltexte/2021/15334/>, <https://github.com/Theomat/PSEAS>.
- [13] Antonio Casares, Thomas Colcombet, and Nathanaël Fijalkow. "Optimal transformations of Muller conditions". In: *International Colloquium on Automata, Languages, and Programming, ICALP*. 2021. URL: <https://doi.org/10.4230/LIPIcs.ICALP.2021.123>, <https://arxiv.org/abs/2011.13041>.
- [14] Nathanaël Fijalkow. "The Theory of Universal Graphs for Games: Past and Future (invited talk)". In: *Coalgebraic Methods in Computer Science, CMCS*. 2020. URL: https://doi.org/10.1007/978-3-030-57201-3_1.
- [15] Nathanaël Fijalkow, Pawel Gawrychowski, and Pierre Ohlmann. "Value Iteration Using Universal Graphs and the Complexity of Mean Payoff Games". In: *Mathematical Foundations of Computer Science, MFCS*. 2020. URL: <https://doi.org/10.4230/LIPIcs.MFCS.2020.34>, <https://arxiv.org/abs/1812.07072>.
- [16] Judith Clymo, Haik Manukian, Nathanaël Fijalkow, Adrià Gascón, and Brooks Paige. "Data Generation for Neural Programming by Example". In: *International Conference on Artificial Intelligence and Statistics, AI&STATS*. Vol. 108. Proceedings of Machine Learning Research. 2020. URL: <http://proceedings.mlr.press/v108/clymo20a.html>, <https://arxiv.org/abs/1911.02624>.
- [17] Nathanaël Fijalkow, Bastien Maubert, Aniello Murano, and Moshe Y. Vardi. "Assume-Guarantee Synthesis for Prompt Linear Temporal Logic". In: *International Joint Conference on Artificial Intelligence, IJCAI*. 2020. URL: <https://doi.org/10.24963/ijcai.2020/17>.
- [18] Corentin Barloy, Nathanaël Fijalkow, Nathan Lhote, and Filip Mazowiecki. "A Robust Class of Linear Recurrence Sequences". In: *Computer Science in Logic, CSL*. 2020. URL: <https://doi.org/10.4230/LIPIcs.CSL.2020.9>, <https://arxiv.org/abs/1908.03890>.
- [19] Thomas Colcombet, Nathanaël Fijalkow, and Pierre Ohlmann. "Controlling a Random Population". In: *Foundations of Software Science and Computation Structures, FoSSaCS*. 2020. URL: https://doi.org/10.1007/978-3-030-45231-5_7, <https://arxiv.org/abs/1911.01195>.
- [20] Nathanaël Fijalkow, Guillaume Lagarde, Pierre Ohlmann, and Olivier Serre. "Lower Bounds for Arithmetic Circuits via the Hankel Matrix". In: *Symposium on Theoretical Aspects of Computer Science, STACS*. 2020. URL: <https://doi.org/10.4230/LIPIcs.STACS.2020.24>.

- [21] Thomas Colcombet and Nathanaël Fijalkow. “Universal Graphs and Good for Games Automata: New Tools for Infinite Duration Games”. In: *Foundations of Software Science and Computation Structures, FoSSaCS*. Invited talk. 2019. URL: https://doi.org/10.1007/978-3-030-17127-8_1.
- [22] Nathanaël Fijalkow, Joël Ouaknine, Amaury Pouly, João Sousa Pinto, and James Worrell. “On the decidability of reachability in linear time-invariant systems”. In: *International Conference on Hybrid Systems: Computation and Control, HSCC*. 2019. URL: <https://doi.org/10.1145/3302504.3311796>, <https://arxiv.org/abs/1802.06575>.
- [23] Nathanaël Fijalkow, Engel Lefaucheux, Pierre Ohlmann, Joël Ouaknine, Amaury Pouly, and James Worrell. “On the Monniaux Problem in Abstract Interpretation”. In: *International Symposium on Static Analysis, SAS*. 2019. URL: https://doi.org/10.1007/978-3-030-32304-2_9, <https://arxiv.org/abs/1907.08257>.
- [24] Wojciech Czerwiński, Laure Daviaud, Nathanaël Fijalkow, Marcin Jurdziński, Ranko Lazić, and Paweł Parys. “Universal trees grow inside separating automata: Quasi-polynomial lower bounds for parity games”. In: *International Symposium on Discrete Algorithms, SODA*. 2019. URL: <https://doi.org/10.1137/1.9781611975482.142>, <https://arxiv.org/abs/1807.10546>.
- [25] Nathanaël Fijalkow. “The State Complexity of Alternating Automata”. In: *Logic in Computer Science, LICS*. 2018. URL: <https://doi.org/10.1145/3209108.3209167>, <https://arxiv.org/abs/1607.00259>.
- [26] Nathanaël Fijalkow, Bastien Maubert, Aniello Murano, and Sasha Rubin. “Quantifying Bounds in Strategy Logic”. In: *Computer Science in Logic, CSL*. 2018. URL: <https://doi.org/10.4230/LIPIcs.CSL.2018.23>.
- [27] Mathias Ruggaard Pedersen, Nathanaël Fijalkow, Giorgio Bacci, Kim G. Larsen, and Radu Mardare. “Timed Comparisons of Semi-Markov Processes”. In: *International Conference on Language and Automata Theory and Applications, LATA*. 2018. URL: https://doi.org/10.1007/978-3-319-77313-1_21, <https://arxiv.org/abs/1711.10216>.
- [28] Nathanaël Fijalkow, Hugo Gimbert, Edon Kelmendi, and Denis Kuperberg. “Stamina: Stabilisation Monoids in Automata Theory”. In: *International Conference on Implementation and Application of Automata, CIAA*. 2017. URL: https://doi.org/10.1007/978-3-319-60134-2_9, <http://stamina.labri.fr>, <https://github.com/nathanael-fijalkow/stamina>.
- [29] Nathanaël Fijalkow, Bartek Klin, and Prakash Panangaden. “Expressiveness of Probabilistic Modal Logics, Revisited”. In: *International Colloquium on Automata, Languages, and Programming, ICALP*. 2017. URL: <https://doi.org/10.4230/LIPIcs.ICALP.2017.105>.
- [30] Nathanaël Fijalkow, Pierre Ohlmann, Joël Ouaknine, Amaury Pouly, and James Worrell. “Semialgebraic Invariant Synthesis for the Kannan-Lipton Orbit Problem”. In: *Symposium on Theoretical Aspects of Computer Science, STACS*. 2017. URL: <https://doi.org/10.4230/LIPIcs.STACS.2017.29>.
- [31] Nathanaël Fijalkow, Cristian Riveros, and James Worrell. “Probabilistic Automata of Bounded Ambiguity”. In: *International Conference on Concurrency Theory, CONCUR*. 2017. URL: <https://doi.org/10.4230/LIPIcs.CONCUR.2017.19>.

- [32] Thomas Colcombet and Nathanaël Fijalkow. “The Bridge Between Regular Cost Functions and Omega-Regular Languages”. In: *International Colloquium on Automata, Languages, and Programming, ICALP*. 2016. URL: <https://doi.org/10.4230/LIPIcs.ICALP.2016.126>.
- [33] Nathanaël Fijalkow. “Characterisation of an Algebraic Algorithm for Probabilistic Automata”. In: *Symposium on Theoretical Aspects of Computer Science, STACS*. 2016. URL: <https://doi.org/10.4230/LIPIcs.STACS.2016.34>, <https://arxiv.org/abs/1501.02997>.
- [34] Nathanaël Fijalkow. “Online Space Complexity of Probabilistic Automata”. In: *Logical Foundations of Computer Science, LFCS*. 2016. URL: https://doi.org/10.1007/978-3-319-27683-0_8.
- [35] Nathanaël Fijalkow, Stefan Kiefer, and Mahsa Shirmohammadi. “Trace Refinement in Labelled Markov Decision Processes”. In: *Foundations of Software Science and Computation Structures, FoSSaCS*. 2016. URL: https://doi.org/10.1007/978-3-662-49630-5_18, <https://arxiv.org/abs/1510.09102>.
- [36] Nathanaël Fijalkow, Florian Horn, Denis Kuperberg, and Michał Skrzypczak. “Trading Bounds for Memory in Games with Counters”. In: *International Colloquium on Automata, Languages, and Programming, ICALP*. 2015. URL: https://doi.org/10.1007/978-3-662-47666-6_16, <https://arxiv.org/abs/1709.03121>.
- [37] Nathanaël Fijalkow and Michał Skrzypczak. “Irregular Behaviours for Probabilistic Automata”. In: *Reachability Problems, RP*. 2015. URL: https://doi.org/10.1007/978-3-319-24537-9_4.
- [38] Thomas Colcombet, Nathanaël Fijalkow, and Florian Horn. “Playing Safe”. In: *Foundations of Software Technology and Theoretical Computer Science, FSTTCS*. 2014. URL: <https://doi.org/10.4230/LIPIcs.FSTTCS.2014.379>.
- [39] Nathanaël Fijalkow, Hugo Gimbert, Florian Horn, and Youssef Oualhadj. “Two Recursively Inseparable Problems for Probabilistic Automata”. In: *Mathematical Foundations of Computer Science, MFCS*. 2014. URL: https://doi.org/10.1007/978-3-662-44522-8_23, <https://arxiv.org/abs/1709.03122>.
- [40] Nathanaël Fijalkow and Denis Kuperberg. “ACME: Automata with Counters, Monoids and Equivalence”. In: *Automated Technology for Verification and Analysis, ATVA*. 2014. URL: https://doi.org/10.1007/978-3-319-11936-6_12, <https://acme.labri.fr/>, <https://github.com/nathanael-fijalkow/acme>.
- [41] Nathanaël Fijalkow and Charles Paperman. “Monadic Second-Order Logic with Arbitrary Monadic Predicates”. In: *Mathematical Foundations of Computer Science, MFCS*. 2014. URL: https://doi.org/10.1007/978-3-662-44522-8_24, <https://arxiv.org/abs/1709.03117>.
- [42] Krishnendu Chatterjee and Nathanaël Fijalkow. “Infinite-state Games with Finitary Conditions”. In: *Computer Science in Logic, CSL*. 2013. URL: <https://doi.org/10.4230/LIPIcs.CSL.2013.181>, <https://arxiv.org/abs/1301.2661>.
- [43] Nathanaël Fijalkow, Sophie Pinchinat, and Olivier Serre. “Emptiness Of Alternating Tree Automata Using Games With Imperfect Information”. In: *Foundations of Software Technology and Theoretical Computer Science, FSTTCS*. 2013. URL: <https://doi.org/10.4230/LIPIcs.FSTTCS.2013.299>.

- [44] Nathanaël Fijalkow, Hugo Gimbert, and Youssouf Oualhadj. “Deciding the Value 1 Problem for Probabilistic Leaktight Automata”. In: *Logic in Computer Science, LICS*. 2012. URL: <https://doi.org/10.1109/LICS.2012.40>, <https://arxiv.org/abs/1104.3055>.
- [45] Nathanaël Fijalkow and Martin Zimmermann. “Cost-Parity and Cost-Streett Games”. In: *Foundations of Software Technology and Theoretical Computer Science, FSTTCS*. 2012. URL: <https://doi.org/10.4230/LIPIcs.FSTTCS.2012.124>, <https://arxiv.org/abs/1207.0663>.
- [46] Krishnendu Chatterjee and Nathanaël Fijalkow. “Finitary Languages”. In: *International Conference on Language and Automata Theory and Applications, LATA*. 2011. URL: https://doi.org/10.1007/978-3-642-21254-3_16, <https://arxiv.org/abs/1101.1727>.
- [47] Krishnendu Chatterjee and Nathanaël Fijalkow. “A Reduction from Parity Games to Simple Stochastic Games”. In: *International Symposium on Games, Automata, Logics, and Formal Verification, GandALF*. 2011. URL: <https://doi.org/10.4204/EPTCS.54.6>, <https://arxiv.org/abs/1106.1232>.

Softwares.....

- [1] Ritam Raha, Roy Rajarshi, Nathanaël Fijalkow, and Daniel Neider. *Scarlet: Scalable Anytime Algorithms for Learning Fragments of Linear Temporal Logic*. 2024. URL: <https://scarlet.labri.fr/>, <https://joss.theoj.org/papers/10.21105/joss.05052>, <https://github.com/rajarshi008/scarlet>.
- [2] Théo Matricon, Nathanaël Fijalkow, Guillaume Lagarde, and Kevin E. Ellis. *DeepSynth: Scaling Neural Program Synthesis with Distribution-based Search*. 2022. URL: <https://deepsynth.labri.fr/>, <https://doi.org/10.21105/joss.04151>, <https://github.com/nathanael-fijalkow/DeepSynth>.

Research Bulletins.....

- [1] Nathanaël Fijalkow. “Undecidability results for probabilistic automata”. In: *ACM Special Interest Group on Logic and Computation SIGLOG News* 4.4 (2017). URL: <https://doi.org/10.1145/3157831.3157833>.
- [2] Nathanaël Fijalkow. “Profinite Techniques for Probabilistic Automata”. In: *Bulletin of the European Association for Theoretical Computer Science, BEATCS* 122 (2017). URL: <http://eatcs.org/beatcs/index.php/beatcs/article/view/497>.

Popularisation Articles.....

- [1] Nathanaël Fijalkow. “L’IA s’attaque à la synthèse de programmes”. In: *La Recherche - Dossier IA et Sciences* 577 (2024). Popularisation article (in French).
- [2] Nathanaël Fijalkow and Émilie Kaufmann. “De l’échantillonnage adaptatif à la résolution de jeux (in French)”. In: *Informatique Mathématique, Une photographie en 2022*. CNRS Editions, 2022.

- [3] Nathanaël Fijalkow. “L’avènement de la synthèse de programmes”. In: *Interstices* (2022). Popularisation article (in French). URL: <https://interstices.info/lavenement-de-la-synthese-de-programme/>.

Bibliometrics.....

Google Scholar (retrieved 14/02/2025): Citation count: **866**, H-index: **19**. This includes self-citations, but in case of articles published in journals citations to earlier conference versions and technical reports are not included (they were merged in my Google Scholar's profile).

DBLP (retrieved 14/02/2025): Conference papers: **45**, Journal papers: **22**, Coauthors: **91**. This does not include technical reports and unpublished papers.

Talks

The lists include declined invitations for personal reasons (health, family).

Invited Talks for International Conferences.....

Jewels of Automata Theory

Parity Games: Beyond Quasipolynomial Time? 16/09/2024

GanDALF: Symposium on Games, Automata, Logics, and Formal Verification

(declined) 15/06/2024

GanDALF: Symposium on Games, Automata, Logics, and Formal Verification

Parity Games: the Quasipolynomial Era 02/09/2019

AutoMathA: from Mathematics to Applications

Probabilistic Automata 08/05/2015

Invited Talks for International Workshops.....

Complexity, Algorithms, Automata and Logic Meet

(declined) 02/06/2025

Viennese Conference on Optimal Control and Dynamic Games

(declined) 15/07/2025

Machine Learning and Theory Workshop in University of East Anglia

(declined) 05/04/2024

Mediterranean Game Theory Symposium

(declined) 01/06/2024

Open Problems in Learning and Verification of Neural Networks (CAV)

Programmatic Reinforcement Learning 15/07/2023

Hausdorff Research Institute: Tropical geometry

Quasipolynomial Time Algorithms beyond Parity Games 22/09/2021

Coalgebraic Methods in Computer Science (CMCS)

The Theory of Universal Graphs: Past and Future 25/04/2020

Games for Logic and Programming Languages (GaLoP, affiliated to ETAPS)

Parity Games: the Quasipolynomial Era 06/04/2019

Complexity, Algorithms, Automata and Logic Meet (CAALM)

Towards Lower Bounds for Parity Games 21/01/2019

Simons Institute for the Theory of Computing Reunion Workshop

Revisiting Probabilistic Bisimulation 12/12/2017

Collective Adaptive Systems Synthesis (Casting, affiliated to ETAPS)

An Invitation to Boundedness Games 02/04/2016

Tutorials and Research Schools.....

Plate-Forme Intelligence Artificielle, PFIA (2,5h)

Tutorial on Machine Learning Meets Program Synthesis 01/07/2024

Symposium on Principles of Programming Languages, POPL (3h)

Tutorial on Machine Learning Meets Program Synthesis 15/01/2024

International Symposium on Formal Methods, FM (3h) <i>Tutorial on Machine Learning Guided Program Synthesis</i>	06/03/2023
École des Jeunes Chercheurs en Informatique Mathématique, EJCIM (4h) <i>Monte Carlo Tree Search Algorithm</i>	02/06/2022
Alan Turing Institute Summer School (20h) <i>Reinforcement Learning: from Theory to Practice</i>	01-07/06/2021
European Conference on Artificial Intelligence, ECAI (2h) <i>Tutorial on Machine Learning Guided Program Synthesis</i>	29/08/2020
ForMaL Spring School on Formal Methods and Machine Learning (2h) <i>Machine Learning Guided Program Synthesis</i>	05/06/2019

Invited Talks in Research Labs and Specialised Workshops.....

2024

- Journées Chaire IA de Confiance (LaBRI)
- Numerics seminar (LaBRI)
- Physics-Informed AI Models: theory and applications (IMS Bordeaux)
- POLARIS Colloquium (Lille)
- Nokia Bell Labs Seminar (Paris)
- SanPsy Meeting (LaBRI)
- R4 Robotics Seminar (Aquitaine)
- PPS Seminar (Paris)
- Algorithms Seminar (Caen)

2023

- Automata Seminar (Warsaw)
- CEA-List Seminar (Paris)

2022

- (declined) Institute seminar for the Physics Laboratory (Clermont-Ferrand)
- GDR IA Seminar (France > Online)
- IARCS Verification Seminar Series (India > Online)
- AI and Dynamical Systems Day in the Mathematics Institute (Toulouse)

2021

- Automata Theory and Applications: Games, Learning and Structures (Singapore > Online)
- Methods and Algorithms for Control in LAAS (Toulouse > Online)
- Göttingen-Kassel Theory Seminar (Kassel > Online)

2020

- CityAI seminar (London > Online)
- London School of Economics (London)
- RWTH i5 and i7 (Aachen)

2019

- 68NQRT (Rennes)
- LSV (Cachan)
- MoVe (Marseille)

2018

- DIMAP (Warwick)
- Theory group (Cambridge)
- Algorithms group (Liverpool)

- PUMA (Munich)

2017

- LACL (Créteil)
- Verification group (Oxford)
- ONERA (Toulouse)
- ULB (Brussels)

2016

- Reactive Systems group (Saarebrücken)
- LIGM (Marne-la-Vallée)

Invitation to Specialised Workshops.....

Dagstuhl Seminar on Approaches and Applications of Inductive Programming		<i>2025</i>
Dagstuhl Seminar on Artificial Intelligence and Formal Methods Join Forces	(declined)	<i>2024</i>
Dagstuhl Seminar on Automated Synthesis: Functional, Reactive and Beyond	(declined)	<i>2024</i>
Simons Reunion Workshop: Theoretical Foundations of Computer Systems	(declined)	<i>2023</i>
Dagstuhl Seminar on Approaches and Applications of Inductive Programming		<i>2023</i>
Dagstuhl Seminar on Model Learning for Improved Trustworthiness	(declined)	<i>2023</i>
Dagstuhl Seminar on Finite Model Theory	(declined)	<i>2022</i>
Dagstuhl Seminar on Unambiguity in Automata Theory		<i>2021</i>
Hausdorff Institute Workshop on Tropical Geometry	(declined)	<i>2021</i>
Lorentz Center Workshop Rigorous Automated Planning	(declined)	<i>2021</i>
Dagstuhl Seminar on Logic and Learning	(declined)	<i>2019</i>
Bellairs Center Barbados Seminar on Probabilistic Programming		<i>2020</i>
Bellairs Center Barbados Seminar on Learning and Verification		<i>2019</i>
Bellairs Center Barbados Seminar on Logical Foundations for Data Science		<i>2018</i>
Dagstuhl Seminar on Nominal Computation	(declined)	<i>2017</i>

Professional service

Scientific Leadership

Head of GT-DAAL: Data, Automata, Algebra, and Languages

2018 – 2024

GDR-IM is a French network gathering computer scientists and mathematicians, it is composed of a dozen working groups and organises and supports several national scientific events. As one of the two Heads of GT-DAAL, one of the working group of GDR-IM, I coordinated the national events pertaining to Database Theory, Automata Theory, and Logic.

Managing Editor for TheoretiCS

2021 – 2024

TheoretiCS is a Diamond Open Access Journal covering all areas of Theoretical Computer Science and launched in Oct 2021. It works as an ArXiv overlay journal, implying that access to all papers is free. Authors are not required to pay any publication fees or article processing charges, and retain copyright. TheoretiCS ambitions to attract the very best papers in each field of Theoretical Computer Science. As one of the two Managing Editors I actively participated in materialising this ambition.

Publicity Chair for the Highlights of Logic, Games, and Automata Conference

2017 – 2022

Highlights of Logic, Games and Automata is an annual conference aiming at integrating the community working in these fields. It is modelled after mathematics conferences: all relevant papers, published elsewhere or not, are accepted for a short presentation. A visit to the Highlights conference offers a wide picture of the latest research in the field and a chance to meet everybody in the community. As Publicity Chair I helped disseminating the conference and related events, and in this capacity I sat in the Steering Committee.

Research Grants

Principal investigator of:

PEPR IA

4 years, 900k€

SAIF: Safe AI using Formal Methods

Sept. 2023 – Aug. 2027

CNRS IRP

5 years, 75k€

Le Trójką

Jan 2024 – Dec 2028

CNRS IEA

2 years, 14k€

WinCent: Applications of Program Synthesis

Jan 2023 – Dec 2025

ANR JCJC

4 years, 140k€

G4S: Games for Synthesis

Jan 2022 – Dec 2024

CNRS Momentum

3 years, 380k€

DeepSynth: Machine Learning Guided Program Synthesis

Jan 2019 – Dec 2021

CNRS PEPS JCJC

1 year, 10k€

Learning for Program Synthesis

Jan 2018 – Dec 2018

Member of: ANR SxC (2025 – 2029), INRIA LLM4Code Challenge (2024 – 2028), ANR CODYS (2018 – 2023), ANR Delta (2016 – 2022), ERC AVS-ISS (2015 – 2020), EPSRC Counter Automata: Verification and Synthesis (2015 – 2017), ANR STOCH-MC (2014 – 2018), ERC GALE (2010 – 2015), ANR FREC (2010 – 2014), ERC SOSNA (2009 – 2014)

Program Committees of International Conferences

Symposium on Principles of Programming Languages

POPL

2026

Symposium on Logic in Computer Science	LICS 2026
International Colloquium on Automata, Languages and Programming	ICALP 2025
International Joint Conference on Artificial Intelligence	IJCAI 2025
Verification, Model Checking, and Abstract Interpretation (declined)	VMCAI 2025
International Conference on Artificial Intelligence	AAAI 2025
International Conference on Knowledge Representation and Reasoning (declined)	KR 2024
International Joint Conference on Artificial Intelligence (declined)	IJCAI 2024
Conference on Concurrency Theory (declined)	CONCUR 2024
Coalgebraic Methods in Computer Science (declined)	CMCS 2024
International Conference on Artificial Intelligence	AAAI 2024
Verification, Model Checking, and Abstract Interpretation	VMCAI 2024
International Joint Conference on Artificial Intelligence	IJCAI 2023
Computer Science in Logic (declined)	CSL 2023
International Conference on Artificial Intelligence	AAAI 2023
International Conference on Quantitative Evaluation of SysTems	QEST 2023
Mathematical Foundations of Computer Science	MFCS 2022
Computer Science in Russia	CSR 2022
International Conference on Reachability Problems	RP 2019
International Colloquium on Automata, Languages and Programming	ICALP 2019
Foundations of Software Systems and Computer Science	FoSSaCS 2019

Highlights of Logic, Games and Automata	Highlights 2019
Mathematical Foundations of Computer Science	MFCS 2018
Highlights of Logic, Games and Automata	Highlights 2018
Program Committees of International Schools and Workshops	
Synthesis	SYNT 2021
Logical Aspects of Multi-Agent Systems and Strategic Reasoning	LAMAS & SR 2021
Formal Methods in Artificial Intelligence	FMAI 2021
Summer School on Modelling and Verification of Parallel Processes	MOVEP 2020
Strategic Reasoning	SR 2018
PhD Committees	
Reviewer for the PhD of Nathanaël Beau <i>Python Code Generation from a Natural Language Description</i> Formal Linguistics Lab, University of Paris Cité	2024
Reviewer for the PhD of Mohamed Reda Marzouk <i>Intelligibilité des réseaux de neurons récurrents par des machines à états finis</i> University of Nantes	2024
Reviewer for the PhD of Nathan Thomasset <i>Strategy complexity for Gale-Stewart games</i> LMF	2023
Examiner for the PhD of Soumyajit Paul <i>Games with imperfect information</i> LaBRI	2023
Examiner for the PhD of Grégoire Menguy <i>Black-box analysis of binary code</i> CEA List	2023
Examiner and reviewer for the PhD viva of Cedric Koh <i>On Linear, Fractional and Submodular Optimization</i> London School of Economics	2022
Examiner and reviewer for the PhD of Xavier Badin de Montjoye <i>Strategy Improvement Method for Solving Simple Stochastic Games</i> Université de Versailles Saint-Quentin-en-Yvelines	2022
Examiner for the PhD of Hugo Bazille <i>Detection and Quantification of Events in Stochastic Systems</i> ENS Rennes	2019

Co-Organisation of Scientific Events.....

Theoretical Foundations of Trustworthy AI <i>Simons Institute, Berkeley</i>	2025
Program Synthesis Days <i>LaBRI, Bordeaux</i>	2024
Dagstuhl Seminar on Stochastic Games <i>Dagstuhl, Wadern</i>	2024
Dagstuhl Seminar on the Futures of Reactive Synthesis <i>Dagstuhl, Wadern</i>	2023
Learning and Verification day <i>LaBRI, Bordeaux</i>	2020
Learning and Verification day <i>UCL, London</i>	2019
Logic and Learning FoPSS School <i>Oxford, affiliated to FLOC</i>	2018
Summit on Machine Learning Meets Formal Methods <i>Oxford, affiliated to FLOC</i>	2018
Logic and Learning Workshop <i>The Alan Turing Institute, London</i>	2018
Annual meeting of the GT ALGA <i>IRIF, Paris</i>	2015

Supervision and Teaching

Post-doctorates.....

Roman Kniazev

Programmatic Reinforcement Learning 2024 – now

Arka Ghosh

Automata Learning 2024 – now

Pierre Vandenhove

Games for Synthesis 2023 – 2024

Now Associate Lecturer in Mons

Guillaume Lagarde

Machine Learning Guided Program Synthesis 2019 – 2020

Now Associate Lecturer in LaBRI

PhD Students.....

Timothé Boulet

LLM code generation for artificial agent control 2024 – now

co-supervised with Xavier Hinaut and Clément Moulin-Frier

Andrew Zamai

LLMs for the differential diagnosis of dementias 2024 – now

co-supervised with Laurent Simon and Pierrick Coupé

Gabriel Bathie

Property testing of regular languages 2022 – now

co-supervised with Tatiana Starikovskaya (Paris)

Rémi Morvan

Semantic Tractability in Databases 2021 – now

co-supervised with Diego Figueira

Théo Matricon

Program Synthesis 2021 – 2024

Defended on 14 Dec. 2024. Now postdoc in INRIA Rennes

Antonio Casares

Controller Synthesis 2020 – 2023

co-supervised with Thomas Colcombet (Paris) and Igor Walukiewicz. Defended on 23 Nov. 2023. Now postdoc in Warsaw

Ritam Raha

Verification of AI-Enabled Systems: Making Artificial Intelligence Safe 2019 – 2023

co-supervised with Guillermo Perez (Antwerp). Defended on 12 Sept. 2023. Now postdoc in MPI-SWS

Pierre Ohlmann

Parity Games 2018 – 2021

co-supervised with Olivier Serre (Paris). Defended on 13 Dec. 2021. Now CNRS in Marseille

Research engineers.....

Priscilla Tissot

An LLM Agent for University of Bordeaux 2025 – now

1 year, co-supervised with Nicolas Charles

Baptiste Mouillon

Mixed Boolean Arithmetic on GPUs 2024 – now

1 year, co-supervised with Gabriel Bathie

Gaëtan Margueritte

ProgSynth: towards usable program synthesis

2023 – 2024

6 months, co-supervised with Théo Matricon

Internships

Arthur Gall

Learning probabilistic automata

2024

4 months, co-supervised with Rémi Morvan

Baptiste Mouillon

Space-efficient reactive synthesis

2024

5 months, co-supervised with Théo Matricon and Pierre Vandenhove

Sylvain Brisset

Programmatic reinforcement learning

2024

2 months, co-supervised with Théo Matricon, Pierre Vandenhove, and Guillaume Lagarde

Gianni Padula

Iterative reactive synthesis

2023 – 2024

4 months, co-supervised with Théo Matricon and Pierre Vandenhove

Shabadi Guruprerana

Towards programmatic reinforcement learning

2023

4 months

Arthur Gall

Learning automata over the integers

2023

4 months, co-supervised with Rémi Morvan

Hugo Francon

Total payoff games

2023

4 months, co-supervised with Denis Kuperberg

Gaëtan Margueritte

Regular Expression Inference using DeepSynth

2022

6 months, co-supervised with Théo Matricon

Pierre Gaillard

Solving Rabin Games for Reactive Synthesis

2022

2 months

Ranjan Utkarsh

Building Towers with Program Synthesis

2022

2 months, co-supervised with Théo Matricon

Théo Matricon

Statistical Comparison of Algorithm Performance Through Instance Selection

2021

6 months, co-supervised with Laurent Simon > Online

Louis Jalouzot

The Abstraction and Reasoning Corpus Challenge for Program Synthesis

2021

2 months, co-supervised with Charles Grellois > Online

Guillaume Pignon-Ywanne

Games Rankings

2020

2 months, co-supervised with Guillaume Lagarde > Online

Aliénor Goubault-Larrecq

Universal Graphs for Solving Games with Combination of Objectives

2020

2 months, co-supervised with Jérôme Leroux > Online

Nayan Akarsh

Search Algorithms for Program Synthesis

2020

2 months > Online

Mohit Gupta

Verification of Neural Networks

2019

2 months

Ashwani Anand

Universal Graphs for Solving Games with Combination of Objectives

2019

2 months, co-supervised with Jérôme Leroux

Pierre Ohlmann

The Hankel Matrix

2018

5 months, co-supervised with Olivier Serre

Ritam Raha

Automata Learning

2018

2 months, co-supervised with Filip Mazowiecki

Corentin Barloy

Subclasses of Linear Recurrent Sequences

2018

2 months, co-supervised with Filip Mazowiecki and Nathan Lhote

Quentin de Goër de Herve

Finitely Ambiguous Weighted Automata

2018

2 months, co-supervised with Filip Mazowiecki and Nathan Lhote

Magdalena Bojarska

Probabilistic Bisimulation

2015

academic year, co-supervised with Mikołaj Bojańczyk

Laureline Pinault

Quantitative Alternating Automata

2014

2 months, co-supervised with Olivier Serre

Teaching.....

Large Language Models

Master Vision Apprentissage, MVA

Starting 2025

24h

Stochastic Games

Parisian Master in Computer Science, MPRI

Since 2025

12h

Theory and Practice of Machine Learning

IA Master at University of Bordeaux

Since 2024

24h

Theory and Practice of Reinforcement Learning

PhD Programme in LaBRI, Bordeaux

Since 2019

12h

Reinforcement Learning

IA Master at ENSEIRB, Engineering School

Since 2019

18h

Games Techniques in Computer Science

Parisian Master in Computer Science, MPRI

2021 – 2024

12h

Games for Synthesis and Control

Master Programme at University of Bordeaux
20h

2018 – 2022

Grader for the Computer Science Exam

Polytechnique Engineering School Entrance Exam

2021 – 2022

Examiner for the Oral Programming Exam

ENS Entrance Exam

2018 – 2020