

Curriculum Vitae

Long version

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Personal

Born in 1987. Married, two children: Léa (2019) and Noé (2021).

Research Positions and Education

Habilitation

French degree allowing me to supervise PhD students

University of Bordeaux

11 Feb 2022

Current.....

Junior Researcher

Chargé de recherche

CNRS, LaBRI, Bordeaux

Since Jan 2018

Visiting Professor

University of Warsaw, Poland

Sept. 2022 – July 2023

Past.....

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] Corentin Barloy, Nathanaël Fijalkow, Nathan Lhote, and Filip Mazowiecki. "A Robust Class of Linear Recurrence Sequences". In: *Information and Computation* (2022). URL: <https://arxiv.org/abs/1908.03890>.
- [2] Thomas Colcombet, Nathanaël Fijalkow, Pawel Gawrychowski, and Pierre Ohlmann. "The Theory of Universal Graphs for Infinite Duration Games". In: *Logical Methods in Computer Science* (2022). URL: <https://arxiv.org/abs/2104.05262>.
- [3] Théo Matricon, Nathanaël Fijalkow, Guillaume Lagarde, and Kevin E. Ellis. "DeepSynth: Scaling Neural Program Synthesis with Distribution-based Search". In: *Journal of Open Source Software* (2022). URL: <https://deepsynth.labri.fr/>, <https://doi.org/10.21105/joss.04151>, <https://github.com/nathanael-fijalkow/DeepSynth>.
- [4] Thomas Colcombet, Nathanaël Fijalkow, and Pierre Ohlmann. "Controlling a Random Population". In: *Logical Methods in Computer Science* (2021). Special issue by invitation of FoSSaCS'20. 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>.
- [5] 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>.

- [6] 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* 22.1 (2021), 7:1–7:24. URL: <https://doi.org/10.1145/3431860>, <https://arxiv.org/abs/2002.03664>.
- [7] Nathanaël Fijalkow, Cristian Riveros, and James Worrell. “Probabilistic Automata of Bounded Ambiguity”. In: *Information and Computation* (2020). URL: <https://doi.org/10.1016/j.ic.2020.104648>, <http://arxiv.org/abs/2205.08175>.
- [8] Alexander Clark and Nathanaël Fijalkow. “Consistent Unsupervised Estimators for Anchored PCFGs”. In: *Transactions of the Association for Computational Linguistics* 8 (2020). URL: https://doi.org/10.1162/tac1_a_00323.
- [9] Nathanaël Fijalkow. “Lower bounds for the state complexity of probabilistic languages and the language of prime numbers”. In: *The Journal of Logic and Computation* 30.1 (2020). Special issue by invitation of LFCS’16. URL: [10.1093/logcom/exaa007](https://doi.org/10.1093/logcom/exaa007).
- [10] Nathanaël Fijalkow, Stefan Kiefer, and Mahsa Shirmohammadi. “Trace Refinement in Labelled Markov Decision Processes”. In: *Logical Methods in Computer Science* 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>.
- [11] Florence Clerc, Nathanaël Fijalkow, Bartek Klin, and Prakash Panangaden. “Expressiveness of probabilistic modal logics: A gradual approach”. In: *Information and Computation* 267 (2019). URL: <https://doi.org/10.1016/j.ic.2019.04.002>.
- [12] 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* 63.5 (2019). Special issue by invitation of STACS’17. URL: <https://doi.org/10.1007/s00224-019-09913-3>, <https://arxiv.org/abs/1701.02162>.
- [13] Nathanaël Fijalkow. “Profinite techniques for probabilistic automata and the Markov Monoid algorithm”. In: *Theoretical Computer Science* 680 (2017). URL: <https://doi.org/10.1016/j.tcs.2017.04.006>, <https://arxiv.org/abs/1501.02997>.
- [14] Nathanaël Fijalkow and Charles Paperman. “Monadic Second-Order Logic with Arbitrary Monadic Predicates”. In: *ACM Transactions on Computational Logic* 18.3 (2017). URL: <https://doi.org/10.1145/3091124>.
- [15] Nathanaël Fijalkow, Hugo Gimbert, Edon Kelmendi, and Youssef Oualhadj. “Deciding the value 1 Problem for Probabilistic Leaktight Automata”. In: *Logical Methods in Computer Science* 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>.
- [16] Nathanaël Fijalkow and Martin Zimmermann. “Cost-Parity and Cost-Streett Games”. In: *Logical Methods in Computer Science* 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>.
- [17] 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] Ritam Raha, Rajarshi Roy, Nathanaël Fijalkow, Daniel Neider, and Guillermo Perez. “Synthesizing Efficiently Monitorable Formulas in Metric Temporal Logic”. In: *International Conference on Verification, Model Checking, and Abstract Interpretation, VMCAI*. 2024.
- [2] 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>.
- [3] Théo Matricon, Nathanaël Fijalkow, and Gaëtan Margueritte. “WikiCoder: Learning to Write Knowledge-Powered Code”. In: *International Symposium on Model Checking of Software, SPIN*. 2023.
- [4] 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.
- [5] 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>.
- [6] 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*. 2022. URL: <https://ojs.aaai.org/index.php/AAAI/article/view/20616>, <https://arxiv.org/abs/2110.12485>.
- [7] 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>.
- [8] 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>.
- [9] 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>.
- [10] 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>.
- [11] 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.

- [12] 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>.
- [13] 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>.
- [14] 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>.
- [15] 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>.
- [16] 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>.
- [17] 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>.
- [18] 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.
- [19] 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>.
- [20] 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>.
- [21] 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>.
- [22] 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>.

- [23] 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>.
- [24] 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>.
- [25] 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>.
- [26] 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>.
- [27] 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>.
- [28] 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>.
- [29] 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>.
- [30] 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>.
- [31] 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.
- [32] 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>.
- [33] 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>.
- [34] 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.

- [35] 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>.
- [36] 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>.
- [37] 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>.
- [38] 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>.
- [39] 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>.
- [40] 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>.
- [41] Nathanaël Fijalkow, Hugo Gimbert, and Youssef 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>.
- [42] 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>.
- [43] 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>.
- [44] 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*. 2022. URL: <https://scarlet.labri.fr/>, <https://github.com/rajarshi008/scarlet>.

- [3] Théo Matricon, Nathanaël Fijalkow, Guillaume Lagarde, and Kevin E. Ellis. “DeepSynth: Scaling Neural Program Synthesis with Distribution-based Search”. In: *Journal of Open Source Software* (2022). URL: <https://deepsynth.labri.fr/>, <https://doi.org/10.21105/joss.04151>, <https://github.com/nathanael-fijalkow/DeepSynth>.
- [2] Théo Matricon, Marie Anastacio, Nathanaël Fijalkow, Laurent Simon, and Holger Hoos. *PSEAS*. 2021. URL: <https://github.com/Theomat/PSEAS>.
- [3] Nathanaël Fijalkow, Hugo Gimbert, Edon Kelmendi, and Denis Kuperberg. *Stamina*. 2017. URL: <http://stamina.labri.fr>, <https://github.com/nathanael-fijalkow/stamina>.
- [4] Nathanaël Fijalkow and Denis Kuperberg. *ACME: Automata with Counters, Monoids and Equivalence*. 2014. URL: <https://acme.labri.fr/>, <https://github.com/nathanael-fijalkow/acme>.

Research Bulletins.....

- [1] Nathanaël Fijalkow. “Undecidability results for probabilistic automata”. In: *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 EATCS* 122 (2017). URL: <http://eatcs.org/beatcs/index.php/beatcs/article/view/497>.

Popularisation Articles.....

- [1] 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.
- [2] 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 02/11/2023): Citation count: **666**, H-index: **16**. 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 02/11/2023): Conference papers: **43**, Journal papers: **19**, Coauthors: **81**. This does not include technical reports and unpublished papers.

Talks

Invited Talks for International Conferences.....

The Theory of Universal Graphs

AutoMathA: from Mathematics to Applications

upcoming

Paris

Parity Games: the Quasipolynomial Era

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

02/09/2019

Bordeaux

Probabilistic Automata

AutoMathA: from Mathematics to Applications

08/05/2015

Leipzig

Invited Talks for International Workshops.....

Programmatic Reinforcement Learning

Open Problems in Learning and Verification of Neural Networks (CAV satellite event) *15/07/2023*

Paris

Quasipolynomial Time Algorithms beyond Parity Games

Tropical geometry and the geometry of linear programming

22/09/2021

Hausdorff Research Institute for Mathematics, Bonn > Online

The Theory of Universal Graphs: Past and Future

Coalgebraic Methods in Computer Science (CMCS)

25/04/2020

Dublin > Online

Parity Games: the Quasipolynomial Era

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

06/04/2019

Prague

Towards Lower Bounds for Parity Games

Complexity, Algorithms, Automata and Logic Meet (CAALM)

21/01/2019

Chennai

Revisiting Probabilistic Bisimulation

Logical Structures for Computation

12/12/2017

Simons Institute for the Theory of Computing, Berkeley

An Invitation to Boundedness Games

Collective Adaptive Systems Synthesis (Cassting, affiliated to ETAPS)

02/04/2016

Eindhoven

Tutorials and Research Schools.....

Tutorial on Machine Learning Guided Program Synthesis

Symposium on Principles of Programming Languages (3h)

15/01/2024

London

Tutorial on Machine Learning Guided Program Synthesis

International Symposium on Formal Methods (3h)

06/03/2023

Lübeck

Monte Carlo Tree Search Algorithm

École des Jeunes Chercheurs en Informatique Mathématique, EJCIM (4h)

02/06/2022

Nice

Reinforcement Learning: from Theory to Practice

Alan Turing Institute Summer School (20h)

01-07/06/2021

London > Online

Tutorial on Machine Learning Guided Program Synthesis

European Conference on Artificial Intelligence (2h)

29/08/2020

Santiago de Compostela > Online

Machine Learning Guided Program Synthesis

ForMaL DigiCosme Spring School on Formal Methods and Machine Learning (2h)

05/06/2019

Cachan

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

2023

- Automata Seminar (Warsaw)

2022

- 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 Artificial Intelligence and Formal Methods Join Forces

Dagstuhl, Wadern

2024

Dagstuhl Seminar on Approaches and Applications of Inductive Programming

Dagstuhl, Wadern

2023

Dagstuhl Seminar on Model Learning for Improved Trustworthiness

Dagstuhl, Wadern

2023

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| Dagstuhl Seminar on Finite Model Theory <i>Dagstuhl, Wadern</i> | 2022 |
| Dagstuhl Seminar on Unambiguity in Automata Theory <i>Dagstuhl, Wadern</i> | 2021 |
| Workshop on Tropical Geometry and the Geometry of Linear Programming <i>Hausdorff Institute, Bonn</i> | 2021 |
| Lorentz Center Workshop Rigorous Automated Planning <i>Lorentz Center, Leiden</i> | 2021 |
| Dagstuhl Seminar on Logic and Learning <i>Dagstuhl, Wadern</i> | 2019 |
| Probabilistic Programming <i>Bellairs Center, Holetown, Barbados</i> | 2020 |
| Learning and Verification <i>Bellairs Center, Holetown, Barbados</i> | 2019 |
| Logical Foundations for Data Science <i>Bellairs Center, Holetown, Barbados</i> | 2018 |

Professional service

Scientific Leadership.....

Managing Editor for TheoretiCS

Since 2021

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 participate in materialising this ambition.

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

Since 2018

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 coordinate the national events pertaining to Database Theory, Automata Theory, and Logic.

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 help disseminating the conference and related events, and in this capacity I sit in the Steering Committee.

Research Grants.....

Principal investigator of:

PEPR IA

4 years, 900k€

SAIF: Safe AI using Formal Methods

Sept. 2023 – Aug. 2027

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, 180k€ + 2 years post-doc

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 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.....

International Conference on Artificial Intelligence

AAAI

Vancouver

2024

Verification, Model Checking, and Abstract Interpretation

VMCAI

London

2024

International Joint Conference on Artificial Intelligence

IJCAI

Cape Town

2023

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| International Conference on Artificial Intelligence <i>Washington</i> | AAAI 2023 |
| International Conference on Quantitative Evaluation of SysTems <i>Antwerp</i> | QEST 2023 |
| Mathematical Foundations of Computer Science <i>Vienna</i> | MFCS 2022 |
| Computer Science in Russia <i>St. Petersburg</i> | CSR 2022 |
| International Conference on Reachability Problems <i>Brussels</i> | RP 2019 |
| International Colloquium on Automata, Languages and Programming <i>Patras</i> | ICALP 2019 |
| Foundations of Software Systems and Computer Science <i>Prague</i> | FoSSaCS 2019 |
| Highlights of Logic, Games and Automata <i>Warsaw</i> | Highlights 2019 |
| Mathematical Foundations of Computer Science <i>Liverpool</i> | MFCS 2018 |
| Highlights of Logic, Games and Automata <i>Berlin</i> | Highlights 2018 |
| Program Committees of International Schools and Workshops..... | |
| Synthesis <i>Los Angeles</i> | SYNT 2021 |
| Logical Aspects of Multi-Agent Systems and Strategic Reasoning <i>London</i> | LAMAS & SR 2021 |
| Formal Methods in Artificial Intelligence <i>London</i> | FMAI 2021 |
| Summer School on Modelling and Verification of Parallel Processes <i>Grenoble</i> | MOVEP 2020 |
| Strategic Reasoning <i>Oxford</i> | SR 2018 |
| PhD Committees..... | |
| 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 |

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| 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 Seminars and Working Groups..... | |
| Dagstuhl Seminar on Stochastic Games <i>Dagstuhl, Wadern</i> | 2024 |
| Dagstuhl Seminar on the Futures of Reactive Synthesis <i>Dagstuhl, Wadern</i> | 2023 |
| Online Worldwide Seminar on Logic and Semantics (OWLS) <i>Online</i> | 2020 – 2022 |
| Theory of Machine Learning Reading Group, and online <i>LaBRI, Bordeaux</i> | 2018 – 2021 |
| Formal Methods Team Seminar <i>LaBRI, Bordeaux</i> | 2018 – 2019 |
| Logic Seminar <i>The Alan Turing Institute, London</i> | 2017 – 2018 |
| Fellows Logic Open <i>Simons Institute, Berkeley</i> | 2016 |
| Verification Seminar <i>Oxford</i> | 2015 – 2016 |
| Automata Seminar <i>LIAFA, Paris</i> | 2014 – 2015 |
| Reviewing activities..... | |
| Reviewer for the GACR – Czech Science Foundation <i>Czech Republic</i> | 2022 |
| Reviewer for the ISF – Israeli Science Foundation <i>Israel</i> | 2021 |
| Reviewer for the NCN – National Science Center <i>Poland</i> | 2020 |

Supervision and Teaching

Post-doctorates.....

Pierre Vandenhove
Games for Synthesis 2023 – now

Guillaume Lagarde
Machine Learning Guided Program Synthesis 2019 – 2020
Now Associate Lecturer in LaBRI

PhD Students.....

Théo Matricon
Program Synthesis 2021 – 2024

Rémi Morvan
Semantic Tractability in Databases 2021 – 2024
co-supervised with Diego Figueira

Antonio Casares
Controller Synthesis 2020 – 2023
co-supervised with Thomas Colcombet (Paris) and Igor Walukiewicz

Ritam Raha
Verification of AI-Enabled Systems: Making Artificial Intelligence Safe 2019 – 2023
co-supervised with Guillermo Perez (Antwerp). 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

Internships.....

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

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| Louis Jalouzot | |
| <i>The Abstraction and Reasoning Corpus Challenge for Program Synthesis</i> | 2021 |
| 2 months, co-supervised with Charles Grellois > Online | |
| Guillaume Pignon-Ywanne | |
| <i>Games Rankings</i> | 2020 |
| 2 months, co-supervised with Guillaume Lagarde > Online | |
| Ali nor Goubault-Larrecq | |
| <i>Universal Graphs for Solving Games with Combination of Objectives</i> | 2020 |
| 2 months, co-supervised with J r me Leroux > Online | |
| Nayan Akarsh | |
| <i>Search Algorithms for Program Synthesis</i> | 2020 |
| 2 months > Online | |
| Mohit Gupta | |
| <i>Verification of Neural Networks</i> | 2019 |
| 2 months | |
| Ashwani Anand | |
| <i>Universal Graphs for Solving Games with Combination of Objectives</i> | 2019 |
| 2 months, co-supervised with J r me Leroux | |
| Pierre Ohlmann | |
| <i>The Hankel Matrix</i> | 2018 |
| 5 months, co-supervised with Olivier Serre | |
| Ritam Raha | |
| <i>Automata Learning</i> | 2018 |
| 2 months, co-supervised with Filip Mazowiecki | |
| Corentin Barloy | |
| <i>Subclasses of Linear Recurrent Sequences</i> | 2018 |
| 2 months, co-supervised with Filip Mazowiecki and Nathan Lhote | |
| Quentin de Go r de Herve | |
| <i>Finitely Ambiguous Weighted Automata</i> | 2018 |
| 2 months, co-supervised with Filip Mazowiecki and Nathan Lhote | |
| Magdalena Bojarska | |
| <i>Probabilistic Bisimulation</i> | 2015 |
| academic year, co-supervised with Miko aj Boja czyk | |
| Laureline Pinault | |
| <i>Quantitative Alternating Automata</i> | 2014 |
| 2 months, co-supervised with Olivier Serre | |

Teaching

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| Theory and Practice of Machine Learning | |
| <i>IA Master at University of Bordeaux</i> | Since 2023 |
| 24h | |
| Games Techniques in Computer Science | |
| <i>Parisian Master in Computer Science, MPRI</i> | Since 2021 |
| 12h | |
| Theory and Practice of Reinforcement Learning | |
| <i>PhD Programme in LaBRI, Bordeaux</i> | Since 2019 |
| 12h | |

Reinforcement Learning

IA Master at ENSEIRB, Engineering School
18h

Since 2019

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