Curriculum Vitae
Long version

✉ nathanael.fijalkow@gmail.com • http://games-automata-play.com/

Personal

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

Research Positions and Education

Habilitation — **University of Bordeaux**
French degree allowing me to supervise PhD students — *11 Feb 2022*

Current

Junior Researcher — **CNRS, LaBRI, Bordeaux**
Chargé de recherche — *Since Jan 2018*

Past

Visiting Professor — **University of Warsaw, Poland**
Sept. 2022 – July 2023

Research Fellow — **The Alan Turing Institute, London**
Logical Foundations of Data Science — *Jan 2017 – Aug. 2022*
Mentored by Ranko Lazić (University of Warwick)

Research Fellow — **Simons Institute, Berkeley**
Theoretical Foundations of Computer Systems — *Jan 2021 – May 2021*
Mentored by Ras Bodik (University of Washington)

Research Fellow — **Simons Institute, Berkeley**
Logical Structures in Computation — *Aug 2016 – Dec 2016*
Mentored by Prakash Panangaden (McGill University)

Research Assistant — **University of Oxford**
Dynamical Systems — *Nov 2015 – July 2016*
Jointly supervised by Joël Ouaknine and James Worrell

Education

PhD in Computer Science — **Paris 7 & Warsaw**
Counting and Randomising in Automata Theory — *Sept 2012 – Oct 2015*
Jointly supervised by Mikołaj Bojańczyk and Thomas Colcombet

Normalien — **École Normale Supérieure de Cachan**
Majoring in Computer Science — *Sept 2008 – Aug 2012*

M.Sc. MPRI (Computer Science) — **Paris 7**
with high honours — *2010 – 2012*
Specialisation in Automata Theory and Logics

M.Sc. LMFI (Mathematical Logics) — **Paris 7**
with high honours — *2009 – 2011*

B.Sc. Computer Science and Mathematics — **Paris 7**
with high honours — *2008 – 2009*

Classes Préparatoires aux Grandes Écoles — **Paris**
Lycée Charlemagne and Louis-le-grand — *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-peviewed 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] Antonio Casares, Thomas Colcombet, Nathanaël Fijalkow, and Karoliina Lehtinen. "From Muller to Parity and Rabin Automata: Optimal Transformations Preserving (History-)Determinism". In: *TheoretiCS* 3 (2024). URL: https://doi.org/10.46298/theoretics.24.12.

[2] Thomas Colcombet, Nathanaël Fijalkow, and Florian Horn. "Playing Safe, Ten Years Later". In: *Logical Methods in Computer Science* (2024). URL: https://arxiv.org/abs/2212.12024.

[3] 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.

[4] 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.

[5] 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://arxiv.org/abs/1911.01195.

[6] 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.

[7] 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.

[8] 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.

[9] 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/tacl_a_00323.

[10] 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.

[11] 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://arxiv.org/abs/1510.09102.

[12] 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.

[13] 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.

[14] 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.

[15] 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.

[16] Nathanaël Fijalkow, Hugo Gimbert, Edon Kelmendi, and Youssouf 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://arxiv.org/abs/1504.04136.

[17] 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://arxiv.org/abs/1207.0663.

[18] 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

[0] 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.

[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. URL: https://arxiv.org/abs/2310.17410.

[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. URL: https://arxiv.org/abs/2303.08574.

[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. URL: https://proceedings.kr.org/2022/14/.

[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 Youssouf 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 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.

[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: 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: *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. "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'échantillonage 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 30/04/2024): Citation count: **726**, H-index: **17**. 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 30/04/2024): Conference papers: **44**, Journal papers: **21**, Coauthors: **89**. 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

Programmatic Reinforcement Learning
Jewels of Automata Theory *16/09/2024*

(declined)
GanDALF: Symposium on Games, Automata, Logics, and Formal Verification *15/06/2024*

Parity Games: the Quasipolynomial Era
GanDALF: Symposium on Games, Automata, Logics, and Formal Verification *02/09/2019*

Probabilistic Automata
AutoMathA: from Mathematics to Applications *08/05/2015*

Invited Talks for International Workshops

(declined)
Machine Learning and Theory Workshop in University of East Anglia *05/04/2024*

(declined)
Mediterranean Game Theory Symposium *01/06/2024*

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

Quasipolynomial Time Algorithms beyond Parity Games
Hausdorff Research Institute: Tropical geometry *22/09/2021*

The Theory of Universal Graphs: Past and Future
Coalgebraic Methods in Computer Science (CMCS) *25/04/2020*

Parity Games: the Quasipolynomial Era
Games for Logic and Programming Languages (GaLoP, affiliated to ETAPS) *06/04/2019*

Towards Lower Bounds for Parity Games
Complexity, Algorithms, Automata and Logic Meet (CAALM) *21/01/2019*

Revisiting Probabilistic Bisimulation
Simons Institute for the Theory of Computing Reunion Workshop *12/12/2017*

An Invitation to Boundedness Games
Collective Adaptive Systems Synthesis (Cassting, affiliated to ETAPS) *02/04/2016*

Tutorials and Research Schools

Tutorial on Machine Learning Meets Program Synthesis
Plate-Forme Intelligence Artificielle, PFIA (2,5h) *01/07/2024*

Tutorial on Machine Learning Meets Program Synthesis
Symposium on Principles of Programming Languages, POPL (3h) *15/01/2024*

Tutorial on Machine Learning Guided Program Synthesis
International Symposium on Formal Methods, FM (3h) *06/03/2023*

Monte Carlo Tree Search Algorithm
École des Jeunes Chercheurs en Informatique Mathématique, EJCIM (4h) *02/06/2022*

Reinforcement Learning: from Theory to Practice
Alan Turing Institute Summer School (20h) *01-07/06/2021*

Tutorial on Machine Learning Guided Program Synthesis
European Conference on Artificial Intelligence, ECAI (2h) *29/08/2020*

Machine Learning Guided Program Synthesis
ForMaL DigiCosme Spring School on Formal Methods and Machine Learning (2h) *05/06/2019*

Invited Talks in Research Labs and Specialised Workshops

2024
- POLARIS Colloquium (Lille)
- 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 Artificial Intelligence and Formal Methods Join Forces **(declined)**
2024

Dagstuhl Seminar on Automated Synthesis: Functional, Reactive and Beyond **(declined)**
2024

Simons Reunion Workshop: Theoretical Foundations of Computer Systems **(declined)**
2023

Dagstuhl Seminar on Approaches and Applications of Inductive Programming
2023

Dagstuhl Seminar on Model Learning for Improved Trustworthiness **(declined)**
2023

Dagstuhl Seminar on Finite Model Theory **(declined)**
2022

Dagstuhl Seminar on Unambiguity in Automata Theory
2021

Hausdorff Institute Workshop on Tropical Geometry **(declined)**
2021

Lorentz Center Workshop Rigorous Automated Planning **(declined)**
2021

Dagstuhl Seminar on Logic and Learning **(declined)**
2019

Bellairs Center Barbados Seminar on Probabilistic Programming
2020

Bellairs Center Barbados Seminar on Learning and Verification
2019

Bellairs Center Barbados Seminar on Logical Foundations for Data Science
2018

Dagstuhl Seminar on Nominal Computation **(declined)**
2017

Professional service

Scientific Leadership

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.

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 participate 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 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*

CNRS IRP — **5 years, 75k€**
Le Trójkąt — *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, 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 Knowledge Representation and Reasoning — **KR**
(declined) — *2024*

International Joint Conference on Artificial Intelligence — **IJCAI**
(declined) — *2024*

Conference on Concurrency Theory **CONCUR**
(declined) *2024*

Coalgebraic Methods in Computer Science **CMCS**
(declined) *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 **CSL**
(declined) *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 Nathan Thomasset
Strategy complexity for Gale-Stewart games *2023*
LMF

Examiner for the PhD of Soumyajit Paul
Games with imperfect information *2023*
LaBRI

Examiner for the PhD of Grégoire Menguy
Black-box analysis of binary code *2023*
CEA List

Examiner and reviewer for the PhD viva of Cedric Koh
On Linear, Fractional and Submodular Optimization *2022*
London School of Economics

Examiner and reviewer for the PhD of Xavier Badin de Montjoye
Strategy Improvement Method for Solving Simple Stochastic Games *2022*
Université de Versailles Saint-Quentin-en-Yvelines

Examiner for the PhD of Hugo Bazille
Detection and Quantification of Events in Stochastic Systems *2019*
ENS Rennes

Co-Organisation of Seminars and Working Groups

Theoretical Foundations of Trustworthy AI
Simons Institute, Berkeley *2025*

Dagstuhl Seminar on Stochastic Games
Dagstuhl, Wadern *2024*

Dagstuhl Seminar on the Futures of Reactive Synthesis
Dagstuhl, Wadern *2023*

Online Worldwide Seminar on Logic and Semantics (OWLS)
Online *2020 – 2022*

Theory of Machine Learning Reading Group, and online
LaBRI, Bordeaux *2018 – 2021*

Formal Methods Team Seminar
LaBRI, Bordeaux *2018 – 2019*

Logic Seminar
The Alan Turing Institute, London *2017 – 2018*

Fellows Logic Open
Simons Institute, Berkeley *2016*

Verification Seminar
Oxford *2015 – 2016*

Automata Seminar
LIAFA, Paris *2014 – 2015*

Co-Organisation of Scientific Events

Learning and Verification day
LaBRI, Bordeaux *2020*

Learning and Verification day
UCL, London *2019*

Logic and Learning FoPSS School
Oxford, affiliated to FLOC *2018*

Summit on Machine Learning Meets Formal Methods
Oxford, affiliated to FLOC *2018*

Logic and Learning Workshop
The Alan Turing Institute, London *2018*

Annual meeting of the GT ALGA
IRIF, Paris *2015*

Reviewing activities

Gilles Kahn SIF PhD Prize
(declined) *2023*

Reviewer for the GACR – Czech Science Foundation
2022

Reviewer for the ISF – Israeli Science Foundation
2021

Reviewer for the NCN – Polish National Science Center
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

Gabriel Bathie
Property testing of regular languages *2022 – now*
co-supervised with Tatiana Starikovskaya (Paris)

Théo Matricon
Program Synthesis *2021 – now*

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

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

Gaëtan Margueritte
ProgSynth: towards usable progrma synthesis *2023 – now*
6 months, co-supervised with Théo Matricon

Internships

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, Saclay *Starting 2025*
24h

Theory and Practice of Machine Learning
IA Master at University of Bordeaux *Since 2024*
24h

Games Techniques in Computer Science
Parisian Master in Computer Science, MPRI *Since 2021*
12h

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 for Synthesis and Control
Master Programme at University of Bordeaux *2018 – 2022*
20h

Grader for the Computer Science Exam
Polytechnique Engineering School Entrance Exam *2021 – 2022*

Examiner for the Oral Programming Exam
ENS Entrance Exam *2018 – 2020*