

Curriculum Vitae

Short 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

French degree allowing me to supervise PhD students

University of Bordeaux

11 Feb 2022

Current

Professor

Directeur de recherche

CNRS, LaBRI, Bordeaux

Since July 2025

Technical Lead LLM

Google.org Generative AI

3iS (NGO)

June - Dec. 2025

Past

Associate Professor

Chargé de recherche

CNRS, LaBRI, Bordeaux

Jan. 2018 – June 2025

Visiting Researcher

Automata group

University of Warsaw, Poland

Sept. 2022 – July 2023

Research Fellow

Logical Foundations of Data Science

Alan Turing Institute of data science, London

Jan. 2017 – Aug. 2022

Research Fellow

Theoretical Foundations for Computer Systems

Simons Institute, University of Berkeley

Jan. 2021 – May. 2021

Research Fellow

Logical Structures in Computation

Simons Institute, University of Berkeley

Aug. 2016 – Dec. 2016

Research Assistant

Dynamical Systems

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

Five most important 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. It

is organised along three axes, reflecting my research activities: reactive synthesis through the prism of games on graphs, machine learning for program synthesis, and logic and automata learning.

Game theory.....

- [1] Nathanaël Fijalkow, C. Aiswarya, Guy Avni, Nathalie Bertrand, Patricia Bouyer, Romain Brenguier, Arnaud Carayol, Antonio Casares, John Fearnley, Hugo Gimbert, Thomas A. Henzinger, Florian Horn, Paul Gastin, Rasmus Ibsen-Jensen, Nicolas Markey, Benjamin Monmege, Petr Novotný, Pierre Ohlmann, Mickael Randour, Ocan Sankur, Sylvain Schmitz, Olivier Serre, Mateusz Skomra, Nathalie Sznajder, Pierre Vandehove. *Games on Graphs: From logic and automata to algorithms*, 2023

Cambridge University Press and publicly available: <https://arxiv.org/abs/2305.10546>.

I initiated a collaborative textbook on the field of infinite duration games on graphs. The book is composed of 16 chapters (600 pages in PDF format) and written in a mathematically rigorous way with uniform notations, definitions, and technical developments, in order to give the only existing comprehensive account on the state of the art for this dynamic field of research. It is published online on Arxiv, and is being printed by Cambridge University Press. I coauthored 5 chapters and acted as project leader, organising the book contents and inviting the 24 other authors.

- [2] Marius Belly, Nathanaël Fijalkow, Hugo Gimbert, Florian Horn, Guillermo A. Pérez, Pierre Vandenheve (alphabetical). *Revelations: A Decidable Class of POMDPs with Omega-Regular Objectives*, AAAI Conference on Artificial Intelligence 2025 (**Outstanding Paper Award**)

Publicly available: <https://arxiv.org/abs/2412.12063>

Machine learning for program synthesis.....

- [3] Théo Matricon, Nathanaël Fijalkow, Guillaume Lagarde (by contributions). *Eco Search: A Constant-Delay Best-First Search Algorithm for Program Synthesis*, AAAI Conference on Artificial Intelligence 2025 (**Invited for Oral Presentation**)

Publicly available: <https://arxiv.org/abs/2412.17330>

- [4] Nathanaël Fijalkow, Guillaume Lagarde, Théo Matricon, Kevin Ellis, Pierre Ohlmann, Akarsh Potta (by contributions). *Scaling Neural Program Synthesis with Distribution-based Search*, AAAI Conference on Artificial Intelligence 2022 (**Invited for Oral Presentation**)

Publicly available: <https://www.aaai.org/AAAI22Papers/AAAI-5100.FijalkowN.pdf>

Logic and automata learning.....

- [5] Mojtaba Valizadeh, Nathanaël Fijalkow, Martin Berger (by contributions). *LTL learning on GPUs*, International Conference on Computer Aided Verification, CAV 2024

Publicly available: <https://arxiv.org/abs/2402.12373>

Invited talks

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

International conferences: ▷ **2024** Symposium on Games, Automata, Logics, and Formal Verification (declined) ▷ **2024** Jewels of Automata Theory ▷ **2019** Symposium on Games, Automata, Logics, and Formal Verification ▷ **2015** ESF AutoMathA conference

International workshops: ▷ **2025** Complexity, Algorithms, Automata and Logic Meet (declined) ▷ **2025** Viennese Conference on Optimal Control and Dynamic Games (declined) ▷ **2024** Machine

Learning and Theory Workshop in University of East Anglia (declined) ▷ **2024** Mediterranean Game Theory Symposium (declined) ▷ **2023** Workshop on Open Problems in Learning and Verification of Neural Networks (Wolverine, CAV satellite event) ▷ **2020** Coalgebraic Methods in Computer Science (CMCS, ETAPS satellite event) ▷ **2019** Games for Logic and Programming Languages (GaLoP, ETAPS satellite event) ▷ **2019** Complexity, Algorithms, Automata and Logic Meet (CAALM, Chennai) ▷ **2017** Logical Structures for Computation at the Simons Institute, Berkeley ▷ **2016** Collective Adaptive Systems Synthesis (Cassting, ETAPS satellite event)

Tutorials and research schools: ▷ **2024,2026** Symposium on Principles of Programming Languages (POPL) ▷ **2024** Plate-Forme Intelligence Artificielle (PFIA) ▷ **2023** World Symposium on Formal Methods (FM) ▷ **2022** French School for Young Researchers in Computer Science and Mathematics (EJCIM) ▷ **2020** European Conference on Artificial Intelligence (ECAI) ▷ **2019** ForMaL DigiCosme Spring School on Formal Methods and Machine Learning

Specialised workshops by invitation: ▷ **2023,2025** Dagstuhl Seminar: Approaches and Applications of Inductive Programming ▷ **2024** Dagstuhl Seminar: Artificial Intelligence and Formal Methods Join Forces for Reliable Autonomy ▷ **2023** Dagstuhl Seminar: Model Learning for Improved Trustworthiness in Autonomous Systems ▷ **2022** Dagstuhl Seminar: Finite Model Theory ▷ **2021** Dagstuhl Seminar: Unambiguity in Automata Theory ▷ **2021** Lorentz Center: Rigorous Automated Planning ▷ **2020** Barbados Bellairs Centre: Probabilistic Programming ▷ **2019** Dagstuhl Seminar: Logic and Learning ▷ **2019** Barbados Bellairs Centre: Logical Foundations for Data Science

Seminar talks: over 30 research groups across Europe

Professional service

Scientific Leadership.....

Head of National Thematic Year on Games

2025 – 2027

I am organising the national thematic year on Games, which will include several events / workshops to evaluate the place of games as a research topic in French academia.

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.

Principal Investigator of Research Grants.....

PEPR IA

4 years, 900k€

SAIF: Safe AI using Formal Methods

Sept. 2023 – Aug. 2027

IRP

5 years, 75k€

Le Trójkąt: Collaboration between Bordeaux, Paris, and Warsaw

Jan 2024 – Dec 2028

IEA

2 years, 14k€

WinCent: Applications of Program Synthesis

Jan 2022 – Dec 2024

ANR JCJC

4 years, 140k€

G4S: Games for Synthesis

Jan 2022 – Dec 2025

CNRS Momentum

3 years, 380k€

DeepSynth: Machine Learning Guided Program Synthesis

Jan 2019 – Dec 2021

Program Committees of International Conferences.....

▷ **2026** Symposium on Principles of Programming Languages (POPL) ▷ **2019, 2025** International Colloquium on Automata, Languages and Programming (ICALP) ▷ **2022 – 2025** International Conference on Artificial Intelligence (AAAI) ▷ **2024** International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI) ▷ **2023, 2024** International Joint Conference on Artificial Intelligence (IJCAI) ▷ **2023** International Conference on Quantitative Evaluation of SysTems (QEST) ▷ **2022** Computer Science in Russia (CSR) ▷ **2018, 2022** Mathematical Foundations of Computer Science (MFCS), ▷ **2019** International Conference on Reachability Problems (RP), ▷ **2019** Foundations of Software Systems and Computer Science (FoSSaCS), ▷ **2018, 2019** Highlights of Logic, Games and Automata (Highlights),

PhD Committees.....

▷ **2025** James Main, The Faces of Strategy Complexity (*University of Mons*) ▷ **2024** Nathanaël Beau, Python Code Generation from a Natural Language Description (*Formal Linguistics Lab, University of Paris Cité*) ▷ **2024** Mohamed Reda Marzouk, Intelligibilité des réseaux de neurons récurrents par des machines à états finis (*University of Nantes*) ▷ **2023** Nathan Thomasset, Strategy complexity for Gale-Stewart games (*LMF*) ▷ **2023** Soumyajit Paul, Games with imperfect information (*LaBRI*) ▷ **2023** Grégoire Menguy, Black-box analysis of binary code (*CEA List*) ▷ **2022** Cedric Koh, On Linear, Fractional and Submodular Optimization (*London School of Economics*) ▷ **2022** Xavier Badin de Montjoye, Strategy Improvement Method for Solving Simple Stochastic Games (*Université de Versailles Saint-Quentin-en-Yvelines*) ▷ **2019** Hugo Bazille, Detection and Quantification of Events in Stochastic Systems (*ENS Rennes*)

Co-Organisation of Scientific Events.....

▷ **2025** Theoretical Foundations of Trustworthy AI (*Simons Institute, Berkeley*) ▷ **2024** Program Synthesis Days (*LaBRI, Bordeaux*) ▷ **2024** Dagstuhl Seminar on Stochastic Games ▷ **2023** Dagstuhl Seminar on the Futures of Reactive Synthesis ▷ **2020** Learning and Verification day (*LaBRI, Bordeaux*) ▷ **2019** Learning and Verification day (*UCL, London*) ▷ **2018** 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*) ▷ **2015** Annual meeting of the GT ALGA (*IRIF, Paris*)

Reviewing activities.....

▷ **2025** ACM India Seminar Series (IndiCS) ▷ **2020,2024** Polish National Science Center (NCN) ▷ **2024** Indo-French Centre for the Promotion of Advanced Research (CEFIPRA) ▷ **2022,2024** Czech Science Foundation (GRIS) ▷ **2023** Gilles Kahn SIF PhD Prize (declined) ▷ **2021** Israeli Science Foundation (ISF)

Supervision.....

I have supervised **23** interns, **6** PhD students (all defended), **3** research engineers, and **4** postdocs.

Teaching

▷ **Since 2025** Large Language Models, Master Vision Apprentissage, MVA (24h) ▷ **Starting 2025** Stochastic Games, Parisian Master in Computer Science, MPRI (12h) ▷ **Since 2024** Theory and Practice of Machine Learning, IA Master in University of Bordeaux (24h) ▷ **2021 – 2024** Games Techniques in Computer Science, Parisian Master in Computer Science, MPRI (12h) ▷ **Since 2019** Theory and Practice of Reinforcement Learning, PhD Programme in LaBRI, Bordeaux (12h) ▷ **Since 2019** Reinforcement Learning, IA Master at ENSEIRB (18h)