

# Rémi Morvan

Database Researcher



“ After four years advancing database theory, I want to apply it to real-world systems. My short-term goal is to deepen my practical skills and industry knowledge of large-scale data systems, in order to build a research project deeply rooted in practical needs. ”

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## AWARDS

🏆 **DISTINGUISHED PAPER AWARD** at PODS '25 for *Minimization of Conjunctive Regular Path Queries*.

🏆 **SELECTED PAPER** at ICDT '23 for *Approximation and Semantic Tree-width of Conjunctive Regular Path Queries*.



## RESEARCH & ENGINEERING EXPERIENCE

since Oct. 2025 · **Freelance**

### SOFTWARE & RESEARCH ENGINEER

- Commissioned by the CNRS to develop *LaTeXML* 🐙. Perl TeX XML

Sept. 2021 – Aug. 2025 · **LaBRI, Université de Bordeaux**

### PH.D. RESEARCHER

- Research projects in **database theory** (graph database query optimization) and **automata theory** (model-checking of infinite structures). 6 publications and 24 seminars. query optimization
- **Main organiser** and founder of a **three-day workshop ATLAS '24** 📅. Member of the organising committee of several conferences. event organization
- **Supervisor** of two interns. student supervision



## TEACHING EXPERIENCE

Dec. 2025 – Feb. 2026 · **Lycée Montaigne** (Bordeaux)

### ORAL EXAMINER IN “PRÉPA” IN COMPUTER SCIENCE (14h)

C OCaml

June – July 2024 · **Bachelor 3 intern from ENS Ulm** (France)

### SUPERVISION OF ANTOINE CUVELIER

Bachelor thesis and six-week internship, on homomorphism problems on automatic structures.

Sep. 2023 – Aug. 2025 · **Bordeaux INP Enseirb-Matmeca** (Bordeaux, France)

### TEACHING ASSISTANT

- Functional Programming Project — Bachelor 3, 2024–25, 25h TypeScript
- Imperative Programming — Bachelor 3, 2024–25, 20h C
- Database Management Systems — Master 1, 2024–25, 20h PostgreSQL
- Database Management Systems — Master 1, 2023–24, 20h

May – July 2023 · **Master 1 intern from ENS Lyon** (France)

### SUPERVISION OF ARTHUR GALL

Three-month internship, co-supervised (remotely) with Nathanaël Fijalkow, on probabilistic automata.

Sep. 2021 – Aug. 2024 · **Université de Bordeaux** (Bordeaux, France)

### TEACHING ASSISTANT

- **Machine Learning & Deep Learning — Master 1 (AI track), 2023–24. 9h lecture + 9h exercise session. Creation of the course.** scikit-learn
- Programming Project — Bachelor 2, 2022–23, 32h C
- Automata Theory — Bachelor 3, 2022–23, 32h
- Computability and Complexity — Master 1, 2021–22, 28h
- Proofs & Logics — Bachelor 3, 2021–22, 24h Rocq
- Digital Literacy — Bachelor 1, 2021–22, 13h

Sep. 2020 – June 2021 · **Lycée Saint-Louis** (Paris)

### ORAL EXAMINER IN “PRÉPA” IN MATHEMATICS (59h)



## RESEARCH VISITS AND SELECTED EVENTS

May 2025 · **Research seminar** (Les Houches, France)

### FINITE AND ALGORITHMIC MODEL THEORY

Mar. 2024 · **Dagstuhl seminar** (Wadern, Germany)

### CATEGORIES FOR AUTOMATA AND LANGUAGE THEORY

Sep. 2023 · **Dagstuhl seminar** (Wadern, Germany)

### THE FUTURES OF REACTIVE SYNTHESIS

Feb. & May 2023 · **Uniwersytet Warszawski** (Warsaw, Poland)

### RESEARCH VISIT

Two two-week visits, hosted by Nathanaël Fijalkow.

- Oct. 2022 · **Pontificia Universidad Católica de Chile** (Santiago, Chile)  
**RESEARCH VISIT**  
One-month visit, hosted by Pablo Barceló and Miguel Romero.
- Feb. 2022 · **Dagstuhl seminar** (Wadern, Germany)  
**FINITE AND ALGORITHMIC MODEL THEORY**



## EDUCATION

- Sept. 2021 – Aug. 2025  
**Université de Bordeaux**  
**PH.D. IN COMPUTER SCIENCE**  
Title: *“Homomorphism Problems in Graph Databases and Automatic Structures”*.  
Supervised by Diego Figueira and Nathanaël Fijalkow (LaBRI, CNRS).  
Members of the jury:
  - Anca Muscholl: president
  - Mikołaj Bojańczyk: reviewer
  - Wim Martens: reviewer
  - Antoine Amarilli: examiner
  - Balder ten Cate: examiner
  - Bartek Klin: examiner
  - Sophie Tison: examiner
  - Diego Figueira: supervisor
  - Nathanaël Fijalkow: co-supervisor
- Sept. 2017 – Aug. 2021  
**École Normale Supérieure Paris-Saclay**  
**MASTER’S IN MATHEMATICS AND COMPUTER SCIENCE**
  - ENS Paris-Saclay diploma (civil-servant student) · 2021
  - Parisian Master of Computer Science** · Université Paris-Cité, 2021
  - “Agrégation” of Mathematics** & Master’s of Higher Education in Mathematics · Université Paris-Saclay, 2020
- Sept. 2015 – Aug. 2017  
**Lycée Saint-Louis**  
**UNDERGRADUATE STUDIES “PRÉPA”**



## SOFTWARE PROJECTS

- since May 2024  
**PYSEMIGROUP 2.0**  
Collaborative database project dedicated to **visualizing** and comparing research results in *automata theory*. I mostly dealt with **knowledge representation**. Project leader: Charles Paperman. **Python** **Pydantic** **FastAPI**
- since Feb. 2022  
**KNOWLEDGE-CLUSTERING**  
LaTeX command-line writing assistance tool. **Creator and main developer**.  
**Python** **Clustering** **Natural Language Processing** **LaTeX**
- 2018 – 2019  
**ATOMPYTHON**  
A platform for simulating double-auction markets to study the behaviour of artificial agents. Written in Python; supervised by Philippe Mathieu. **Python**  
**Multiagent systems**



## ASSOCIATIVE & ELECTORAL ENGAGEMENT

- Dec. 2023 – Aug. 2025  
**LaBRI**  
**MEMBER OF LABRI’S SCIENTIFIC COUNCIL**
- June 2023 – Aug. 2025  
**Université de Bordeaux**  
**SUBSTITUTE MEMBER OF THE COUNCIL OF THE STEM DEPARTMENT**
- July 2022 – June 2023  
**Université de Bordeaux**  
**SUBSTITUTE MEMBER OF THE COUNCIL OF THE DOCTORAL SCHOOL (EDMI)**
- Dec. 2021 – Nov. 2022  
**AFoDIB**  
**PRESIDENT** **event organization** **communication** **funding application**  
Association of Computer Science Ph.D. Students in Bordeaux. I was also **secretary** (Dec. 2020 – Nov. 2021) and **member of the board** (Dec. 2022 – Nov. 2023).

Sep. 2018 – Mar. 2019

La Cinquième Parallèle

**TREASURER**

LGBTIQ+ Student Association at ENS Paris-Saclay.



## SCIENTIFIC SERVICE

2026 – 2027

ICDT 2027

**MEMBER OF THE PROGRAM COMMITTEE**

Main conference of database theory in Europe (CORE rank A).

Sep. 2024

Highlights of Logic, Games and Automata 2024

**MEMBER OF THE ORGANIZING COMMITTEE**

SafeToc counsellor and co-organizer of the workshop on algebraic methods in automata theory.

Apr. 2024

ATLAS 24

**INITIATOR & CO-ORGANIZER**

Workshop on Automata, Transducers, Logic, Algebras & Semigroups. First edition of the workshop. 45 participants, 16 talks including two invited ones (Sreejith A V and Christof Löding). Co-organized with Thomas Colcombet, Hugo Bazille and Uli Fahrenberg.

Sep. 2023 – Aug. 2024

LX Seminar (Logical foundations of computing)

**CO-ORGANIZER**

Bimonthly one-hour seminar of the LX team. Co-organized with Guillaume Lagarde.

Sep. 2022 – June 2023

Games reading group

**ORGANIZER**

Weekly two-hour reading group on games, automata & logic in LaBRI.



## RESEARCH ETHICS & VALUES

Given the urgency of the climate crisis, I decided in 2021 (start of my Ph.D.) to only take the plane for *long-term visits* ( $\geq 1$  month) to countries inaccessible by train, and to limit the number of these visits. In particular, **I do not take the plane to go to conferences**—and I do not ask of my coauthors to take the plane in my stead.

As of 2022, I also decided **not to publish in for-profit publishers** (Springer, Elsevier, etc.), although I still occasionally accept to review for them.



## PUBLICATIONS

### IN PREPARATION

2026  
w/ Diego Figueira and Miguel Romero

In preparation; invited for publication at TheoretiCS

**Minimizing Conjunctive Regular Path Queries**

2026  
w/ Antoine Cuvelier

In preparation

**A Dichotomy Theorem for Automatic Structures**

2026

In preparation; journal version of CSL '25 article

**Relative Membership of Regular Languages**

### JOURNAL

2025  
w/ Diego Figueira

LMCS (Selected Papers of ICDT '23)

**Semantic Tree-Width and Path-Width of Conjunctive Regular Path Queries**

2019  
w/ Philippe Mathieu

Physica A: Statistical Mechanics and its Applications

**A deterministic behaviour for realistic price dynamics**

### CONFERENCES

- 2025

w/ Diego Figueira and Miguel Romero

**PODS '25**  
Minimizing Conjunctive Regular Path Queries
- 2025

**CSL '25**  
The Algebras for Automatic Relations
- 2023

w/ Pablo Barceló and Diego Figueira

**MFCS '23**  
Separating Automatic Relations
- 2023

w/ Diego Figueira

**ICDT '23**  
Approximation and Semantic Tree-width of Conjunctive Regular Path Queries
- 2022

w/ Marcin Jurdziński and K. S. Thejaswini

**Principles of Systems Design (Thomas Henzinger's Festschrift)**  
Universal Algorithms for Parity Games and Nested Fixpoints
- 2022

w/ Thomas Colcombet and Sam van Gool

**FoSSaCS '22**  
First-order separation over countable ordinals
- THESIS**
- 2025

**Ph.D. thesis**  
Homomorphism Problems in Graph Databases and Automatic Structures
- 2021

**Internship report, MPRI, École normale supérieure Paris-Saclay**  
First-order separation of transfinite regular languages



## TALKS

- 30/07/2025

online · 45min

**Relational AI**  
Homomorphisms Problems in Graph Databases and Automatic Structures, and Beyond
- 03/07/2025

Bordeaux · 45min

**PhD Defence**  
Homomorphisms Problems in Graph Databases and Automatic Structures
- 28/05/2025

Les Houches · 15min

**Finite Model Theory**  
Minimizing Conjunctive Regular Path Queries
- 31/03/2025

Dagstuhl · 25min

**Categories for Automata and Language Theory**  
Relative Membership of Regular Languages
- 14/02/2025

Amsterdam · 25min

**CSL '25**  
The Algebras for Automatic Relations
- 10/02/2025

Amsterdam · 15min

**LeaLog@CSL '25**  
Residual Probabilistic Automata
- 04/02/2025

Bordeaux · 50min

**RATIO seminar**  
Minimizing Conjunctive Regular Path Queries
- 20/09/2024

Bordeaux · 8min

**Highlights '24**  
Minimizing Conjunctive Regular Path Queries
- 25/04/2024

Rennes · 30min

**GT DAAL '24**  
The Algebras for Automatic Relations
- 08/03/2024

Paris · 50min

**SemAuto**  
Automatic relations through the prism of graph colourability and algebraic language theory
- 22/02/2024

Bordeaux · 50min


















**LX Seminar**  
Automatic relations through the prism of graph colourability and algebraic language theory
- 15/11/2023

Bordeaux · 30min

**Sémidoc**  
What's Your Thesis About? Abolishing Capitalism. (Popularization Talk)
- 28/08/2023

Bordeaux · 20min

**MFCS '23**  
Separating Automatic Relations, or: Graph Colouring for Impractical Mathematicians

 27/07/2023 Kassel · 10min	<b>Highlights '23</b> <b>Algebras for Regular Relations</b>
 25/06/2023 online/Boston · 20min	<b>Structure meets Power '23</b> <b>Algebras for Regular Relations</b>
 21/04/2023 Le Kremlin-Bicêtre · 20min	<b>GT DAAL '23</b> <b>Approximation and Semantic Tree-width of Conjunctive Regular Path Queries</b>
 29/03/2023 online/loannina · 25min	<b>ICDT '23</b> <b>Approximation and Semantic Tree-width of Conjunctive Regular Path Queries</b>
 12/01/2023 Marseille · 50min	<b>MoVe Seminar</b> <b>Approximation and Semantic Tree-width of Conjunctive Regular Path Queries</b>
 9/12/2022 Lille · 50min	<b>LINKS Seminar</b> <b>Approximation and Semantic Tree-width of Conjunctive Regular Path Queries</b>
 6/12/2022 Bordeaux · 50min	<b>M2F Seminar</b> <b>Approximation and Semantic Tree-width of Conjunctive Regular Path Queries</b>
 7/10/2022 Bordeaux · 8min	<b>Journée M2F</b> <b>Approximation and Semantic Tree-width of Conjunctive Regular Path Queries</b>
 1/07/2022 Paris · 8min	<b>Highlights '22</b> <b>Quantitative Algebraic Characterisations on Truly Infinite Words</b>
 8/06/2022 Nice · 25min	<b>EJCIM '22</b> <b>Quantitative Algebraic Characterisations on Truly Infinite Words</b>
 4/01/2022 online · 20min	<b>6th ANR Delta meeting</b> <b>Quantitative Algebraic Characterisations on Truly Infinite Words</b>
 5/04/2022 Munich · 25min	<b>FoSSaCS '22</b> <b>First-order Separation over Countable Ordinals</b>
 7/10/2021 Bordeaux · 50min	<b>LX Seminar</b> <b>First-order Separation over Countable Ordinals</b>
 3/09/2021 Paris · 20min	<b>M2 internship defense</b> <b>First-order Separation over Countable Ordinals</b>
13/02/2023 Paris · 50min	<b>Verification Seminar @ IRIF</b> <b>Universal Algorithms for Parity Games and Nested Fixpoints</b>
 28/06/2021 Paris · 20min	<b>5th ANR Delta meeting</b> <b>Universal Algorithms for Parity Games and Nested Fixpoints</b>
 16/09/2020 online · 5min	<b>Highlights '20</b> <b>Universal Algorithms for Parity Games and Nested Fixpoints</b>
 4/09/2019 Cachan · 20min	<b>M1 internship defense</b> <b>Universal Algorithms for Parity Games and Nested Fixpoints</b>