Antonio Casares

Postdoctoral Researcher in Theoretical Computer Science

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Birth date: 11 April 1997

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▬▬▬ Research Experience

Oct 2025 – Now	**PostDoc**, *Technical University of Kaiserslautern RPTU, (Germany)*. Supervisor: Anthony Lin.
Dec 2023 – Oct 2025	**PostDoc**, *University of Warsaw, (Poland)*. Supervisor: Mikołaj Bojańczyk.
Oct 2020 – Nov 2023	**PhD Thesis**, *LaBRI, Université de Bordeaux, (France)*. Title: *Structural properties of automata over infinite words and memory for games.* Supervisors: Nathanaël Fijalkow and Igor Walukiewicz. PhD Thesis Award "Science and Technology" from the University of Bordeaux.
April 2020 – July 2020	**Master Thesis**, *IRIF, Université de Paris, (France)*. Title: *Optimal transformations of Muller conditions.* Supervisors: Thomas Colcombet and Nathanaël Fijalkow.
Sept 2018 – July 2019	**Bachelor Thesis**, *Universidad de Valladolid, (Spain)*. Title: *Valuations, Hardy fields and o-minimal structures.* Supervisor: Fernando Sanz Sánchez.

▬▬▬ Education

2019 – 2020	**Master in Mathematical Logic and Foundations of Computer Science**, *Université de Paris, (France), Average grade: 19.26/20.* Supported by the Fondation Sciences Mathématiques de Paris.
2015 – 2019	**Bachelor in Mathematics**, *Universidad de Valladolid, (Spain)*, Average grade: 8.88/10. Premio Extraordinario Fin de Grado (Special award for the best student record).
2018 – 2019	**Erasmus exchange program**, *Université de Versailles, (France)*, Average grade: 18.74/20. Courses of the first year of master on algebra and cryptography.

▬▬▬ Publications

Book chapters

Scheduled for March 2026	**Positionality and Memory**, *in "Games on Graphs" (Cambridge University Press)*, with Pierre Ohlmann and Pierre Vandenhove, edited by Nathanaël Fijalkow. `https://arxiv.org/abs/2305.10546`

Journals

LMCS 2025 | **Characterising Memory in Infinite Games**, with Pierre Ohlmann.
https://lmcs.episciences.org/15411

TheoretiCS 2024 | **From Muller to Parity and Rabin Automata: Optimal Transformations Preserving (History) Determinism**, with Thomas Colcombet, Nathanaël Fijalkow and Karoliina Lehtinen.
https://theoretics.episciences.org/11336

LMCS 2024 | **Half-Positional Objectives Recognized by Deterministic Büchi Automata**, with Patricia Bouyer, Mickael Randour and Pierre Vandenhove.
https://lmcs.episciences.org/14130

Journal papers under review

TheoretiCS, Phase 2 | **Positional ω-regular languages**, with Pierre Ohlmann.
https://arxiv.org/abs/2401.15384

LMCS | **Infinite lexicographic products of positional objectives**, with Pierre Ohlmann, Michał Skrzypczak and Igor Walukiewicz.
https://arxiv.org/abs/2506.14544

Peer-reviewed international conferences

ICALP 2025 | **The memory of ω-regular and $\mathrm{BC}(\Sigma_2^0)$ objectives**, with Pierre Ohlmann.
https://arxiv.org/abs/2502.05840

CSL 2025 | **On the Minimisation of Deterministic and History-Deterministic Generalised (co)Büchi Automata**, with Olivier Idir, Denis Kuperberg, Corto Mascle and Aditya Prakash.
DOI: 10.4230/LIPIcs.CSL.2025.22

TACAS 2025 | **Fast value iteration: A uniform approach to efficient algorithms for energy games**, with Michaël Cadilhac and Pierre Ohlmann.
DOI: 0.1007/978-3-031-90653-4_16

LICS 2024 | **Positional ω-Regular Languages**, with Pierre Ohlmann.
https://antonio-casares.github.io/Publications/CO24-LICS-Positional.pdf

MFCS 2024 | **The Complexity of Simplifying ω-Automata through the Alternating Cycle Decomposition**, with Corto Mascle.
DOI: 10.4230/LIPIcs.MFCS.2024.35

SOSA 2024 | **Simple and Tight Complexity Lower Bounds for Solving Rabin Games**, with Marcin Pilipczuk, Michal Pilipczuk, Uéverton S. Souza, K. S. Thejaswini.
DOI: 10.1137/1.9781611977936.16

ICALP 2023 | **Characterising Memory in Infinite Games**, with Pierre Ohlmann.
DOI: 10.4230/LIPIcs.ICALP.2023.122

CONCUR 22, IJCAI 2023	**Half-Positional Objectives Recognized by Deterministic Büchi Automata**, with Patricia Bouyer, Mickael Randour and Pierre Vandenhove. DOI: 10.4230/LIPIcs.CONCUR.2022.20 ○ Invited for publication in LMCS special issue. ○ Invited for presentation at IJCAI 2023 (Best Papers from Sister Conferences Track). `https://www.ijcai.org/proceedings/2023/713`
ICALP 2022	**On the Size of Good-For-Games Rabin Automata and its Link with the Memory in Muller Games**, with Thomas Colcombet and Karoliina Lehtinen. DOI: 10.4230/LIPIcs.ICALP.2022.117
TACAS 2022	**Practical Applications of the Alternating Cycle Decomposition**, with Alexandre Duret-Lutz, Klara J. Meyer, Florian Renkin and Salomon Sickert. DOI: 10.1007/978-3-030-99527-0_6
CSL 2022	**On the Minimisation of Transition-Based Rabin Automata and the Chromatic Memory Requirements of Muller Conditions**. DOI: 10.4230/LIPIcs.CSL.2022.12 ○ Helena Rasiowa Award (Best Student Paper Award). ○ Invited for publication in LMCS special issue (declined).
ICALP 2021	**Optimal Transformations of Games and Automata using Muller Conditions**, with Thomas Colcombet and Nathanaël Fijalkow. DOI: 10.4230/LIPIcs.ICALP.2021.123

Other

Bulletin EATCS 2025	**Transition-based vs stated-based acceptance for automata over infinite words**, *(Survey, single author)*. `https://arxiv.org/abs/2508.15402` ○ Invited for presentation at the online FLAT seminar.

Preprints (unpublished)

2024	**A positional Π^3_0-complete objective**, with Pierre Ohlmann and Pierre Vandenhove. `https://arxiv.org/abs/2410.14688`

Papers in preparation

Layered Automata I: A canonical model for ω-regular languages, with Christof Löding and Igor Walukiewicz.

An automata model for the MSO-Borel theory of the full binary tree, with Mikołaj Bojańczyk, Sven Manthe and Paweł Parys.

Awards and Honours

Thesis Prize "Sciences and Technologies", *Award for excellent thesis dissertation*, Université de Bordeaux, 2024.

Helena Rasiowa Award for the Best Student Paper, CSL 2022.

Laureate of the *Paris Graduate School of Mathematics (PGSM)*, *Scholarship awarded by the Fondation Sciences Mathématiques de Paris*, 2019.

Premio extraordinario fin de grado, *Special award to the best record of the undergraduate degree*, Universidad de Valladolid, 2019.

Supervising activities

Sept 2024 - Sept 2025

Kacper Lewandowski. Master Thesis, *Topic: On the size of deterministic and history-deterministic automata*, (only supervisor).
University of Warsaw, Poland.

May 2025 - August 2025

Alan Le Brech. Two-month M1 internship, *Topic: Universal value-iteration algorithms*, (only supervisor).
University of Warsaw, Poland.

Oct 2023

Kacper Lewandowski. 3 weeks internship, *Topic: Lower bounds for energy-games algorithms*, (with Nathanaël Fijalkow and Pierre Vandenhove, 33% supervision).
LaBRI, Université de Bordeaux.

Talks

Invited talks, *in workshops and other events.*
- Online FLAT seminar, Dec 2025 – *Transition-based vs. state-based acceptance for automata over infinite words.*
- Young Research Forum (satellite of MFCS 2025), Warsaw, Aug 2025 – *How to write a good introduction.*
- Young Research Forum (satellite of MFCS 2025), Warsaw, Aug 2025 - *Panel member.*
- Day of the EDMI (Doctoral School in Mathematics and Computer Science) of Bordeaux, April 2025 – *Can we program using only `for` loops?*
- Talk for the Thesis Prize Ceremony of the University of Bordeaux, Nov 2024.

Seminar talks, *under invitation.*
- ISTA Viena, groups of T. Henzinger and K. Chatterjee (Austria), Oct 2025.
- MPI Kaiserslautern, group of Georg Zetzsche (Germany), April 2025.
- Automata Seminar, MIMUW, University of Warsaw (Poland), May 2025.
- Plume Team, LIP Lyon (France), Nov 2024.
- Automata Team, IRIF, Paris (France), Nov 2024.
- Pôle Modèles, LMF, Paris-Saclay (France), Oct 2024.
- Automata Seminar, MIMUW, University of Warsaw (Poland), Oct 2024.
- MOVE Team, LIS, Marseille (France), April 2024.
- Automata Seminar, MIMUW, University of Warsaw (Poland), Dec 2023.
- Automata Team, IRIF, Paris (France), Oct 2023.
- LX Team, LaBRI, Bordeaux (France), Sept 2023.
- Automata Seminar, MIMUW, University of Warsaw (Poland), Dec 2022.
- MOVE Team, LIS, Marseille (France), Dec 2021.
- LX Team, LaBRI, Bordeaux (France), Nov 2021.
- Hebrew University of Jerusalem, group of Orna Kupferman (Israel) (online), July 2021.
- Automata Team, IRIF, Paris (France), July 2021.
- Formal Methods Department, LaBRI, Bordeaux (France), Dec 2020.

Contributed talks at workshops.
- GT Verif, Créteil, (France), Nov 2025.
- Program Synthesis Days, LaBRI, Bordeaux (France), Nov 2024.
- ATLAS Workshop, Rennes (France), April 2024.
- GT DAAL Meeting, Rennes (France), April 2024.
- GT Verif, LaBRI, Bordeaux (France), July 2022.
- ANR Delta Meeting, CIRM, Marseille (France), May 2022.
- ANR Delta Meeting, IRIF, Paris (France), June 2021.
- GT ALGA, Online, June 2021.
- Spotlight on Games Workshop, Online, Nov 2020.

Conference talks.
- Highlights 2025, Saarbrücken (Germany).
- ICALP 2025, Aarhus (Denmark).
- LICS 2024, Tallin (Estonia).
- Highlights 2024, Bordeaux (France).
- MFCS 2024, Bratislava (Slovakia).
- Highlights 2023, Kassel (Germany).
- ICALP 2022, Paris (France).
- Highlights 2022, Paris (France).
- CSL 2022, Online.
- Highlights 2021, Online.
- ICALP 2021, Online.

Scientific outreach talks, (see also "Invited talks").
- PhD Student Seminar, Bordeaux (France), March 2023 – *Some logical paradoxes*.
- Student Seminar of the Toulouse Mathematics Institute (online), Feb 2021 – *The synthesis problem: from logic to games*.
- National Meeting of Mathematics Students (ENEM) (online), July 2020 – *Can we program using only `for` loops?*

▬▬▬▬▬ Organization of Scientific Events and Professional Activities

Oct 2021 – Now	**Publicity Chair of the International Conference "Highlights of Logic, Games and Automata"** *Member of the Steering Committee.*
Dec 2021 – Dec 2022	**Vice-president of the AFoDIB (PhD student association)** *LaBRI and INRIA, Bordeaux*, France.
Sept 2021 – Sept 2022	**Co-organizer of the Formal Methods and Models Seminar** *LaBRI, Bordeaux*, France.
Sept 2021 – Dec 2022	**Organizer of the Sémi-doc Seminar (PhD student seminar)** *LaBRI and INRIA, Bordeaux*, France.
Mars 2021 – Nov 2023	**Member of the board of the AFoDIB (PhD student association)** *LaBRI and INRIA, Bordeaux*, France.
Sept 2020	**Member of the Organizing Committee of Highlights of Logic, Games and Automata** *Online.*

Reviewing activities

Conferences	Reviewer for LICS (2021, 2022, 2024, 2025), ICALP (2024, 2025), CAV (2025), SODA (2025,2026), STACS (2022, 2023,2025), CSL (2026), MFCS (2021, 2022, 2024), FSTTCS (2021, 2022), FOSSACS (2023), LATIN (2024), DLT (2023), GandALF (2021).
Journals	Reviewer for LMCS (2024,2025), ToCL (2021).

Participation in invitation-based scientific events

Jan – May 2021	Simons Institute Spring 2021 research program "Theoretical Foundations of Computer Systems program" (online).
(Postponed)	Invitation of Bakh Khoussainov for a research stay in The University of Electronic Science and Technology of China (UESTC) to work in games on graphs.
Nov 2025	LOGALG workshop, TU Wien (Austria).
July 2025	Autobóz research camp (Grenaa, Denmark).
July 2024	Autobóz research camp (Keibu, Estonia).
Jun 2024	Dagstuhl Seminar "Stochastic Games".
Sept 2023	Dagstuhl Seminar "The Futures of Reactive Synthesis ".
July 2023	Autobóz research camp (Kassel, Germany).
April 2022	Nomad Automata Workshop (Hauteluce, France).
Nov 2021	Dagstuhl Seminar "Unambiguity in Automata Theory" (online participation).
Dec 2022	Visit to the automata team of MIMUW, University of Warsaw, Poland.
2021 – 2025	Frequent visits to the laboratories IRIF (Paris), and LIS (Marseille).

Teaching

April 2024	**Two invited lectures on Universal graphs for games**, *Bachelor Course "Algorithmic aspects of game theory"*. University of Warsaw, Poland.
Jan 2024	**Invited lecture on Positionality of parity games**, *Master Course "Advanced topics in automata"*. University of Warsaw, Poland.
Fall 2023	**Algorithmic Aspects of Game Theory (3rd-4th year bachelor)**, *Problem sessions*. University of Warsaw, Poland.
Fall 2022	**Programmation Impérative 1 (3rd year bachelor)**, *Teacher assistant*, 20 hours, Programming in C. ENSEIRB-MATMECA, Bordeaux INP, France.
Fall 2022	**Systèmes de Gestion de Bases de Données (4th year bachelor)**, *Teacher assistant*, 12 hours, Database modeling and SQL. ENSEIRB-MATMECA, Bordeaux INP, France.
Spring 2022	**Algorithmique des Tableaux (1st year bachelor)**, *Teacher assistant*, 32 hours, Sorting algorithms in Python. Université de Bordeaux, France.

Spring 2022	**Modèles de la Programmation et du Calcul (3rd year bachelor)**, *Teacher assistant*, 32 hours, Automata theory. Université de Bordeaux, France.
Spring 2021	**Modèles de la Programmation et du Calcul (3rd year bachelor)**, *Teacher assistant*, 32 hours, Automata theory. Université de Bordeaux, France.
Fall 2020	**Coloration Informatique (1st year bachelor)**, *Teacher assistant*, 32 hours, Programming project in Python. Université de Bordeaux, France.

Languages

- Spanish: Native
- English: Fluent
- French: Fluent
- Polish: Basic

Other Interests

Music (violin and piano, former member of several orchestras: OSiUP, JOUVA, BISYOC). Philosophy of science, language and the mind. Sports (ultimate frisbee and badminton). Dancing. Board games.