Antonio Casares

Postdoctoral Researcher in Theoretical Computer Science

✆ *+34 645 45 55 83*
✉ *antoniocasaressantos@gmail.com*
🖥 *antonio-casares.github.io/*
Birth date: 11 April 1997

Research Experience

Dec 2023 – Now	**PostDoc**, *University Warsaw, (Poland)*. Project: *Polynomial Finite State Computation*. Supervisor:Mikołaj Bojańczyk (University of Warsaw).
Oct 2020 – Nov 2023	**PhD Thesis**, *LaBRI, Université de Bordeaux, (France)*. Title: *Structural properties of automata over infinite words and memory for games*. Supervisors: Thomas Colcombet (IRIF, CNRS), Nathanaël Fijalkow (LaBRI, CNRS), Igor Walukiewicz (LaBRI, CNRS).
April 2020 – July 2020	**Master Thesis**, *IRIF, Université de Paris, (France)*. Title: *Optimal transformations of Muller conditions*. Supervisors: Thomas Colcombet (IRIF, CNRS), Nathanaël Fijalkow (LaBRI, CNRS).
Sept 2018 – July 2019	**Bachelor Thesis**, *Universidad de Valladolid, (Spain)*. Title: *Valuations, Hardy fields and o-minimal structures*. Supervisor: Fernando Sanz Sánchez (Universidad de Valladolid).

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 programme**, *Université de Versailles, (France)*, Average grade: 18.74/20. Last year of the Bachelor's degree. Courses of the first year of master on applied algebra.

Publications

Journals

TheoretiCS 2024	**From Muller to Parity and Rabin Automata: Optimal Transformations Preserving (History) Determinism**, with Thomas Colcombet, Nathanaël Fijalkow and Karoliina Lehtinen.
LMCS 2024	**Half-Positional Objectives Recognized by Deterministic Büchi Automata**, with Patricia Bouyer, Mickael Randour and Pierre Vandenhove. (To appear).

Conferences

LICS 2024	**Positional ω-Regular Languages**, with Pierre Ohlmann.

MFCS 2024	**The Complexity of Simplifying ω-Automata through the Alternating Cycle Decomposition**, with Corto Mascle.
SOSA 2024	**Simple and Tight Complexity Lower Bounds for Solving Rabin Games**, with Marcin Pilipczuk, Michal Pilipczuk, Uéverton S. Souza, K. S. Thejaswini.
ICALP 2023	**Characterising Memory in Infinite Games**, with Pierre Ohlmann.
CONCUR 2022, IJCAI 2023	**Half-Positional Objectives Recognized by Deterministic Büchi Automata**, with Patricia Bouyer, Mickael Randour and Pierre Vandenhove.

- Invited for publication in LMCS special issue.
- Invited for presentation at IJCAI 2023 (Best Papers from Sister Conferences Track).

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.
TACAS 2022	**Practical Applications of the Alternating Cycle Decomposition**, with Alexandre Duret-Lutz, Klara J. Meyer, Florian Renkin and Salomon Sickert.
CSL 2022	**On the Minimisation of Transition-Based Rabin Automata and the Chromatic Memory Requirements of Muller Conditions**.

- 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.

Preprints

2021	**On the ESL Algorithm for Energy Games**, with Pierre Ohlmann.

Talks

A characterisation of positionality for ω-regular languages.

- LICS 2024, Tallin (Estonia)
- Automata Seminar, MIMUW, University of Warsaw (Poland), Dec 2023
- Automata Seminar, IRIF, Paris (France), Oct 2023.
- Seminar LX Team, LaBRI, Bordeaux (France), Sept 2023.

State-based vs transition-based acceptance for ω-automata.

- GT DAAL Meeting, Rennes (France), April 2024.
- Seminar MOVE Team, LIS, Marseille (France), April 2024.

A correspondence between memory and automata for Muller languages.

- Automata Seminar, MIMUW, University of Warsaw (Poland), Dec 2022
- CSL 2022, (Online).
- Highlights 2021 (Online).
- Seminar MOVE Team, LIS, Marseille (France), Dec 2021.
- Seminar LX Team, LaBRI, Bordeaux (France), Nov 2021.

Half-positional objectives recognized by deterministic Büchi automata.

- Meeting GT Verif, LaBRI, Bordeaux (France), July 2022.
- ANR Delta Meeting, CIRM, Marseille (France), May 2022.

On the size of good-for-games Rabin automata and its link with the memory in Muller games.
- Highlights 2022, Paris (France).
- ICALP 2022, Paris (France).
- Seminar MOVE Team, LIS, Marseille (France), Dec 2021.

On the minimisation of transition-based Rabin automata.
- Seminar at the Hebrew University of Jerusalem (Isreal) (online), July 2021.
- ANR Delta Meeting, IRIF, Paris (France), June 2021.

Optimal transformations of games and automata using Muller conditions.
- ICALP 2021 (online).
- Automata Seminar, IRIF, Paris (France), July 2021.
- Formal Methods Seminar, LaBRI, Bordeaux (France), Dec 2020.
- Meeting GT ALGA (online), June 2021.

Some logical paradoxes.
- PhD Student Seminar, LaBRI, Bordeaux (France), March 2023.

The synthesis problem: from logic to games.
- Student Seminar of the Toulouse Mathematics Institute (online), Feb 2021.

Can we program using only `for` loops?.
- National Meeting of Mathematics Students (ENEM) (online), July 2020.

Organization of Scientific Events and Professional Activities

Oct 2021 – Now	**Publicity Chair of 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 ICALP (2024), LICS (2021, 2022, 2024), STACS (2022, 2023), MFCS (2021, 2022, 2024), FSTTCS (2021, 2022), FOSSACS (2023), LATIN (2024), DLT (2023), GandALF (2021).
Journals	Reviewer for LMCS (2024), ToCL (2021).

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 Award, 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 among the mathematics graduates of the year_, Universidad de Valladolid, 2019.

Teaching

Fall 2023
Algorithmic Aspects of Game Theory (3ʳᵈ-4ᵗʰ year bachelor), _Problem sessions + 2 lectures_.
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.