

# Nicolás Bitar

+ (33) 769147445  
✉ nicolas.bitar@upsaclay.fr  
🌐 www.lri.fr/~bittar

## Education

- 2021–2024 **PhD in Discrete Mathematics and Computer Science**, *Université Paris Saclay*,  
Expected June 2024, Supervisor: Nathalie Aubrun.
- 2020–2021 **Masters in Fundamental Mathematics**, *Université d'Aix-Marseille*.
- 2019–2020 **Masters in Engineering Science, Applied Mathematics**, *Universidad de Chile*.
- 2014–2019 **Civil Mathematical Engineering**, *Universidad de Chile*.
- 2017–2018 **Minor in Quantum Physics**, *Universidad de Chile*.
- 2014–2018 **Bachelor's degree in Engineering Sciences, mention in Mathematics**, *Universidad de Chile*.

## Publications

### Journals

- 2023 **Strongly Aperiodic SFTs on Generalized Baumslag-Solitar groups**,  
*Ergodic Theory and Dynamical Systems (to appear)*,  
N. Aubrun, N. Bitar, S. Huriot-Tattergrain.
- 2022 **Computational Complexity of Biased Diffusion-Limited Aggregation**,  
*SIAM Journal on Discrete Mathematics* 36(1):823-866,  
N. Bitar, E. Goles, P. Montealegre.

### Conference Proceedings

- 2024 **Contributions to the Domino Problem: Seeding, Recurrence and Satisfiability**,  
*41st International Symposium on Theoretical Aspects of Computer Science 2024*,  
N. Bitar.
- 2023 **Domino Snake Problems on Groups**,  
*International Symposium on Fundamentals of Computation Theory 2023*,  
N. Aubrun, N. Bitar.

### Book Chapters

- 2022 **Distortion in Automorphisms of Expansive Systems**,  
*Automata and Complexity: Essays Presented to Eric Goles on the Occasion of His 70th Birthday*,  
Springer,  
N. Bitar, S. Donoso, A. Maass.

### Pre-prints

- 2024 **Self-Avoiding Walks on Cayley Graphs Through the Lens of Symbolic Dynamics**,  
*arXiv Preprint*,  
N. Aubrun, N. Bitar.
- 2023 **Computability of Domino Snake Problems on Finitely Generated Groups**,  
*Submitted to a special issue of the Journal of Computer and System Sciences*,  
N. Aubrun, N. Bitar.

## Memoires

- 2021 **Domino Problem on Groups**, *Mémoire Master 2*, Aix-Marseille Université.
- 2020 **Contributions to the study of distortion in automorphism groups**, *Memoria Magíster en Ciencias de la Ingeniería, Mención Matemáticas Aplicadas*, Universidad de Chile.

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## Selected Talks & Presentations

- 03/2024 **Contributions to the Domino Problem: Seeding, Recurrence and Satisfiability**, *Clermont-Ferrand*,  
41st International Symposium on Theoretical Aspects of Computer Science 2024.
- 02/2024 **Snakes, SAWs and Symbolic Dynamics**, *CIRM, Marseille*,  
Complexity of Simple Dynamical Systems in honor of Jarkko Kari's 60th birthday.
- 02/2024 **Substitutions and Hierarchical Structures on Countable Groups**, *CIRM, Marseille*,  
Research School in Discrete Mathematics and Computer Science.
- 12/2023 **Caminos Autoevitantes desde la Dinámica Simbólica**, *Universidad de Chile*,  
XCI Encuentro Anual de la SOMACHI.
- 09/2023 **Domino Snake Problems on Groups**, *Université de Liège*,  
Séminaire des Mathématiques Discrètes.
- 09/2023 **Domino Snake Problems on Groups**, *Universität Trier*,  
24th International Symposium on Fundamentals of Computation Theory 2023.
- 08/2023 **Subshifts de Tipo Finito Aperiódicos para Grupos de Baumslag-Solitar Generalizados**,  
*Universidad Católica de Chile*,  
Seminario de Sistemas Dinámicos.
- 06/2023 **Dissecting the Infinite Domino Snake Problem**, *XLIM, Poitiers*,  
EJCIM 2023.
- 05/2023 **Subshifts of Finite Type on Groups - Emptiness and Aperiodicity**, *LISN, Gif-Sur-Yvette*,  
Journées des Doctorants 2023.
- 03/2023 **Realizability of Subgroups by SFTs**, *Institut de Mathématiques de Toulouse*,  
Journées sda2 2023.
- 03/2023 **The Domino Snake Problem**, *LIFO, Orléans*,  
Journées de l'ANR C\_SyDySi.
- 01/2023 **Symbolic dynamics on groups: Emptiness and Aperiodicity**, *IMJ-PRG, Paris*,  
Séminaire DGeCo.
- 10/2022 **Strongly Aperiodic SFTs on Generalized Baumslag-Solitar groups**, *LAMFA, Amiens*,  
Séminaire SymPA.
- 06/2022 **Strongly Aperiodic SFTs on Generalized Baumslag-Solitar groups**, *Université de Liège*,  
Journées sda2 2022.

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## Reviews

- 2023 **Mathematical Foundations of Computer Science (MFCS)**.
- 2019-2021 **International Journal of Modern Physics C**.

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## Teaching

Lecturer

- Fall 2023 **Linear algebra, normal forms and applications**, *Préparation à l'agrégation externe de Mathématiques d'Orsay et ENS Paris-Saclay, Option C: algèbre et calcul formel*, 6h.  
**Teaching Assistant**
- Spring 2023 **Introduction to Operating Systems and their Functioning**, *IUT d'Orsay*, TP, 1st year, 16h.  
**Introduction to Computer Architecture**, *IUT d'Orsay*, TP, 1st year, 16h.  
**Algorithms and Complexity**, *Polytech Paris-Saclay*, TD et TP, 2nd year, 28h.
- Spring 2022 **Sorting and Complexity**, *Préparation à l'agrégation externe de Mathématiques d'Orsay et ENS Paris-Saclay, Option C: algèbre et calcul formel*, TP, 6h.  
**Mathematics 1**, *Polytech Paris-Saclay*, TD, 1st year, 32h.  
**Introduction to Imperative Programming**, *Université Paris-Saclay*, TP, 1st year, 24h.
- Fall 2022 **Safety and Security**, *Université Paris-Saclay*, TD, 3rd year, 24h.
- Spring 2021 **Introduction to Imperative Programming**, *Université Paris-Saclay*, TD et TP, 1st year, 42h.
- Fall 2020 **Functional Analysis**, *Universidad de Chile*, Master 1, 32h.
- Fall 2019 **Complex Analysis and Special Functions**, *Universidad de Chile*, 3rd year, 32h.  
**Computability and Computational Complexity**, *Universidad de Chile*, Master 1, 32h.
- Spring 2017 **Abstract Algebra**, *Universidad de Chile*, 3rd year, 32h.
- Fall 2017 **Multivariable Calculus**, *Universidad de Chile*, 2nd year, 32h.
- Spring 2015 **Linear Algebra**, *Universidad de Chile*, 1st year, 32h.  
**Grader**
- Fall 2016 **Introduction to Algebra**, *Universidad de Chile*, 1st year, 32h.

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## Awards and Scholarships

- 2021 **PhD grant**, *Ecole Doctorale STIC*, Université Paris-Saclay.
- 2020 **Master 2 grant**, *Institut Archimède*, Aix-Marseille Université.
- 2019 **Romberg Grant for selected participants of the 7th Heidelberg Laureate Forum**, *Heidelberg University*.
- 2019 **CONYCIT Master Grant**, *Comisión Nacional de Investigación Científica y Tecnológica*, Chile.
- 2015–2018 **Outstanding student**, *Escuela de Ingeniería y Ciencias*, Universidad de Chile,  
 Awarded to exceptional pre-graduate students who have achieved remarkable performances on all their courses.
- 2014 **Andrés Bello Scholarship**, *Universidad de Chile*,  
 Awarded for outstanding admission score in the national selection test in Engineering.
- 2012 **Bronze Medal**, *Olimpiada Iberoamericana de Física*.

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## Certifications

- 2021 **24.09x: Minds and Machines**, *MITx, MIT, Cambridge*.
- 2020 **CS-191x: Quantum Mechanics and Quantum Computation**,  
*BerkeleyX, University of California, Berkeley*.
- 2019 **Heidelberg Laurate Forum**,  
*Participated on the Seventh Heidelberg Forum organized by the HLF foundation on the city of Heidelberg in Germany as one of the 200 students selected to participate.*

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## Miscellaneous

- Languages Spanish (maternal), English (fluent), French (fluent).
- Programming Unix, Python,  $\LaTeX$ , Sage, C++.
- Interests Running, Trail Running, Hiking, History, Literature, Philosophy, Music: I play both guitar and bass guitar.