

# Sebastián Andrés Barbieri Lemp

Associate Professor




## personal information


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Born August 1st 1989  
Chilean and Italian

## Research Interests


I am interested in dynamical systems and ergodic theory. Particularly in topics linking symbolic dynamics with group theory and computability.


## Research identifiers

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## SHORT RESUMÉ

2024–	<b>Associate professor</b> DMCC · Universidad de Santiago de Chile
2020–2023	<b>Assistant professor</b> DMCC · Universidad de Santiago de Chile
2019–2020	<b>Postdoctoral researcher</b> LABRI · Université de Bordeaux
2017–2019	<b>Postdoctoral fellow</b> DEPARTMENT OF MATHEMATICS · University of British Columbia
2014–2017	<b>PhD candidate</b> LIP · École normale supérieure de Lyon Thesis: Shift spaces on groups: computability and dynamics.
2008–2014	<b>Mathematical Engineering</b> DIM · Universidad de Chile

## RESEARCH GRANTS

2024–2027	<b>Fondecyt regular 1240085</b> PI · Symbolic dynamics on groups
2021–2023	<b>Fondecyt iniciación 11200037</b> PI · Computability and symbolic dynamics of group actions
2019–2022	<b>ANR-18-CE40-000</b> COLLABORATOR · Computer orbits for Discrete Dynamical Systems
2017–2021	<b>ANR-16-CE40-0005</b> COLLABORATOR · Computational and Combinatorial aspects of Symbolic Dynamics on Groups

## PUBLICATIONS IN JOURNALS

- [1] S. Barbieri, F. García-Ramos, and S. Taati. "Cellular automata, percolation and dynamical dichotomies". *Transactions of the American Mathematical Society* (to appear).
- [2] S. Barbieri and L. Poirier. "A remark on inverse limits of effective subshifts". *Bulletin of the London Mathematical Society* (to appear).
- [3] S. Barbieri, M. Sablik, and V. Salo. "Self-simulable groups". *Transactions of the American Mathematical Society* (to appear).
- [4] S. Barbieri, J. Kari, and V. Salo. "The group of reversible turing machines: subgroups, generators, and computability". *Forum of Mathematics. Sigma* 13 (2025), Paper No. e176.
- [5] S. Barbieri, N. Carrasco-Vargas, and C. Rojas. "Effective dynamical systems beyond dimension zero and factors of SFTs". *Ergodic Theory and Dynamical Systems* 45.5 (2025), pp. 1329–1369.
- [6] S. Barbieri and S. Labbé. "Indistinguishable asymptotic pairs and multidimensional Sturmian configurations". *Ergodic Theory and Dynamical Systems* 45.2 (2025), pp. 337–395.
- [7] S. Barbieri, M. Sablik, and V. Salo. "Soficity of free extensions of effective subshifts". *Discrete and Continuous Dynamical Systems* 45.4 (2025), pp. 1117–1149.
- [8] S. Barbieri, R. Bissacot, G. Dalle Vedove, and P. Thieullen. "Zero-temperature chaos in bidimensional models with finite-range potentials". *Advances in Mathematics* 457 (2024), pp. 109906, 1–51.
- [9] S. Barbieri. "Aperiodic subshifts of finite type on groups which are not finitely generated". *Proceedings of the American Mathematical Society* (2023).
- [10] S. Barbieri and T. Meyerovitch. "The Lanford-Ruelle theorem for actions of sofic groups". *Transactions of the American Mathematical Society* 376.2 (2023), pp. 1299–1342.
- [11] S. Barbieri, F. García-Ramos, and H. Li. "Markovian properties of continuous group actions: algebraic actions, entropy and the homoclinic group". *Advances in Mathematics* 397 (2022), pp. 108196, 1–52.
- [12] S. Barbieri. "On the entropies of subshifts of finite type on countable amenable groups". *Groups, Geometry, and Dynamics* 15.2 (2021), pp. 607–638.

- [13] S. Barbieri and F. García-Ramos. "A hierarchy of topological systems with completely positive entropy". *Journal d'Analyse Mathématique* 143.2 (2021), pp. 639–680.
- [14] S. Barbieri, R. Gómez, B. Marcus, T. Meyerovitch, and S. Taati. "Gibbsian representations of continuous specifications: the theorems of Kozlov and Sullivan revisited". *Communications in Mathematical Physics* 382.2 (2021), pp. 1111–1164.
- [15] S. Barbieri, S. Labbé, and Š. Starosta. "A characterization of Sturmian sequences by indistinguishable asymptotic pairs". *European Journal of Combinatorics* 95.103318 (2021), pp. 1–22.
- [16] S. Barbieri, R. Gómez, B. Marcus, and S. Taati. "Equivalence of relative Gibbs and relative equilibrium measures for actions of countable amenable groups". *Nonlinearity* 33.5 (2020), pp. 2409–2454.
- [17] N. Aubrun, S. Barbieri, and S. Thomassé. "Realization of aperiodic subshifts and uniform densities in groups". *Groups, Geometry, and Dynamics* 13.1 (2019), pp. 107–129.
- [18] S. Barbieri. "A geometric simulation theorem on direct products of finitely generated groups". *Discrete Analysis* (2019), Paper No. 9, 25.
- [19] S. Barbieri and M. Sablik. "A generalization of the simulation theorem for semidirect products". *Ergodic Theory and Dynamical Systems* 39.12 (2019), pp. 3185–3206.
- [20] N. Aubrun, S. Barbieri, and M. Sablik. "A notion of effectiveness for subshifts on finitely generated groups". *Theoretical Computer Science* 661 (2017), pp. 35–55.

## CONFERENCE PROCEEDINGS

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- [21] N. Aubrun, S. Barbieri, and E. Moutot. "The Domino Problem is Undecidable on Surface Groups". *44th International Symposium on Mathematical Foundations of Computer Science (MFCS 2019)*. Vol. 138. 2019, 46:1–46:14.
- [22] S. Barbieri, J. Kari, and V. Salo. "The Group of Reversible Turing Machines". *Cellular Automata and Discrete Complex Systems, Proceedings*. 2016, pp. 49–62.
- [23] S. Barbieri and M. Sablik. "The Domino Problem for Self-similar Structures". *Computability in Europe: Pursuit of the Universal, Proceedings*. 2016, pp. 205–214.

## BOOK CHAPTERS

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- [24] N. Aubrun, S. Barbieri, and E. Jeandel. "About the Domino Problem for Subshifts on Groups". en. *Sequences, Groups, and Number Theory*. Ed. by V. Berthé and M. Rigo. Trends in Mathematics. Cham: Springer International Publishing, 2018, pp. 331–389.

## PREPRINTS

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- [25] S. Barbieri and N. Bitar. "A general framework for quasi-isometries in symbolic dynamics beyond groups". *arXiv: 2504.05194* (2025).
- [26] S. Barbieri, K. Blot, M. Sablik, and V. Salo. "A geometric obstruction to self-simulation for groups". *arXiv: 2510.10291* (2025).
- [27] S. Barbieri, N. Carrasco-Vargas, and P. Rivera-Burgos. "The automorphism group of a strongly irreducible subshift on a group". *arXiv: 2501.14463* (2025).
- [28] S. Barbieri and N. Carrasco-Vargas. "Medvedev degrees of subshifts on groups". *arXiv: 2406.12777* (2024).

## ADMINISTRATIVE DUTIES

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2024–2021–	<b>Master committee member</b> · DMCC – USACH
2021–2025	<b>Outreach committee member</b> · FACULTY OF SCIENCE – USACH
2021–2024	<b>Subdirector of outreach</b> · DMCC – USACH
2021–2023	<b>Continuous studies committee member</b> · USACH
2015–2017	<b>Organizer of the DMCC colloquium</b> · DMCC – USACH
	<b>Organizer of the MC2 seminar</b> · ENS DE LYON

## COURSES TAUGHT

2025-II	<b>Measure theory</b> · MATHEMATICAL ENGINEERING – USACH
2025-I	<b>Abstract algebra</b> · MATHEMATICAL ENGINEERING – USACH
2025-I	<b>Group theory and cellular automata</b> · PHD PROGRAM – USACH
2024-II	<b>Functional analysis</b> · MATHEMATICAL ENGINEERING – USACH
2024-II	<b>Measures and functional analysis</b> · PHD PROGRAM – USACH
2024-I	<b>Functional analysis</b> · MATHEMATICAL ENGINEERING – USACH
2023-II	<b>Measure theory</b> · MATHEMATICAL ENGINEERING – USACH
2023-I	<b>Real analysis</b> · MATHEMATICAL ENGINEERING – USACH
2023-I	<b>Hyperbolic groups</b> · PHD PROGRAM – USACH
2022-II	<b>Measure theory</b> · MATHEMATICAL ENGINEERING – USACH
2022-I	<b>Abstract algebra</b> · MATHEMATICAL ENGINEERING – USACH
2022-I	<b>Dynamical systems</b> · PHD PROGRAM – USACH
2021-II	<b>Measure theory</b> · MATHEMATICAL ENGINEERING – USACH
2021-II	<b>Algorithmic group theory</b> · PHD PROGRAM – USACH
2021-I	<b>Real analysis</b> · MATHEMATICAL ENGINEERING – USACH
2021-I	<b>Ergodic theory for group actions</b> · PHD PROGRAM – USACH
2020-II	<b>Linear algebra</b> · MATHEMATICAL ENGINEERING – USACH
2020-I	<b>Real analysis</b> · MATHEMATICAL ENGINEERING – USACH
2018-II	<b>Differential calculus</b> · ECONOMY PROGRAM – UBC
2018-II	<b>Calculus III</b> · SCIENCE PROGRAM – UBC
2018-I	<b>Calculus II</b> · SCIENCE PROGRAM – UBC
2017-I	<b>Calculus II</b> · SCIENCE PROGRAM – UBC

## TUTORING

2025–	<b>Victor Valdebenito Silva</b> PHD PROGRAM · USACH Defense expected 2027
2024–2025	<b>Paul Toussaint Browne</b> MASTER PROGRAM – USACH · Thesis: Computability Notions for Quasi-isometries
2024–2024	<b>Leo Poirier</b> RESEARCH VISIT WITHIN M2 PROGRAM- ENS DE LYON ·
2022–2025	<b>Paola Rivera</b> · co-directed with <b>Cristóbal Rivas</b> PHD PROGRAM · USACH Thesis: Grupos de automorfismos y $G$ -subshifts.
2022–2024	<b>Nicanor Carrasco Vargas</b> · co-directed with <b>Cristóbal Rojas</b> PHD PROGRAM · PUC Thesis: Subshifts on groups and computable analysis
2022–2024	<b>Esteban Cifuentes Alvarado</b> MASTER PROGRAM · USACH Thesis: Problema 108 de Rufus Bowen

## NATURAL LANGUAGES

<b>Spanish</b>	mother tongue
<b>English</b>	● ● ● ● ●
<b>French</b>	● ● ● ● ●
<b>Italian</b>	● ● ● ● ●

## COMPUTER LANGUAGES

<b>LaTeX</b>	● ● ● ● ●
<b>Sage</b>	● ● ● ● ●
<b>Rust</b>	● ● ● ● ●
<b>Python</b>	● ● ● ● ●
<b>C++</b>	● ● ● ● ●

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