

Sebastián Barbieri

Employment and education

- 2024– **Associate professor**, *Departamento de Matemática y Ciencia de la Computación*, Universidad de Santiago de Chile.
- 2020–2023 **Assistant professor**, *Departamento de Matemática y Ciencia de la Computación*, Universidad de Santiago de Chile.
- 2019–2020 **Postdoctoral position**, *LaBRI, Université de Bordeaux*, under the supervision of Sébastien Labbé.
- 2017–2019 **Postdoctoral Fellow**, *Department of mathematics of the University of British Columbia*, under the supervision of Brian Marcus.
- 2014–2017 **PhD**, *École Normale Supérieure de Lyon*, under the supervision of Nathalie Aubrun and Stéphan Thomassé.
Title : *Shift spaces on groups: computability and dynamics*.
- 2014–2014 **Second semester of Master 2**, *École Normale Supérieure de Lyon*.
- 2008–2014 **Civil Mathematical Engineering**, *Universidad de Chile*.
- 2008–2013 **Bachelor's degree in engineering sciences, mention mathematics**, *Universidad de Chile*.

Publications

Journals

- [1] Sebastián Barbieri, Nicanor Carrasco-Vargas, and Cristóbal Rojas. Effective dynamical systems beyond dimension zero and factors of sfts. *Ergodic Theory and Dynamical Systems*, in early access.
- [2] Sebastián Barbieri and Sébastien Labbé. Indistinguishable asymptotic pairs and multidimensional sturmian configurations. *Ergodic Theory and Dynamical Systems*, in early access.
- [3] Sebastián Barbieri, Mathieu Sablik, and Ville Salo. Soficity of free extensions of effective subshifts. *Discrete and Continuous Dynamical Systems*, in early access.
- [4] Sebastián Barbieri, Rodrigo Bissacot, Gregório Dalle Vedove, and Philippe Thieullen. Zero-temperature chaos in bidimensional models with finite-range potentials. *Advances in Mathematics*, 457:109906, 2024.
- [5] Sebastián Barbieri. Aperiodic subshifts of finite type on groups which are not finitely generated. *Proceedings of the American Mathematical Society*, June 2023.
- [6] Sebastián Barbieri and Tom Meyerovitch. The Lanford-Ruelle theorem for actions of sofic groups. *Transactions of the American Mathematical Society*, 376(2):1299–1342, 2023.
- [7] Sebastián Barbieri, Felipe García-Ramos, and Hanfeng Li. Markovian properties of continuous group actions: algebraic actions, entropy and the homoclinic group. *Advances in Mathematics*, 397:108196, 1–52, 2022.
- [8] Sebastián Barbieri. On the entropies of subshifts of finite type on countable amenable groups. *Groups, Geometry, and Dynamics*, 15(2):607–638, 2021.

- [9] Sebastián Barbieri and Felipe García-Ramos. A hierarchy of topological systems with completely positive entropy. *Journal d'Analyse Mathématique*, 143(2):639–680, 2021.
- [10] Sebastián Barbieri, Ricardo Gómez, Brian Marcus, Tom Meyerovitch, and Siamak Taati. Gibbsian representations of continuous specifications: The theorems of kozlov and sullivan revisited. *Communications in Mathematical Physics*, 382(2):1111–1164, 2021.
- [11] Sebastián Barbieri, Sébastien Labbé, and Štěpán Starosta. A characterization of sturmian sequences by indistinguishable asymptotic pairs. *European Journal of Combinatorics*, 95:103318, 2021.
- [12] Sebastián Barbieri, Ricardo Gómez, Brian Marcus, and Siamak Taati. Equivalence of relative Gibbs and relative equilibrium measures for actions of countable amenable groups. *Nonlinearity*, 33(5):2409–2454, 2020.
- [13] Nathalie Aubrun, Sebastián Barbieri, and Stéphan Thomassé. Realization of aperiodic subshifts and uniform densities in groups. *Groups, Geometry, and Dynamics*, 13(1):107–129, 2019.
- [14] Sebastián Barbieri. A geometric simulation theorem on direct products of finitely generated groups. *Discrete Analysis*, 9:1–25, 2019.
- [15] Sebastián Barbieri and Mathieu Sablik. A generalization of the simulation theorem for semidirect products. *Ergodic Theory and Dynamical Systems*, 39(12):3185–3206, 2019.
- [16] Nathalie Aubrun, Sebastián Barbieri, and Mathieu Sablik. A notion of effectiveness for subshifts on finitely generated groups. *Theoretical Computer Science*, 661:35–55, 2017.
- Conference Proceedings**
- [17] Nathalie Aubrun, Sebastián Barbieri, and Etienne Moutot. The Domino Problem is Undecidable on Surface Groups. In *44th International Symposium on Mathematical Foundations of Computer Science (MFCS 2019)*, volume 138 of *Leibniz International Proceedings in Informatics (LIPIcs)*, pages 46:1–46:14, 2019.
- [18] Sebastián Barbieri, Jarkko Kari, and Ville Salo. The group of reversible Turing machines. In *Cellular Automata and Discrete Complex Systems*, pages 49–62. Springer International Publishing, 2016.
- [19] Sebastián Barbieri and Mathieu Sablik. The domino problem for self-similar structures. In *Pursuit of the Universal*, pages 205–214. Springer International Publishing, 2016.
- Book Chapters**
- [20] Nathalie Aubrun, Sebastián Barbieri, and Emmanuel Jeandel. About the domino problem for subshifts on groups. In *Sequences, Groups, and Number Theory*, pages 331–389. Springer International Publishing, 2018.
- Preprints**
- [21] Sebastián Barbieri, Felipe García-Ramos, and Siamak Taati. Cellular automata, percolation and dynamical dichotomies. *arxiv:2410.23770*, 2024.
- [22] Sebastián Barbieri and Nicanor Carrasco-Vargas. Medvedev degrees of subshifts on groups. *arXiv:2406.12777*, 2024.
- [23] Sebastián Barbieri, Jarkko Kari, and Ville Salo. The group of reversible turing machines: subgroups, generators and computability. *arXiv:2303.17270*, 2023.
- [24] Sebastián Barbieri, Mathieu Sablik, and Ville Salo. Groups with self-simulable zero-dimensional dynamics. *arXiv:2104.05141*, 2021.

Thesis and Memoires

- [25] Sebastián Barbieri. *Shift spaces on groups : computability and dynamics*. Theses, Université de Lyon, June 2017.
- [26] Sebastián Barbieri. Subshifts generados por sustituciones multidimensionales. *Memoria Ingeniería Universidad de Chile*, 2014.
- [27] Sebastián Barbieri. Tilings on different structures: exploration towards two problems. *Memoire M2 ENS de Lyon*, 2014.

Teaching

Course lecture notes:

Álgebra III, Lecture notes on linear algebra [spanish], [\[PDF\]](#).

Análisis I, Lecture notes on real analysis [spanish], [\[PDF\]](#).

Courses:

- 2024-2 **Functional analysis**, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2024-2 **Measure theory and functional analysis**, 3h weekly [PhD course, in spanish], Universidad de Santiago de Chile.
- 2024-1 **Functional analysis**, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2023-2 **Análisis II (measure theory)**, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2023-1 **Hyperbolic groups**, Mar 15 - Jul 31, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2023-1 **Análisis I (real analysis)**, Mar 15 - Jul 31, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2022-2 **Análisis II (measure theory)**, Aug 15 - Dec 23, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2022-1 **Abstract algebra**, Mar 14 - Jul 08, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2022-1 **Dynamical systems and symbolic dynamics**, Mar 14 - Jul 08, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2021-2 **Symbolic dynamics and algorithmic group theory**, Aug 23 - Dec 10, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2021-2 **Análisis II (measure theory)**, Sep 20 - Jan 31, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2021-1 **Ergodic theory of group actions**, Mar 22 - Aug 30, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2021-1 **Análisis I (real analysis)**, Apr 12 - Aug 30, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2020-2 **Álgebra III (linear algebra)**, Oct 12 - Feb 30, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2020-1 **Análisis I (real analysis)**, Aug 01 - Sep 26, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2018-1 **MATH200**, *Calculus III*, Sep 04 - Nov 30, 3h weekly [english], University of British Columbia.
- 2018-1 **MATH104**, *Differential Calculus with Applications to Commerce and Social Sciences.*, Sep 04 - Nov 30, 3h weekly [english], University of British Columbia.
- 2018-3 **MATH253**, *Multivariable Calculus*, May 14 - Jun 21, 7h weekly [english], University of British Columbia.

2017-1 **MATH253**, *Multivariable Calculus*, Sep 05 - Dec 01, 3h weekly [english], University of British Columbia.

Teaching Assistantships

2019-1 **Coloration Informatique**, *TPL1*, 40h [french], Université de Bordeaux.

2017-1 **Logic**, *TDL3*, 32h [french], ENS de Lyon.

2016-2 **LIFAP1 Programming on C++**, *TPL1*, 24h [french], Université Lyon 1.

2016-1 **Foundations of Informatics**, *TDL3*, 32h [french], ENS de Lyon.

2016-1 **Optimization**, *TDM1*, 28h [english], ENS de Lyon.

2015-2 **Computer architecture**, *TPL2*, 22h [french], Université Lyon 1.

2015-2 **ACM**, *TPL3* 48h [french], ENS de Lyon.

2013-2 **Dinámica simbólica**, 21h [spanish], Universidad de Chile.

2013-1 **Teoría de la información**, 21h [spanish], Universidad de Chile.

2013-1 **Combinatoria**, 21h [spanish], Universidad de Chile.

2012-2 **Teoría de juegos**, 21h [spanish], Universidad de Chile.

2011-1 **Ecuaciones diferenciales ordinarias**, 42h [spanish], Universidad de Chile.

2010-2 **Álgebra lineal**, 21h [spanish], Universidad de Chile.

Awards and scholarships

2013 **Honorable Mention in ACM IPCP world finals**, *Saint Petersburg, Russia*.

2012 **First place in ACM IPCP - Latin America Programming Contest Chile**, *Valparaíso*.

2008-2012 **Outstanding student**, *Universidad de Chile*, 2008, 2009, 2010, 2011, 2012.

2007 **Andrés Bello scholarship for the best admission score in the national selection test in Engineering**, *Universidad de Chile*.

Responsibilities

2021- **Subdirector of outreach (vinculación con el medio)**.

2020 **Co-organizer of the EJCIM school**, [[webpage](#)] .

2017 **Co-organizer of the EJCIM school**, [[webpage](#)] .

2015-2017 **Organizer of the MC2 seminar in the LIP of ENS de LYON**.

2016 **Co-organizer of the SDA2 group workshop**.

Mini courses

01/2018 **UNAM, Mexico**, *Winter school on dynamics and groups*, Symbolic dynamics on groups, [[webpage](#)],[[PDF1](#)],[[PDF2](#)],[[PDF3](#)],[[PDF4](#)].

Other

2018-2022 French "qualification MCF" in sections 25 and 27.

2015-2020 I contributed problems each year for the Chilean computer science olympiads, [[LINK](#)].

2014-2017 I participated in MATH.en.JEANS to encourage research in young people.

Languages

Spanish (native), English (fluent), French (fluent) and Italian (intermediate).

C, C++, Java, Python, Sage.