

Sebastián Barbieri

Employment and education

- 2020– **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 and Felipe García-Ramos. A hierarchy of topological systems with completely positive entropy. *Journal d'Analyse Mathématique*, in press.
- [2] Sebastián Barbieri. On the entropies of subshifts of finite type on countable amenable groups. *Groups, Geometry and Dynamics*, in press.
- [3] 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.
- [4] Sebastián Barbieri, Sébastien Labbé, and Štěpán Starosta. A characterization of Sturmian sequences by indistinguishable asymptotic pairs. *European Journal of Combinatorics*, 95:103318, 2021.
- [5] 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.
- [6] 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.
- [7] Sebastián Barbieri. A geometric simulation theorem on direct products of finitely generated groups. *Discrete Analysis*, 9:25, 2019.
- [8] Sebastián Barbieri and Mathieu Sablik. A generalization of the simulation theorem for semidirect products. *Ergodic Theory and Dynamical Systems*, 39(12):3185–3206, 2019.
- [9] 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

- [10] 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.
- [11] 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.
- [12] 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

- [13] 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

- [14] Sebastián Barbieri, Mathieu Sablik, and Ville Salo. Groups with self-simulable zero-dimensional dynamics. *arXiv:2104.05141*, 2021.
- [15] Sebastián Barbieri, Felipe García-Ramos, and Hanfeng Li. Markovian properties of continuous group actions: algebraic actions, entropy and the homoclinic group. *arXiv:1911.00785*, 2019.

Thesis and Memoires

- [16] Sebastián Barbieri. *Shift spaces on groups : computability and dynamics*. Theses, Université de Lyon, June 2017.
- [17] Sebastián Barbieri. Subshifts generados por sustituciones multidimensionales. *Memoria Ingeniería Universidad de Chile*, 2014.
- [18] 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], [\[PDF\]](#).

Lectures:

- 2021-1 **Ergodic theory of group actions**, Mar 22 - Aug 30, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2021-1 **Análisis I**, Apr 12 - Aug 30, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2020-2 **Álgebra III**, Oct 12 - Feb 30, 3h weekly [spanish], Universidad de Santiago de Chile.
- 2020-1 **Análisis I**, 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].

Talks with slides or videos

- 04/2021 **Séminaire TEICH Marseille**, *Self-simulable groups*, [PDF].
- 10/2020 **Seminario de Grupos y Geometría**, *Acciones calculables de grupos y su dinámica [in spanish]*, [PDF].
- 06/2020 **Seminario de sistemas dinámicos de Santiago**, *On the relation between topological entropy and asymptotic pairs*, [PDF].
- 05/2020 **One day online session for symbolic dynamics**, *Topological Markov properties*, [PDF][VIDEO].
- 05/2019 **Symbolic Dynamical Systems, Oaxaca**, *Topological entropies of subshifts of finite type in countable amenable groups*, [PDF][VIDEO].

- 12/2018 **Conference on Computability, Complexity and Randomness**, *The domino problem for word-hyperbolic groups*, [\[PDF\]](#).
- 03/2018 **Algorithmic questions in dynamical systems, Toulouse**, *A strongly aperiodic SFT in the Grigorchuk group*, [\[PDF\]](#).
- 06/2017 **Pingree Park, Colorado**, *A strongly aperiodic SFT in the Grigorchuk group*, [\[PDF\]](#).
- 06/2017 **PhD defense, ENS de Lyon**, *Shift spaces on groups: computability and dynamics*, [\[PDF\]](#).
- 06/2017 **Workshop dyadisc, Amiens**, *Realizability of non-expansive dynamics and applications*, [\[PDF\]](#).
- 05/2017 **Séminaire Automata IRIF, Paris**, *Symbolic dynamics and simulation theorems*, [\[PDF\]](#).
- 04/2017 **Séminaire Ernest, Marseille**, *Strongly aperiodic subshifts in countable groups*, [\[PDF\]](#).
- 03/2017 **Séminaire de combinatoire et théorie des nombres, Lyon**, *Strongly aperiodic subshifts in countable groups*, [\[PDF\]](#).
- 03/2017 **Wroclaw**, *The torsion problem for the automorphism group of a full \mathbb{Z}^d -shift and its topological fullgroup*, [\[PDF\]](#).
- 12/2016 **CMM, Santiago**, *The group of reversible Turing machines and the torsion problem for $\text{Aut}(\mathcal{A}^{\mathbb{Z}^d})$ and related topological fullgroups*, [\[PDF\]](#).
- 06/2016 **CIE, Paris**, *The domino problem for self-similar structures*, [\[PDF\]](#).
- 06/2016 **AUTOMATA, University of Zurich**, *The group of reversible Turing machines*, [\[PDF\]](#).
- 05/2016 **Interactions, ENS de Lyon**, *Une courte preuve de l'existence des subshifts fortement aperiodiques sur les groupes dénombrables*, [\[PDF\]](#).
- 03/2016 **Séminaire de la détente mathématique, ENS de Lyon**, *Que pensent les mosaïques de la monotonie ?*, [\[PDF\]](#).
- 01/2016 **Séminaire LAMA, Chambéry**, *A short proof of the existence of non-empty strongly aperiodic subshifts over $\{0, 1\}$ in countable groups*, [\[PDF\]](#).
- 12/2015 **Séminaire LAMFA, Amiens**, *A short proof of the existence of non-empty strongly aperiodic subshifts over $\{0, 1\}$ in countable groups*, [\[PDF\]](#).
- 11/2015 **Séminaire LACL, Paris-est Creteil**, *The domino problem for structures between \mathbb{Z} and \mathbb{Z}^2* , [\[PDF\]](#).
- 10/2015 **Turku Seminar**, *The domino problem for structures between \mathbb{Z} and \mathbb{Z}^2* , [\[PDF\]](#).
- 10/2015 **Séminaire Combinatoire et Algorithmes de Rouen**, *Subshifts in groups: From square-free words on graphs to aperiodic subshifts*, [\[PDF\]](#).
- 04/2015 **Journées Calculabilités Fontainebleau**, *Effectiveness and aperiodicity of subshifts*, [\[PDF\]](#).
- 04/2015 **EJCIM**, *Effective subshifts in finitely generated groups*, [\[PDF\]](#).
- 11/2014 **LIAFA**, *Effectiveness in finitely generated groups*, [\[PDF\]](#).

Other

- 2019 I was interviewed (audition) in the "concours CNRS section 41/04"
- 2018–2022 French "qualification MCF" in sections 25 and 27.
- 2015–present I contribute 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.

Last updated: April 23, 2021