

Christopher Cabezas

Curriculum Vitæ

Department of Mathematics
Université de Liège
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Personal Information

Date of Birth 09/08/1993.
Place of Birth Santiago, Chili.
Citizenship Chilean.
Civil status Married.

Education

- 13/09/2022 **Ph.D in Mathematics**, *Université de Picardie Jules Verne*, France.
Thesis advisor: Samuel Petite.
Thesis title: Sur l'étude des homomorphismes entre \mathbb{Z}^d -systèmes dynamiques topologiques.
Funding: Centre National de la Recherche Scientifique (CNRS).
- 21/05/2019 **Master 2 in Fundamental Mathematics**, *Sorbonne Université*, France.
Thesis advisor: Carlos Matheus.
Thesis title: Anosov mapping class actions on the $SU(2)$ -representation variety of a punctured torus.
Funding: Fondation Sciences Mathématiques de Paris (FSMP).
- 17/04/2018 **Master of Science in Engineering (Mention in Applied Mathematics)**, *Universidad de Chile*, Chili.
Thesis advisor: Alejandro Maass and Sebastian Donoso.
Thesis title: Cubos dinámicos direccionales para \mathbb{Z}^d -sistemas minimales.
Funding: Center for Mathematical Modeling (CMM).
- 17/04/2018 **Professional Title in Mathematical Engineering (Double degree)**, *Universidad de Chile*, Chili.
- 22/01/2016 **Bachelor of Engineering Science in Mathematics**, *Universidad de Chile*, Chili.

Research interests

My research interests are mainly centered in multidimensional symbolic dynamics (especifically minimal Cantor systems), topological dynamics and ergodic theory and its interactions with different fields of mathamtics, such as automata theory, combinatorics on words, finite geometry, fractal geometry, and number theory.

Professional Experience

- 01/11/2022 - **Postdoc researcher**, *Department of Mathematics, Université de Liège*, Belgium.
31/10/2024 Supervisor: Julien Leroy.
Funding: Subside Fédéral à la Recherche - IPD-STEMA 2022.

- 05/03/2018 - **Research Assistant**, *Universidad de Chile*, Chile.
 24/08/2018 Supervisor: Sebastian Donoso
 Funding: Fondecyt Project 11160061.
- 05/03/2018 - **Teaching tutor in Taller Los Dos Relojes**, *Universidad de Chile*, Chile.
 24/08/2018 Description: Study support for first and second-year students.
- 11/07/2016 - **Professional Internship**, *Universidad de O'Higgins*, Chile.
 19/08/2016 Supervisor: Felipe Alvarez.
 Description: Design of final projects for students of the course IN1000 Precalculus.
- 04/01/2016 - **Research Assistant/Professional Internship**, *Center for Mathematical Modeling*, Chile.
 29/01/2016 Supervisor: Hector Ramirez.
 Description: Conduct studies on observability applied to biofuels.
 Funding: Basal project PFB-03 (Conicyt).
- 05/01/2015 - **Research Assistant/Professional Internship**, *Centre for Advanced Research in Education (CIAE) Universidad de Chile*, Chile.
 30/01/2015 Supervisor: Pablo Dartnell and David Gomez.
 Description: Design and execution of an experiment on mathematical cognition.
 Funding: Fondef Project D11I1009.

List of Publications

Link to all published publications: <https://christophercabezas.github.io/publications/>

1. C. Cabezas, and J. Leroy. Decidability of the isomorphism problem between multidimensional constant-shape substitutive subshifts. *arXiv preprint arXiv: 2403.11357*, 2024.
2. C. Cabezas, and S. Petite. Large normalizers of \mathbb{Z}^d -odometers systems and realization on substitutive subshifts. *Discrete Contin. Dyn. Syst.*, 2024. <https://doi.org/10.3934/dcds.2024080>
3. C. Cabezas. Homomorphisms between multidimensional constant-shape substitutions. *Groups Geom. Dyn.*, 17(4):1259–1323, 2023.
4. C. Cabezas, S. Donoso, and A. Maass. Directional dynamical cubes for minimal \mathbb{Z}^d -systems. *Ergodic Theory Dynam. Systems*, 40(12):3257–3295, 2020.

In preparation

1. N. Bitar, C. Cabezas, and P. Guillon. Substitutions and Hierarchical Structures in Groups.
2. C. Cabezas, J. Leroy. Multidimensional automatic sequences.
3. C. Cabezas, B. Espinoza, J. Leroy. Dynamics of dendric shift spaces.
4. C. Cabezas, B. Espinoza, J. Gomez, J. N. Jones-Baro. Stabilized automorphism of higher-dimensional systems.

Presentations

Talks

- 16/06/2024 Numeration 2024, Utrecht University, Utrecht, Holland.

- 16/05/2024 Dynamics on zero-dimensional spaces: new connections, Lorentz Center, Leiden, Holland. **Invited speaker.**
- 02/04/2024 Multidimensional symbolic dynamics and lattice models of quasicrystals, CIRM, Marseille, France.
- 20/02/2024 One World Combinatorics on Words Seminar.
- 12/02/2024 Discrete Mathematics & Computer Science: Groups, Dynamics, Complexity, Words. Week 3: "Complexity of Simple Dynamical Systems", CIRM, Marseille, France. **Invited speaker.**
- 06/02/2024 Discrete Mathematics & Computer Science: Groups, Dynamics, Complexity, Words. Week 2: "GAGTA, Geometric and Asymptotic Group Theory with Applications", CIRM, Marseille, France.
- 05/07/2023 Dyadisc 6: Dynamics on the Cantor set and applications, Université de Picardie Jules Verne, Amiens, France. **Invited speaker.**
- 02/12/2022 Rencontre Pytheas Fogg: Décidabilité de l'apériodicité d'un pavage substitutif 2D, Université Aix-Marseille, Marseille, France.
- 02/12/2022 Rauzy Seminar, Université Aix-Marseille, Marseille, France.
- 18/06/2022 36th Summer Topology Conference. Tiling Spaces Section, University of Vienna, Vienna, Austria.
- 13/06/2022 Journées SDA2 2022: Systèmes Dynamiques, Automates and Algorithmes, Université de Liège, Liège, Belgium.
- 23/05/2022 Dynamical Systems Seminar in Santiago, Universidad de Chile, Santiago, Chili.
- 18/10/2021 Extended Symmetries in Symbolic Dynamics, Bielefeld University, Bielefeld, Germany. **Invited speaker.**
- 28/09/2021 Journées annuelles du GDR AMA, IGESA, Porquerolles, France.
- 21/09/2021 Séminaire de mathématiques discrètes de l'Université de Liège, Liège, Belgium.
- 13/01/2021 Invariants combinatoires et algébriques des décalages et des pavages, CIRM, Marseille, France. **Invited speaker.**
- 04/12/2020 Journées SDA2 2020, Organized by GREYC of Université de Caen Normandie, Caen, France, Online presentation.
- 05/12/2017 First Encounter of Graduate Students in Mathematics (PostMat 2017), Universidad de Chile, Santiago, Chili.

Posters

- 14/08/2024 Algebra, Analysis, and Aperiodic Order, Bielefeld, Germany.
- 08/07/2021 Dyadisc4: Dynamique et Analyse Discrète: problèmes ouverts en dynamique de faible complexité, Amiens, France.

Research Visits

28/11/2022 - Pierre Guillon, Chargé de recherche. Université Aix-Marseille, Marseille, France.
02/12/2023

28/02/2022 - Sebastian Donoso, Assistant Professor, Universidad de Chile, Santiago, Chili.
27/05/2022

18/10/2021 - Michael Baake, Full Professor, Bielefeld University, Bielefeld, Germany.
22/10/2021

20/09/2021 - Julien Leroy, Assistant Professor, Université de Liège, Liège, Belgium.
23/09/2021

Organization and Evaluation in Scientific Aspects

15/02/2023 - **Organizer of the Discrete Mathematics Seminar**, *Université de Liège*, Liège, Belgium.
20/06/2024

03/03/2023 - **Reviewer board**, *Conference: WORDS 2023*.
27/03/2023

18/12/2019 - **External Peer Review: Internal Research Projects**, *Universidad Autónoma de Chile*,
05/01/2020 Santiago, Chili.

Prizes and Awards

20/11/2023 **Postdoctoral Fellowship**, *CMM*, Universidad de Chile, Santiago, Chili..

05/05/2022 **Postdoctoral Fellowship**, *IPD-STEMA 2022*, Université de Liège, Liège, Belgium.

04/07/2022 - **Member of the ANR IZES Project**, *Coordinator: Fabien Durand*.
Present

15/01/2022 **Travel Grant**, (1000 €) *Project ECOS SUD (projet ACEDic C21E04)*.

20/02/2020 **Travel Grant**, (1950 €). *Project S2R Mobilité*, Université de Picardie Jules Verne, Amiens, France, Used in 2021 due to the pandemic.

28/06/2019 **PhD Fellowship**, *UMR7352-CHRCAL-001*, CNRS, Amiens, France.

12/03/2018 **Master Fellowship**, *PGSM program*, Fondation Sciences Mathématiques de Paris, Paris, France.

24/01/2017 **Master Fellowship**, *CMM Excellence Scholarship*, Universidad de Chile, Santiago, Chili.

25/11/2016 **Summer School Fellowship**, *Instituto Nacional de Matemática Pura e Aplicada (IMPA)*, Rio de Janeiro, Brazil.

16/12/2012 - **Distinction**, *Outstanding Student*, 2012, 2013, 2015, 2016, 2017.
27/03/2018

10/02/2012 **Undergraduate Fellowship**, *Beca Bicentenario*, Financed by the Ministry of Education, Chili.

21/11/2011 **Gold Medal**, *National Physics Olympiad*, Chili.

01/10/2011 **Honorable Mention**, *Iberoamerican Physics Olympiad*, Guayaquil, Ecuador.

Attended scientific venues

Conference: Thematic Month Discrete Mathematics & Computer Science: Groups, Dynamics, Complexity, Words; 29 January – 1st March, 2024, CIRM, Marseille, France.

Conference: Numeration 2023, 22 - 25 May 2023, Liège, Belgium.

Conference: Journées SDA2 2023, 29 - 31 March 2023, Toulouse, France.

Conference: Dyadisc 5: S-adicity, 15 - 17 July 2022, Amiens, France.

Conference: Winter School: Billiards, 17 - 21 January 2022, Autrans, France.

Conference: Journées SDA2 2021, 28 - 29 November 2021, Caen, France.

Conference: École d'été finistérienne en systèmes dynamiques, 21 - 25 June 2021, Brest, France.

Workshop: Expanding Dynamics-Creative Online Ventures in Dynamics (I-XIII), 08/05/2020 - 14/06/2021, Online workshops.

Workshop: Workshop in Dynamical Systems and Applications, 4 - 6 December 2019, Concepción, Chile.

Conference: Measurable, Borel, and Topological Dynamics, 7 - 11 October 2019, Marseille, France.

Conference: Dyadisc 3: Decidability and dynamical systems, 3 - 5 July 2019, Amiens, France.

Workshop: LXIII Colloquium: Celebrating Rafael Labarca's 60th Birthday, 25 - 29 September 2017, Santiago, Chile.

Workshop: Suma 2016, Organized by SOMACHI and UMA, 14 - 17 December 2016, Valparaíso, Chile.

Conference: School of Information and Randomness 2016, 5 - 9 December 2016, Santiago, Chile.

Teaching Experience

Link to a detailed description of my teaching experiences: <https://christophercabezas.github.io/teaching/>

14/09/2023 - **Teaching Assistant**, *Department of Mathematics*, Université de Liège, Liège, Belgium.

28/06/2024 Combinatorics on Words, General Topology. Total exercise sessions: 40 hours.

10/03/2014 - **Teaching Assistant**, *Departament of Mathematical Engineering*, Universidad de Chile, Santiago, Chile.

Introduction to Dynamical Systems and Ergodic Theory, Convex Analysis and Duality, Functional Analysis, Measure Theory, General Topology, Topics in Convex Analysis, Multivariable Calculus, Linear Algebra. Total exercise sessions: 280 hours.

05/03/2018 - **Teaching Assistant**, *Engineering School*, Universidad de O'Higgins, Rancagua, Chile.

21/07/2018 Multivariable Calculus, Introduction to Discrete Mathematics. Total exercise sessions: 60 hours.

04/08/2014 - **Teaching Assistant**, *Departament of Computer Science*, Universidad de Chile, Santiago, Chile.

Discrete Mathematics for Computer Science. Total exercise sessions: 20 hours.

Institutional responsibilities

09/03/2016 - Design of the lecture notes for the course MA3801 General Topology with Professor Aris
19/08/2016 Daniilidis.

09/03/2015 - Member of the Student Council of Mathematical Engineering (CEIMAT).
18/12/2015

Languages

Spanish Native.

English C1.

French B1.

Programming Skills

SageMath.

L^AT_EX.

Matlab.

Python.