

France GHEERAERT

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Born October 17, 1997

Last update: April 5, 2024

Education

Academic curriculum

2020-2023 PhD in Mathematics at University of Liège (Liège, Belgium)

Thesis title: A study of dendricity through the lens of morphisms

Supervisor: Julien Leroy

Jury members: Marie-Pierre Béal, Julien Cassaigne, Émilie Charlier, Fabien Durand, Arnaud Hilion, Julien Leroy, Michel Rigo

2018-2020 Master in Mathematics with a professional focus in computer science at University of Liège (Liège, Belgium)

2015-2018 Bachelor in Mathematics at University of Liège (Liège, Belgium)

2015 CESS (secondary school diploma) from the Centre Scolaire Saint-Benoit Saint-Servais (Liège, Belgium)

Distinctions and prizes

2019 Prix Garnir awarded to a student in Mathematics at University of Liège

Employment

March 2024-now Postdoctoral researcher at the Institute for Mathematics, Astrophysics and Particle Physics at Radboud University of Nijmegen (Nijmegen, Netherlands)

2020-February 2024 FNRS Research fellow in the UR Mathematics at University of Liège (Liège, Belgium)

2018-2020 Student instructor in the Department of mathematics at University of Liège (Liège, Belgium)

Scientific work

Publications

- Journal papers
 1. F. Gheeraert, Some properties of morphic images of (eventually) dendric words. *Monatshefte für Mathematik*, **202**(2), 335–351 (2023).
 2. F. Gheeraert, M. Lejeune, J. Leroy, \mathcal{S} -adic characterization of minimal ternary dendric shifts, *Ergodic theory and dynamical systems*, **42**(11), 3393–3432 (2022).
- Conference papers
 1. F. Gheeraert, G. Romana, M. Stipulanti, String attractors of fixed points of k -bonacci-like morphisms. In: A. Frid, R. Mercas (eds) *Combinatorics on Words. WORDS 2023. Lecture Notes in Computer Science*, **13899**.

Accepted, submitted and working papers

1. F. Gheeraert, H. Goulet-Ouellet, J. Leroy, P. Stas, Stable behaviors of subgroups generated by return words. *Work in progress*.
2. P. Béaur, F. Gheeraert, B. Hellouin de Menibus, String attractors of bi-infinite words. *Submitted*, arXiv: 2403.13449.
3. F. Gheeraert, G. Romana, M. Stipulanti, String attractors of some simple-Parry automatic sequences. *Extended version of String attractors of fixed points of k -bonacci-like morphisms. Submitted*, arXiv:2302.13647.
4. J. Cassaigne, F. Gheeraert, A. Restivo, G. Romana, M. Sciortino, M. Stipulanti, New string attractor-based complexities for infinite words. *Submitted*.
5. F. Gheeraert, J. Leroy, S -adic characterization of minimal dendric shifts. *Submitted*, arXiv: 2206.00333.

Posters

1. Sturmian and dendric words, *Journées du GDR IM*, IRIF (Paris, France), April 4, 2023.
2. S -adic characterization of dendric shift spaces, *Dyadisc 4*, Université Picardie Jules Verne (Amiens, France), July 8-9, 2021.

Talks

- International conferences
 1. How extensions impact the factor complexity of morphic images. Thematic month - Combinatorics on words, CIRM (Marseille, France), 28 février 2024.
 2. String attractors of fixed points of k -bonacci-like morphisms, *WORDS 2023*, Umeå University (Umeå, Sweden), June 12, 2023.
 3. Numeration systems and string attractors, *Numeration 2023*, University of Liège (Liège, Belgium), May 26, 2023.
 4. Morphic images of (eventually) dendric words, *Journées montoises d'informatique théorique 2022*, Czech Technical University (Prague, Czech Republic), September 6, 2022.
- International workshops and seminars

1. Some known results and open questions about eventually dendric shift spaces, *Dyadisc 6*, Université Picardie Jules Verne (Amiens, France), July 6, 2023. **Invited talk**
 2. S-adic characterization of minimal dendric shifts: an example, *Dyadisc 5*, University of Liège (Liège, Belgium), June 16, 2022. **Invited talk**
 3. S-adic characterization of dendric languages: ternary case, *One World Combinatorics on Words Seminar*, online, October 11, 2021.
- Other conferences and seminars
 1. Survol de la dendricité et de l'ultime dendricité, *Séminaire Rauzy*, I2M (Marseille, France), April 5, 2024. **Invited talk**
 2. Dendricité : quand les mots rencontrent les graphes, *Journée Amiens-Calais de Dynamique et Probabilités*, LMPA (Calais, France), March 19, 2024. **Invited talk**
 3. A study of dendricity through the lens of morphisms, *Discrete Mathematics Seminar*, University of Liège (Liège, Belgium), December 8, 2023.
 4. Dendric words and morphisms, *Seminar of the Dipartimento di Matematica e Informatica*, University of Palermo (Palermo, Italy), March 14, 2023.
 5. Caractérisations des sous-shifts dendriques, *Rencontre IZES 2022*, IMB (Bordeaux, France), November 14, 2022.
 6. Dendric words and strongly left proper morphisms, *Séminaire du GT Combinatoire et Interactions*, LaBRI (Bordeaux, France), May 30, 2022.
 7. Dendric preserving morphisms, *Séminaire des doctorants de l'UR Mathematics*, University of Liège (Liège, Belgium), April 25, 2022.
 8. S-adic characterization of dendric languages: ternary case, *Journées SDA2 2021*, GREYC (Caen, France), November 30, 2021.
 9. Caractérisation S-adique des dendriques, *Discrete Mathematics Seminar*, University of Liège (Liège, Belgium), May 5, 2021.
 10. Caractérisation S-adique des sous-shifts dendriques ternaires, *Séminaire des doctorants de l'UR Mathematics*, University of Liège (Liège, Belgium), November 18, 2020.

Collaborations

I had the opportunity to work with the following people (in alphabetical order):

Pierre Béaur, Fabien Durand, Herman Goulet-Ouellet, Benjamin Hellouin de Menibus, Sébastien Labbé, Marie Lejeune, Julien Leroy, Antonio Restivo, Giuseppe Romana, Marinella Sciortino, Pierre Stas, Manon Stipulanti.

Research stays

- Long research stays
 1. Università degli Studi di Palermo (Palermo, Italy) with Antonio Restivo, Giuseppe Romana, and Marinella Sciortino, March 11-21, 2023.
 2. LaBRI (Laboratoire Bordelais de Recherche en Informatique, Bordeaux, France) with Sébastien Labbé, May 21-June 11, 2022.
- Short research stays
 1. LAMFA (Laboratoire Amiénois de Mathématique Fondamentale et Appliquée, Amiens, France) with Fabien Durand and Samuel Petite, March 20-21, 2024.

2. LaBRI (Laboratoire Bordelais de Recherche en Informatique, Bordeaux, France) with Sébastien Labbé, January 25-26, 2024.
3. LISN (Laboratoire Interdisciplinaire des Sciences du Numérique, Orsay, France) with Pierre Béaur and Benjamin Hellouin de Menibus, December 20-21, 2023.
4. IRIF (Institut de Recherche en Informatique Fondamentale, Paris, France) with Valérie Berthé and Herman Goulet-Ouellet, December 18-19, 2023.
5. LaBRI (Laboratoire Bordelais de Recherche en Informatique, Bordeaux, France) with Sébastien Labbé, February 2-3, 2023.

Attended seminars and conferences

I attend the following events on a regular basis:

Discrete Mathematics Seminar (2018-2024), Séminaire des Doctorants de l'UR Mathematics (2020-2023), One World Combinatorics on Words Seminar (2020-2024), One World Numeration Seminar (2020-2022), Brussels Summer School of Mathematics (2017-2022).

In addition, I have attended the following events:

Thematic month – Discrete Mathematics & Computer Science: Groups, Dynamics, Complexity, Words (Marseille, France), Dyadisc 6 (Amiens, France), WORDS 2023 (Umeå, Sweden), Developments in Language Theory 2023 (Umeå, Sweden), Numeration 2023 (Liège, Belgium), Journées nationales du GDR IM 2023 (Paris, France), Journées de Combinatoire de Bordeaux 2023 (Bordeaux, France), Rencontre IZES 2022 (Bordeaux, France), Journées montoises d'informatique théorique 2022 (Prague, Czech Republic), Dyadisc 5 (Liège, Belgium), Journées SDA2 2022 (Liège, Belgium), Journées de Combinatoire de Bordeaux 2022 (Bordeaux, France), Developments in Language Theory 2022 (Tampa, Florida, USA), Journées SDA2 2021 (Caen, France), WORDS 2021 (online), Dyadisc 4 (Amiens, France), Algebraic and Combinatorial Invariants of Subshifts and Tilings (online), Journées SDA2 2020 (online), 3rd Young Mathematicians Symposium of the Greater Region (online).

I also took part in the workshop SageDays117 (Bordeaux, France).

Teaching

During my PhD at the University of Liège, I have supervised the following student projects:

- (with J. Leroy) the research project of M. Sportelli in 2020-2021,
- (with J. Leroy) the research project of P. Stas in 2021-2022,
- the master project of P. Hrebenar in 2021-2022,
- the bachelor project of L. Backes in 2022-2023.

I was also in charge of the following exercise sessions at the University of Liège:

Year(s)	Course	Audience
2018-2019	General mathematics	1st year in biology
2019-2020	General mathematics	1st year in geology
2020-2021	General mathematics	1st year in informatics
2020-2021 2022-2023	Ergodic theory	master in mathematics
2020-2021	Topology	3rd year in mathematics and master in mathematics
2021-2022 2022-2023 2023-2024	Linear algebra supplements	2nd year in mathematics
2021-2022 2022-2023 2023-2024	Mathematics	1st year in biomedical sciences
2021-2022 2022-2023 2023-2024	Formal language theory	3rd year in mathematics

Others

Outreach

- Mentoring of secondary school students for MATH.en.JEANS (a project promoting research in mathematics) since 2019.
- Maths à Modeler workshops (a project bringing mathematics to people from 7 to 77 through games) during the Printemps des Sciences in 2018 and 2019.

Involvement in the university life

- Representative of the PhD students of the UR Mathematics from 2021 to 2023.
- Organizer of the Séminaire des doctorants de l'UR Mathematics in 2021-2022.
- Member of the council of the Department of Mathematics from 2020 to 2022.

Programming languages

1. Advanced: SageMath, Python
2. Intermediate: C
3. Basics: Java, Mathematica

Foreign languages

1. Mother tongue: French
2. Advanced: English
3. Intermediate: Dutch