

# Clément Requilé | Curriculum Vitae

Department of Mathematics and Institute of Mathematics (IMTech), Universitat Politècnica de Catalunya.  
Despatx 432, edifici Omega, carrer Jordi Girona 1-3, 08034 Barcelona, Spain.

clement.requile@upc.edu

<https://requile.github.io>

## Education

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### Ph.D. in Mathematics

*Asymptotic study of regular planar graphs*  
Supervisor: Juanjo Rué

Freie Universität Berlin

11/2017

### Master in Computer Science

*Modélisation, Optimisation, Combinatoire et Algorithmique*

Université de Montpellier (UdM)

07/2014

### Bachelor in Mathematics

*Mathématiques Fondamentales et Appliquées*

UdM

07/2011

## Current affiliation

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### Professor lector (lecturer)

*Research group: Geometric, Algebraic and Probabilistic Combinatorics (GAPComb)*

Universitat Politècnica de Catalunya (UPC)

05/2024 - present

## Past affiliations

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### Beatriu de Pinós fellow in Mathematics

*Research group: Geometric, Algebraic and Probabilistic Combinatorics (GAPComb)*

Universitat Politècnica de Catalunya (UPC)

05/2021 - 04/2024

### Postdoctoral researcher in Mathematics

*Research group: Analysis and Probability Theory*

Uppsala University

09/2020 - 05/2021

### Postdoctoral researcher in Mathematics

*Research group: Discrete Mathematics and Geometry*

Technische Universität Wien

05/2018 - 06/2020

### Postdoctoral researcher in Mathematics

*Research group: Algebra*

Johannes Kepler Universität Linz

10/2017 - 04/2018

### Phase II student

*Mentor: Raman Sanyal*

Berlin Mathematical School

02/2015 - 10/2017

### Ph.D. student in Mathematics

*Research group: Combinatorics and Graph Theory*

Freie Universität Berlin

09/2014 - 09/2017

### Master student in Computer Science

*Research group: Algorithmes, Graphes et Combinatoire (ALGCo)*

UdM - LIRMM

03/2014 - 07/2014

## Research interests

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My main research consists in applying methods from *analytic combinatorics* and *computer algebra* to the study of *random discrete structures*. I am particularly interested in the study of topological graphs, tree-like structures and lattice paths. Another topic of interest is the design of *fixed-parameter tractable algorithms* to efficiently solve NP-Hard problems. I also like *extremal problems* on combinatorial structures, in particular those expressed in terms of *positional games*.

## Publications (refereed)

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23. **Enumeration of rooted 3-connected bipartite planar maps**, with Marc Noy and Juanjo Rué. *Comptes Rendus. Mathématique*, volume 362, July 2024, pp. 143–158. *arXiv:2202.13929*.

22. **Chordal graphs with bounded tree-width**, with Jordi Castellví, Michael Drmota and Marc Noy. *Advances in Applied Mathematics*, volume 157, June 2024, 102700. *arXiv:2301.00194*.
21. **Chordal graphs with bounded tree-width** (extended abstract), with Jordi Castellví, Michael Drmota and Marc Noy. *European Conference on Combinatorics, Graph Theory and Applications (EuroComb) 2023, Prague, Czech Republic - Masaryk University Press, 1st electronic edition (ISSN 2788-3116)*, pp. 270-276.
20. **Random cubic planar maps**, with Michael Drmota, Marc Noy and Juanjo Rué. *The Electronic Journal of Combinatorics*, volume 30, issue 2, June 2023, P2.51 (*arXiv:2209.14799*).
19. **Enumeration of labelled 4-regular planar graphs II: asymptotics**, with Marc Noy and Juanjo Rué. *The European Journal of Combinatorics*, volume 110, May 2023, 103661 (*arXiv:2001.05943*).
18. **Enumeration of chordal planar graphs and maps**, with Jordi Castellví and Marc Noy. *Discrete Mathematics*, volume 346, issue 1, January 2023, 113163 (*arXiv:2202.13340*).
17. **Enumeration of chordal planar graphs and maps** (extended abstract), with Jordi Castellví and Marc Noy. *Discrete Maths Days (DMD) 2022, Santander, Spain - Editorial Universidad de Cantabria: Santander (ISBN 978-84-19024)*, pp. 77-83.
16. **Enumeration of rooted 3-connected bipartite planar maps** (extended abstract), with Marc Noy and Juanjo Rué. *GASCom 2022, Trieste, Italy - Pure Mathematics and Applications*, 30(1):97-105, 2022.
15. **On the expected number of perfect matchings in cubic planar graphs**, with Marc Noy and Juanjo Rué. *Publicacions matemàtiques*, volume 66, issue 1, January 2022, pp. 325-353 (*arXiv:2005.13821*).
14. **LNetReduce: Tool for reducing linear dynamic networks with separated timescales**, with Marion Buffard, Aurélien Desoeuvres, Aurélien Naldi, Ovidiu Radulescu and Andrei Zinovyev. *Computational Methods in Systems Biology (CSMB) 2021, Bordeaux, France - Lecture Notes in Computer Science / Bioinformatics*, volume 12881, September 2021, pp. 238-244. *bioRxiv:10.1101/2021.05.11.443578*.
13. **On the expected number of perfect matchings in cubic planar graphs** (extended abstract), with Marc Noy and Juanjo Rué. *European Conference on Combinatorics, Graph Theory and Applications (EuroComb) 2021, Barcelona, Spain - Trends in Mathematics*, volume 14, August 2021, pp. 167-174.
12. **Block statistics in subcritical graph classes**, with Dimbinaina Ralaivaosaona and Stephan Wagner. *Analysis of Algorithms (AofA) 2020, Klagenfurt, Austria - Leibniz International Proceedings in Informatics (LIPIcs)*, volume 159, June 2020, pp. 24:1-24:14.
11. **Further results on random cubic planar graphs**, with Marc Noy and Juanjo Rué. *Random Structures and Algorithms*, volume 56, issue 3, May 2020, pp. 892-924 (*arXiv:1802.06679*).
10. **Maximal independent sets and maximal matchings in subcritical graph classes**, with Michael Drmota, Lander Ramos and Juanjo Rué. *The Electronic Journal of Combinatorics*, volume 27, issue 1, January 2020, P1.5 (*arXiv:1904.10244*).
9. **Enumeration of labelled 4-regular planar graphs**, with Marc Noy and Juanjo Rué. *Proceedings of the London Mathematical Society*, volume 119, issue 2, August 2019, pp. 358-378 (*arXiv:1709.04678*).
8. **Maximal independent sets and maximal matchings in series-parallel and related graph classes** (extended abstract), with Michael Drmota, Lander Ramos and Juanjo Rué. *Analysis of Algorithms (AofA) 2018, Uppsala, Sweden - Leibniz International Proceedings in Informatics*, volume 110, June 2018, pp. 18:1-18:15.
7. **Proper coloring Painter-Builder game**, with Małgorzata Bednarska-Bzdega, Michael Krivelevich and Viola Mészáros. *Discrete Mathematics*, volume 341, issue 3, March 2018, pp. 658-664 (*arXiv:1612.02156*).
6. **Strong Ramsey games: Drawing on an infinite board**, with Dan Hefetz, Christopher Kusch, Lothar Narins, Alexey Pokrovskiy and Amir Sarid. *Journal of Combinatorial Theory, Series A*, volume 150, August 2017, pp. 248-266 (*arXiv:1605.05443*).
5. **Enumeration of labeled 4-regular planar graphs** (extended abstract), with Marc Noy and Juanjo Rué. *European Conference on Combinatorics, Graph Theory and Applications (EuroComb) 2017, Vienna, Austria - Electronic Notes in Discrete Mathematics*, volume 61, August 2017, pp. 933-939.
4. **Random cubic planar graphs revisited** (extended abstract), with Marc Noy and Juanjo Rué. *Discrete Mathematics Days (DMD) 2016, Barcelona, Spain - Electronic Notes in Discrete Mathematics*, volume 54, October 2016, pp. 211-216.

3. **FPT algorithms for plane completion problems**, with Dimitris Chatzidimitriou, Archontia C. Giannopoulou, Spyridon Maniatis, Dimitrios M. Thilikos and Dimitris Zoros. *Mathematical Foundations of Computer Science (MFCS), August 2016, Kraków, Poland - Leibniz International Proceedings in Informatics, volume 58, August 2016, pp. 26:1-26:13.*
2. **Variants of plane diameter completion**, with Petr A. Golovach and Dimitrios M. Thilikos. *International Symposium on Parameterized and Exact Computation (IPEC) 2015, Patras, Greece - Leibniz International Proceedings in Informatics, volume 43, November 2015, pp. 30-42 (arXiv:1509.00757).*
1. **Triangles in random cubic planar graphs** (extended abstract), with Juanjo Rué. *European Conference on Combinatorics, Graph Theory and Applications (EuroComb) 2015, Bergen, Norway - Electronic Notes in Discrete Mathematics, volume 49, November 2015, pp. 383-391.*

## Publication (non-refereed)

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- ▷ **Asymptotic enumeration of labelled 4-regular planar graphs**, with Marc Noy and Juanjo Rué. *Mathematisches Forschungsinstitut Oberwolfach report number 23, volume 15, 2018, pp. 1401-1403.*

## Supervision of a Master thesis

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**Jordi Castellví** (co-supervised with Marc Noy) **UPC**  
*Enumeration of chordal planar graphs and maps* *2022*

## Experience as lecturer

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**ProInformatik I: Logik und Diskrete Mathematik (German)** **Freie Universität Berlin**  
*Bachelor in Computer Science* *Summer semester 2017 - 36 hours*

## Experiences as teaching assistant

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**Funcions de Variable Complexa (Catalan/Spanish)** **UPC**  
*Bachelor in Mathematics* *Spring 2023 - 30 hours*

**Combinatorics and Graph Theory (English)** **UPC**  
*Bachelor in Mathematics* *Fall 2022 - 15 hours*

**Discrete Mathematics and Optimisation (English)** **Universitat Pompeu Fabra - ESCI**  
*Bachelor in Bioinformatics* *Fall 2022 - 20 hours*

**Discrete Mathematics and Optimisation (English)** **Universitat Pompeu Fabra - ESCI**  
*Bachelor in Bioinformatics* *Fall 2021 - 40 hours*

**Discrete Mathematics (English)** **Technische Universität Wien**  
*Master in Computer Science* *Winter 2019 - 30 hours*

**Discrete Mathematics (English)** **Technische Universität Wien**  
*Master in Computer Science* *Winter 2018 - 30 hours*

**Stochastic II (English)** **Freie Universität Berlin**  
*Bachelor in Mathematics* *Summer 2015 - 30 hours*

## Grants as principal investigator

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**Beatriu de Pinós (BP-2019): AGAUR and H2020 COFUND project # 801370**  
*Structural analysis of random planar graphs and maps.*  
 Duration: 05/2021 - 04/2024.

**Freie Universität Berlin Research Alumni Program: travel grant to UPC Barcelona, Spain.**  
*Size of the largest 2-connected component in a random cubic planar graph.*  
 Duration: 06/2016 - 07/2016.

## Grants as participant

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### **Project Horizon 2020: RandNet - 101007705**

*Randomness and learning in networks.*

Duration of participation: 05/2021 - 12/2024. Principal investigator: Marc Noy.

### **Project I+D+i of the Spanish Ministry for Science and Innovation PID2020 - 113082GB-I00**

*Combinatorics: new trends and real-world applications.*

Duration of participation: 05/2021 - 12/2023. Principal investigators: Simeon Ball and Guillem Perarnau.

### **Special Research Program (SFB) of the Austrian Science Fund (FWF) F50-02**

*Algorithmic and Enumerative Combinatorics - Shape characteristics of planar maps and planar graphs.*

Duration of participation: 05/2018 - 06/2020. Principal investigator: Michael Drmota.

### **Special Research Program (SFB) of the Austrian Science Fund (FWF) F50-04**

*Algorithmic and Enumerative Combinatorics - Algorithmic lattice path counting using the kernel method.*

Duration of participation: 10/2017 - 04/2018. Principal investigator: Manuel Kauers.

### **DAAD - CAMPUS FRANCE: Bilateral project 57134837**

*Analytic, probabilistic and geometric methods for random constrained graphs.*

Duration of participation: 01/2015 - 12/2016. Principal investigators: Vlado Ravelomanana and Juanjo Rué.

### **Marie Skłodowska-Curie Career Integration Grant (Europe): FP7-PEOPLE-2013-CIG project 630749**

*CountGraph - Enumeration of discrete structures: algebraic, analytic, probabilistic and algorithmic methods for enriched planar graphs and planar maps.*

Duration of participation: 03/2014 - 12/2016. Principal investigator: Juanjo Rué.

## Co-organization of scientific meetings

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### **4th Workshop on Geometric, Algebraic and Probabilistic Combinatorics (GAPComb)**

*Member of the organizing committee (chair: Guillem Perarnau and Lluís Vena)*

**Montserrat**  
9 - 12/07/2023

### **BGSMath - BMS Joint Junior Meeting**

*Member of the organizing committee (chairs: Carme Cascante and Jürg Kramer)*

**Barcelona**  
5 - 7/09/2022

### **3rd Workshop on Geometric, Algebraic and Probabilistic Combinatorics (GAPComb)**

*Member of the organizing committee (chair: Simeon Ball and Lluís Vena)*

**Montserrat**  
10 - 13/07/2022

### **European Conference on Combinatorics, Graph Theory and Applications**

*Member of the organizing committee (chairs: Guillem Perarnau and Juanjo Rué)*

**Barcelona**  
6 - 10/09/2021

### **2nd Workshop on Geometric, Algebraic and Probabilistic Combinatorics (GAPComb)**

*Member of the organizing committee (chair: Anne de Mier and Juanjo Rué)*

**Montserrat**  
12 - 14/07/2021

### **SFB F50 Statusseminar**

*Member of the organizing committee (chair: Christian Krattenthaler)*

**Strobl am Wolfgangsee**  
2 - 5/12/2018

### **10th Jornadas de Matemática Discreta y Algorítmica**

*Member of the organizing committee (chair: Juanjo Rué)*

**Barcelona**  
6 - 8/07/2016

### **TAU-FUB Joint Workshop on Positional Games**

*Member of the organizing committee (chairs: Michael Krivelevich and Tibor Szabó)*

**Berlin**  
22 - 26/02/2016

## Scientific visits

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### **Department of Mathematics of Technische Universität Wien, Austria**

*Research group: Institute of Discrete Mathematics and Geometry with Michael Drmota 2 weeks in 2021-2024*

### **Department of Mathematical Sciences of Stellenbosch University, Western Cape, South Africa**

*Research group: Mathematics Division with Stephan Wagner*

12/2018

### **Department of Mathematics at UPC Barcelona, Spain**

*Research group: Discrete Mathematics with Marc Noy*

03/2016 - 04/2017

**IRIF at Université de Paris, France**

*Research group: Combinatorics with Vlado Ravelomanana*

11/2016

**Department of Mathematics of the National Kapodistrian University of Athens, Greece**

*Research group: Mathematical Analysis with Dimitrios Thilikos*

02/2015

## Internships

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**Parameterized complexity of modification problems on plane graphs**

*Supervisor: Dimitrios M. Thilikos*

UdM - LIRMM

03 - 06/2014

**Model reduction with many timescales of bio-chemical graphs**

*Supervisor: Ovidiu Radulescu*

UdM - DIMNP

06 - 08/2013

**Algorithms of approximation for the maximum clique problem**

*Joint with Gaëlle Hisler. Supervisor: Rodolphe Giroudeau*

UdM

03 - 06/2013

**Topological methods in combinatorics**

*Supervisor: Jorge Luis Ramírez Alfonsín*

UdM

03 - 06/2012

## Advanced courses and thematic meetings as student

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**Algorithmic and Enumerative Combinatorics**

*5th AEC Summer School*

RISC, Hagenberg

07/2019

**Analysis of discrete random structures**

*ALEA Young*

Domaine de la Tour, Caen

05/2019

**Algorithmic and Enumerative Combinatorics**

*4th AEC Summer School*

RISC, Hagenberg

07/2018

**Random Discrete Structures and Beyond**

*BGSMath Monthly Program*

UPC, Barcelona

06/2017

**Random Graphs**

*Cargèse Fall School*

IES, Cargèse

09/2015

**Additive Combinatorics**

*Block Course*

Freie Universität Berlin

10/2014

## Conference talks

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**Analysis of Algorithms**

*Chordal graphs with bounded tree-width*

Taipei

29/06/2023

**Congreso de Jóvenes Investigadores de la Real Sociedad Matemática Española**

*Average number of perfect matchings in cubic planar graphs*

León

09/02/2023

**Algorithmic and Enumerative Combinatorics conference**

*Chordal graphs with bounded tree-width*

Vienna

07/07/2022

**Discrete Mathematics Days**

*Enumeration of chordal planar graphs and maps*

Santander

05/07/2022

**Journées de Combinatoire de Bordeaux**

*Énumération des cartes planaires biparties 3-connexes*

Bordeaux

10/06/2022

**European Conference on Combinatorics, Graph Theory and Applications**

*The expected number of perfect matchings in cubic planar graphs*

Barcelona/Online

08/09/2021

**Workshop on Geometric, Algebraic and Probabilistic Combinatorics**

*From the Ising model on maps to the enumeration of bipartite planar graphs*

Montserrat

12/07/2021

<b>Analysis of Algorithms</b> <i>The expected number of perfect matchings in cubic planar graphs</i>	<b>Klagenfurt/Online</b> 15/06/2021
<b>SFB F50 Statusseminar</b> <i>Ising model on maps and enumeration of some classes of planar graphs</i>	<b>Online</b> 15/12/2020
<b>Analysis of Algorithms</b> <i>Block statistics in subcritical graph classes</i>	<b>Klagenfurt/Online recording</b> <a href="https://www.youtube.com/watch?v=-SJRssqq020">youtube.com/watch?v=-SJRssqq020</a>
<b>Workshop on Analytic and Enumerative Aspects of Combinatorics</b> <i>Long cycles in cubic planar graphs</i>	<b>Caen</b> 31/08/2019
<b>Discrete Mathematics Workshop</b> <i>A census of planar maps and graphs</i>	<b>Stellenbosch</b> 12/12/2018
<b>Joint Meeting of the Czech, Slovenian, Austrian, Slovak and Catalan Mathematical Societies</b> <i>Asymptotic enumeration of labelled 4-regular planar graphs</i>	<b>Bratislava</b> 13/09/2018
<b>Analysis of Algorithms</b> <i>Maximal independent sets and maximal matchings in series-parallel and related graph classes</i>	<b>Uppsala</b> 25/06/2018
<b>Workshop on Enumerative Combinatorics</b> <i>Asymptotic enumeration of 4-regular planar graphs</i>	<b>Oberwolfach</b> 15/05/2018
<b>SFB F50 Statusseminar</b> <i>Asymptotic study of regular planar graphs</i>	<b>Strobl</b> 4/12/2017
<b>European Conference on Combinatorics, Graph Theory and Applications</b> <i>Enumeration of labelled 4-regular planar graphs</i>	<b>Vienna</b> 28/08/2017
<b>Berlin-Poznań seminar on Discrete Mathematics</b> <i>On the enumeration of regular planar graphs</i>	<b>Hamburg</b> 21/04/2017
<b>Journées ALÉA</b> <i>Énumération des graphes planaires 4-réguliers</i>	<b>Marseille</b> 20/03/2017
<b>FUB-TAU Joint Research Workshop on Graph and Hypergraph Coloring</b> <i>On a version of the game of Painter-Builder</i>	<b>Tel Aviv</b> 5/03/2017
<b>Jornadas de Matematica Discreta y Algoritmica</b> <i>Random cubic planar graph revisited</i>	<b>Barcelona</b> 7/07/2016
<b>International Symposium on Parameterized and Exact Computation</b> <i>Variants of plane diameter completion</i>	<b>Patras</b> 16/09/2015
<b>European Conference on Combinatorics, Graph Theory and Applications</b> <i>Triangles in random cubic 3-connected planar graphs</i>	<b>Bergen</b> 31/08/2015

## Seminar talks

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<b>Seminar Arbeitsgemeinschaft Diskrete Mathematik</b> <i>Enumeration of unlabelled chordal graphs with bounded tree-width</i>	<b>Technische Universität Wien</b> 04/06/2024
<b>GAPComb Reading Seminar on the Polynomial Freiman Ruzsa (PFR) conjecture</b> <i>Entropy methods, entropic Ruzsa distance and entropic formulation of PFR</i>	<b>UPC</b> 07/03/2024
<b>Analysis and Dynamics Seminar</b> <i>Asymptotic study of chordal graphs with bounded tree-width</i>	<b>University of Denver</b> 27/10/2023
<b>LIMDA Seminar (special GAPComb Reading Seminar session)</b> <i>The Implicit Graph Conjecture is false</i>	<b>UPC</b> 04/05/2023

<b>GAPComb Reading Seminar on Thresholds</b> <i>Park-Pham's Theorem: a proof of the Kahn-Kalai Conjecture</i>	<b>UPC</b> 16/12/2022
<b>Séminaire de combinatoire énumérative et analytique de l'IRIF</b> <i>Modèle d'Ising et couplages parfaits sur les graphes planaires cubiques</i>	<b>Université Paris Cité/Online</b> 17/12/2020
<b>Probability and Combinatorics Seminar</b> <i>Random planar graphs</i>	<b>Uppsala University</b> 08/10/2020
<b>Seminar Arbeitsgemeinschaft Diskrete Mathematik</b> <i>Long cycles in cubic planar graphs</i>	<b>Technische Universität Wien</b> 22/10/2019
<b>Seminar Arbeitsgemeinschaft Diskrete Mathematik</b> <i>Enumeration of labeled 4-regular planar graphs</i>	<b>Technische Universität Wien</b> 12/12/2017
<b>Seminar Algebra</b> <i>Enumeration of regular planar graphs</i>	<b>Johannes Kepler Universität Linz</b> 23/11/2017
<b>LIMDA Joint Seminar</b> <i>The enumeration of 4-regular planar graphs</i>	<b>UPC</b> 26/04/2017
<b>Combinatorics reading seminar</b> <i>Graph limits: graph parameters and connection matrices</i>	<b>UPC</b> 31/01/2017
<b>Combinatorics reading seminar</b> <i>Sampling and random walks on expander graphs</i>	<b>UPC</b> 27/10 - 03/11/2016
<b>Combinatorics reading seminar</b> <i>The phase transition in random graphs</i>	<b>UPC</b> 12/04/2016
<b>Seminar Discrete Geometry</b> <i>Intrinsic volumes for polyconvex sets</i>	<b>Freie Universität Berlin</b> 15/12/2016
<b>LIMDA Joint Seminar</b> <i>Variants of plane diameter completion</i>	<b>UPC</b> 18/11/2015
<b>Research Seminar Combinatorics</b> <i>Triangles in random cubic planar graphs</i>	<b>Freie Universität Berlin</b> 15/07/2015
<b>Research Seminar Combinatorics</b> <i>A parameterized algorithm for the diameter improvement problem for plane graphs</i>	<b>Freie Universität Berlin</b> 27/11/2014
<b>Séminaire ALGCo</b> <i>Complexité paramétrée et complétion plane à diamètre borné</i>	<b>LIRMM</b> 12/06/2014

## Languages

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### Natural

*French* (native), *English* (fluent), *German* (good), *Spanish* (good), *Catalan* (beginner) and *Swedish* (beginner)

### Programming

*Python*, *C* and *C++*, and mathematical softwares (*Maple*, *Sage*, *Mathematica* and *MatLab*)