

Clément Requile | Curriculum Vitae

Department of Mathematics and Institute of Mathematics (IMTech), Universitat Politècnica de Catalunya.
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Education

Ph.D. in Mathematics <i>Asymptotic study of regular planar graphs</i> Supervisor: Juanjo Rué	Freie Universität Berlin 11/2017
Master in Computer Science <i>Modélisation, Optimisation, Combinatoire et Algorithmique</i>	Université de Montpellier (UdM) 07/2014
Bachelor in Mathematics <i>Mathématiques Fondamentales et Appliquées</i>	UdM 07/2011

Current affiliation

Professor lector (lecturer) <i>Research group: Geometric, Algebraic and Probabilistic Combinatorics (GAPComb)</i>	Universitat Politècnica de Catalunya (UPC) 05/2024 - present
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Past affiliations

Beatriu de Pinós fellow in Mathematics <i>Research group: Geometric, Algebraic and Probabilistic Combinatorics (GAPComb)</i>	Universitat Politècnica de Catalunya (UPC) 05/2021 - 04/2024
Postdoctoral researcher in Mathematics <i>Research group: Analysis and Probability Theory</i>	Uppsala University 09/2020 - 05/2021
Postdoctoral researcher in Mathematics <i>Research group: Discrete Mathematics and Geometry</i>	Technische Universität Wien 05/2018 - 06/2020
Postdoctoral researcher in Mathematics <i>Research group: Algebra</i>	Johannes Kepler Universität Linz 10/2017 - 04/2018
Phase II student <i>Mentor: Raman Sanyal</i>	Berlin Mathematical School 02/2015 - 10/2017
Ph.D. student in Mathematics <i>Research group: Combinatorics and Graph Theory</i>	Freie Universität Berlin 09/2014 - 09/2017
Master student in Computer Science <i>Research group: Algorithmes, Graphes et Combinatoire (ALGCo)</i>	UdM - LIRMM 03/2014 - 07/2014

Research interests

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)

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)

- ▷ **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

Jordi Castellví (co-supervised with Marc Noy)	UPC
<i>Enumeration of chordal planar graphs and maps</i>	<i>2022</i>

Experience as lecturer

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

Experiences as teaching assistant

Funcions de Variable Complexa (Catalan/Spanish)	UPC
<i>Bachelor in Mathematics</i>	<i>Spring 2023 - 30 hours</i>
Combinatorics and Graph Theory (English)	UPC
<i>Bachelor in Mathematics</i>	<i>Fall 2022 - 15 hours</i>
Discrete Mathematics and Optimisation (English)	Universitat Pompeu Fabra - ESCI
<i>Bachelor in Bioinformatics</i>	<i>Fall 2022 - 20 hours</i>
Discrete Mathematics and Optimisation (English)	Universitat Pompeu Fabra - ESCI
<i>Bachelor in Bioinformatics</i>	<i>Fall 2021 - 40 hours</i>
Discrete Mathematics (English)	Technische Universität Wien
<i>Master in Computer Science</i>	<i>Winter 2019 - 30 hours</i>
Discrete Mathematics (English)	Technische Universität Wien
<i>Master in Computer Science</i>	<i>Winter 2018 - 30 hours</i>
Stochastic II (English)	Freie Universität Berlin
<i>Bachelor in Mathematics</i>	<i>Summer 2015 - 30 hours</i>

Grants as principal investigator

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

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: Vlady 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

4th Workshop on Geometric, Algebraic and Probabilistic Combinatorics (GAPComb)	Montserrat
Member of the organizing committee (chair: Guillem Perarnau and Lluís Vena)	9 - 12/07/2023
BGSMath - BMS Joint Junior Meeting	Barcelona
Member of the organizing committee (chairs: Carme Cascante and Jürg Kramer)	5 - 7/09/2022
3rd Workshop on Geometric, Algebraic and Probabilistic Combinatorics (GAPComb)	Montserrat
Member of the organizing committee (chair: Simeon Ball and Lluís Vena)	10 - 13/07/2022
European Conference on Combinatorics, Graph Theory and Applications	Barcelona
Member of the organizing committee (chairs: Guillem Perarnau and Juanjo Rué)	6 - 10/09/2021
2nd Workshop on Geometric, Algebraic and Probabilistic Combinatorics (GAPComb)	Montserrat
Member of the organizing committee (chair: Anne de Mier and Juanjo Rué)	12 - 14/07/2021
SFB F50 Statusseminar	Strobl am Wolfgangsee
Member of the organizing committee (chair: Christian Krattenthaler)	2 - 5/12/2018
10th Jornadas de Matemática Discreta y Algorítmica	Barcelona
Member of the organizing committee (chair: Juanjo Rué)	6 - 8/07/2016
TAU-FUB Joint Workshop on Positional Games	Berlin
Member of the organizing committee (chairs: Michael Krivelevich and Tibor Szabó)	22 - 26/02/2016

Scientific visits

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 Vlady Ravelomanana	11/2016

Internships

Parameterized complexity of modification problems on plane graphs <i>Supervisor: Dimitrios M. Thilikos</i>	UdM - LIRMM 03 - 06/2014
Model reduction with many timescales of bio-chemical graphs <i>Supervisor: Ovidiu Radulescu</i>	UdM - DIMNP 06 - 08/2013
Algorithms of approximation for the maximum clique problem <i>Joint with Gaëlle Hisler. Supervisor: Rodolphe Giroudeau</i>	UdM 03 - 06/2013
Topological methods in combinatorics <i>Supervisor: Jorge Luis Ramírez Alfonsín</i>	UdM 03 - 06/2012

Advanced courses and thematic meetings as student

Algorithmic and Enumerative Combinatorics <i>5th AEC Summer School</i>	RISC, Hagenberg 07/2019
Analysis of discrete random structures <i>ALEA Young</i>	Domaine de la Tour, Caen 05/2019
Algorithmic and Enumerative Combinatorics <i>4th AEC Summer School</i>	RISC, Hagenberg 07/2018
Random Discrete Structures and Beyond <i>BGSMath Monthly Program</i>	UPC, Barcelona 06/2017
Random Graphs <i>Cargèse Fall School</i>	IES, Cargèse 09/2015
Additive Combinatorics <i>Block Course</i>	Freie Universität Berlin 10/2014

Conference talks

Analysis of Algorithms <i>Chordal graphs with bounded tree-width</i>	Taipei 29/06/2023
Congreso de Jóvenes Investigadores de la Real Sociedad Matemática Española <i>Average number of perfect matchings in cubic planar graphs</i>	León 09/02/2023
Algorithmic and Enumerative Combinatorics conference <i>Chordal graphs with bounded tree-width</i>	Vienna 07/07/2022
Discrete Mathematics Days <i>Enumeration of chordal planar graphs and maps</i>	Santander 05/07/2022
Journées de Combinatoire de Bordeaux <i>Énumération des cartes planaires biparties 3-connexes</i>	Bordeaux 10/06/2022
European Conference on Combinatorics, Graph Theory and Applications <i>The expected number of perfect matchings in cubic planar graphs</i>	Barcelona/Online 08/09/2021
Workshop on Geometric, Algebraic and Probabilistic Combinatorics <i>From the Ising model on maps to the enumeration of bipartite planar graphs</i>	Montserrat 12/07/2021
Analysis of Algorithms <i>The expected number of perfect matchings in cubic planar graphs</i>	Klagenfurt/Online 15/06/2021

SFB F50 Statusseminar <i>Ising model on maps and enumeration of some classes of planar graphs</i>	Online 15/12/2020
Analysis of Algorithms <i>Block statistics in subcritical graph classes</i>	Klagenfurt/Online recording youtube.com/watch?v=-SJRssqq020
Workshop on Analytic and Enumerative Aspects of Combinatorics <i>Long cycles in cubic planar graphs</i>	Caen 31/08/2019
Discrete Mathematics Workshop <i>A census of planar maps and graphs</i>	Stellenbosch 12/12/2018
Joint Meeting of the Czech, Slovenian, Austrian, Slovak and Catalan Mathematical Societies <i>Asymptotic enumeration of labelled 4-regular planar graphs</i>	Bratislava 13/09/2018
Analysis of Algorithms <i>Maximal independent sets and maximal matchings in series-parallel and related graph classes</i>	Uppsala 25/06/2018
Workshop on Enumerative Combinatorics <i>Asymptotic enumeration of 4-regular planar graphs</i>	Oberwolfach 15/05/2018
SFB F50 Statusseminar <i>Asymptotic study of regular planar graphs</i>	Strobl 4/12/2017
European Conference on Combinatorics, Graph Theory and Applications <i>Enumeration of labelled 4-regular planar graphs</i>	Vienna 28/08/2017
Berlin-Poznań seminar on Discrete Mathematics <i>On the enumeration of regular planar graphs</i>	Hamburg 21/04/2017
Journées ALÉA <i>Énumération des graphes planaires 4-réguliers</i>	Marseille 20/03/2017
FUB-TAU Joint Research Workshop on Graph and Hypergraph Coloring <i>On a version of the game of Painter-Builder</i>	Tel Aviv 5/03/2017
Jornadas de Matematica Discreta y Algoritmica <i>Random cubic planar graph revisited</i>	Barcelona 7/07/2016
International Symposium on Parameterized and Exact Computation <i>Variants of plane diameter completion</i>	Patras 16/09/2015
European Conference on Combinatorics, Graph Theory and Applications <i>Triangles in random cubic 3-connected planar graphs</i>	Bergen 31/08/2015
Seminar talks	
Analysis and Dynamics Seminar <i>Asymptotic study of chordal graphs with bounded tree-width</i>	University of Denver 27/10/2023
LIMDA Seminar <i>The Implicit Graph Conjecture is false</i>	UPC 04/05/2023
GAPComb Reading Seminar on Thresholds <i>Park-Pham's Theorem: a proof of the Kahn-Kalai Conjecture</i>	UPC 16/12/2022
Séminaire de combinatoire énumérative et analytique de l'IRIF <i>Modèle d'Ising et couplages parfaits sur les graphes planaires cubiques</i>	Université Paris Cité/Online 17/12/2020
Probability and Combinatorics Seminar <i>Random planar graphs</i>	Uppsala University 08/10/2020

Seminar Arbeitsgemeinschaft Diskrete Mathematik
Long cycles in cubic planar graphs

Technische Universität Wien
22/10/2019

Seminar Arbeitsgemeinschaft Diskrete Mathematik
Enumeration of labeled 4-regular planar graphs

Technische Universität Wien
12/12/2017

Seminar Algebra
Enumeration of regular planar graphs

Johannes Kepler Universität Linz
23/11/2017

LIMDA Joint Seminar
The enumeration of 4-regular planar graphs

UPC
26/04/2017

Combinatorics reading seminar
Graph limits: graph parameters and connection matrices

UPC
31/01/2017

Combinatorics reading seminar
Sampling and random walks on expander graphs

UPC
27/10 - 03/11/2016

Combinatorics reading seminar
The phase transition in random graphs

UPC
12/04/2016

Seminar Discrete Geometry
Intrinsic volumes for polyconvex sets

Freie Universität Berlin
15/12/2016

LIMDA Joint Seminar
Variants of plane diameter completion

UPC
18/11/2015

Research Seminar Combinatorics
Triangles in random cubic planar graphs

Freie Universität Berlin
15/07/2015

Research Seminar Combinatorics
A parameterized algorithm for the diameter improvement problem for plane graphs

Freie Universität Berlin
27/11/2014

Séminaire ALGCo
Complexité paramétrée et complétion plane à diamètre borné

LIRMM
12/06/2014

Languages

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*)