

Clément Requilé | 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

Beatriu de Pinós postdoctoral researcher in Mathematics <i>Research group: Geometric, Algebraic and Probabilistic Combinatorics (GAPComb)</i>	Universitat Politècnica de Catalunya (UPC) 05/2021 - present
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Past affiliations

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*.

Preprints

- ▷ **Chordal graphs with bounded tree-width**, with Jordi Castellví, Michael Drmota and Marc Noy.
Submitted. arXiv:2301.00194.
- ▷ **Random cubic planar maps**, with Michael Drmota, Marc Noy and Juanjo Rué.
Submitted. arXiv:2209.14799.
- ▷ **Enumeration of rooted 3-connected bipartite planar maps**, with Marc Noy and Juanjo Rué.
Submitted. arXiv:2202.13929.

18. **Enumeration of labelled 4-regular planar graphs II: asymptotics**, with Marc Noy and Juanjo Rué. *To appear in the European Journal of Combinatorics*, volume 110, May 2023, 103661 (arXiv:2001.05943).
17. **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).
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 Ralaivaosona 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-Bzdęga, 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**
Enumeration of chordal planar graphs and maps 2022

Experience as lecturer

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

Experiences as teaching assistant

Combinatorics and Graph Theory (English) **UPC**
Seventh semester of the Bachelor in Mathematics Fall 2022 - in course (14 hours)

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

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

Discrete Mathematics (English) **Technische Universität Wien**
First semester of the Master in Computer Science Winter 2019 - 28 hours

Discrete Mathematics (English) **Technische Universität Wien**
First semester of the Master in Computer Science Winter 2018 - 28 hours

Stochastic II (English) **Freie Universität Berlin**
Sixth semester of the Bachelor in Mathematics Summer 2015 - 26 hours

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: 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

BGSMath - BMS Joint Junior Meeting	Barcelona
<i>Member of the organizing committee (chairs: Carme Cascante and Jürg Kramer)</i>	5 - 7/09/2022
European Conference on Combinatorics, Graph Theory and Applications	Barcelona
<i>Member of the organizing committee (chairs: Guillem Perarnau and Juanjo Rué)</i>	6 - 10/09/2021
SFB F50 Statusseminar	Strobl am Wolfgangsee
<i>Member of the organizing committee (chair: Christian Krattenthaler)</i>	2 - 5/12/2018
10th Jornadas de Matemática Discreta y Algorítmica	Barcelona
<i>Member of the organizing committee (chair: Juanjo Rué)</i>	6 - 8/07/2016
TAU-FUB Joint Workshop on Positional Games	Berlin
<i>Member of the organizing committee (chairs: Michael Krivelevich and Tibor Szabó)</i>	22 - 26/02/2016

Scientific visits

Department of Mathematical Sciences of Stellenbosch University, Western Cape, South Africa	
<i>Research group: Mathematics Division with Stephan Wagner</i>	12/2018
Department of Mathematics at UPC Barcelona, Spain	
<i>Research group: Discrete Mathematics with Marc Noy</i>	03/2016 - 04/2017
IRIF at Université de Paris, France	
<i>Research group: Combinatorics with Vlado Ravelomanana</i>	11/2016
Department of Mathematics of the National Kapodistrian University of Athens, Greece	
<i>Research group: Mathematical Analysis with Dimitrios Thilikos</i>	02/2015

Internships

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

Advanced courses and thematic meetings as student

Algorithmic and Enumerative Combinatorics	RISC, Hagenberg
<i>5th AEC Summer School</i>	07/2019
Analysis of discrete random structures	Domaine de la Tour, Caen

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

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

Analysis of Algorithms
The expected number of perfect matchings in cubic planar graphs

Klagenfurt/Online
 15/06/2021

SFB F50 Statusseminar
Ising model on maps and enumeration of some classes of planar graphs

Online
 15/12/2020

Analysis of Algorithms
Block statistics in subcritical graph classes

Klagenfurt/Online recording
[youtube.com/watch?v=-SJRssqq020](https://www.youtube.com/watch?v=-SJRssqq020)

Workshop on Analytic and Enumerative Aspects of Combinatorics
Long cycles in cubic planar graphs

Caen
 31/08/2019

Discrete Mathematics Workshop
A census of planar maps and graphs

Stellenbosch
 12/12/2018

Joint Meeting of the Czech, Slovenian, Austrian, Slovak and Catalan Mathematical Societies
Asymptotic enumeration of labelled 4-regular planar graphs

Bratislava
 13/09/2018

Analysis of Algorithms
Maximal independent sets and maximal matchings in series-parallel and related graph classes

Uppsala
 25/06/2018

Workshop on Enumerative Combinatorics
Asymptotic enumeration of 4-regular planar graphs

Oberwolfach
 15/05/2018

SFB F50 Statusseminar
Asymptotic study of regular planar graphs

Strobl
 4/12/2017

European Conference on Combinatorics, Graph Theory and Applications
Enumeration of labelled 4-regular planar graphs

Vienna
 28/08/2017

Berlin-Poznań seminar on Discrete Mathematics
On the enumeration of regular planar graphs

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

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 <i>Long cycles in cubic planar graphs</i>	Technische Universität Wien 22/10/2019
Seminar Arbeitsgemeinschaft Diskrete Mathematik <i>Enumeration of labeled 4-regular planar graphs</i>	Technische Universität Wien 12/12/2017
Seminar Algebra <i>Enumeration of regular planar graphs</i>	Johannes Kepler Universität Linz 23/11/2017
LIMDA Joint Seminar <i>The enumeration of 4-regular planar graphs</i>	UPC 26/04/2017
Combinatorics reading seminar <i>Graph limits: graph parameters and connection matrices</i>	UPC 31/01/2017
Combinatorics reading seminar <i>Sampling and random walks on expander graphs</i>	UPC 27/10 - 03/11/2016
Combinatorics reading seminar <i>The phase transition in random graphs</i>	UPC 12/04/2016
Seminar Discrete Geometry <i>Intrinsic volumes for polyconvex sets</i>	Freie Universität Berlin 15/12/2016
LIMDA Joint Seminar <i>Variants of plane diameter completion</i>	UPC 18/11/2015
Research Seminar Combinatorics <i>Triangles in random cubic planar graphs</i>	Freie Universität Berlin 15/07/2015
Research Seminar Combinatorics <i>A parameterized algorithm for the diameter improvement problem for plane graphs</i>	Freie Universität Berlin 27/11/2014
Séminaire ALGCo <i>Complexité paramétrée et complétion plane à diamètre borné</i>	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*)