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 — **Freie Universität Berlin**
Asymptotic study of regular planar graphs — *11/2017*
Supervisor: Juanjo Rué

Master in Computer Science — **Université de Montpellier (UdM)**
Modélisation, Optimisation, Combinatoire et Algorithmique — *07/2014*

Bachelor in Mathematics — **UdM**
Mathématiques Fondamentales et Appliquées — *07/2011*

Current affiliation

Professor lector (lecturer) — **Universitat Politècnica de Catalunya (UPC)**
Research group: Geometric, Algebraic and Probabilistic Combinatorics (GAPComb) — *05/2024 - present*

Past affiliations

Beatriu de Pinós fellow in Mathematics — **Universitat Politècnica de Catalunya (UPC)**
Research group: Geometric, Algebraic and Probabilistic Combinatorics (GAPComb) — *05/2021 - 04/2024*

Postdoctoral researcher in Mathematics — **Uppsala University**
Research group: Analysis and Probability Theory — *09/2020 - 05/2021*

Postdoctoral researcher in Mathematics — **Technische Universität Wien**
Research group: Discrete Mathematics and Geometry — *05/2018 - 06/2020*

Postdoctoral researcher in Mathematics — **Johannes Kepler Universität Linz**
Research group: Algebra — *10/2017 - 04/2018*

Phase II student — **Berlin Mathematical School**
Mentor: Raman Sanyal — *02/2015 - 10/2017*

Ph.D. student in Mathematics — **Freie Universität Berlin**
Research group: Combinatorics and Graph Theory — *09/2014 - 09/2017*

Master student in Computer Science — **UdM - LIRMM**
Research group: Algorithmes, Graphes et Combinatoire (AlGCo) — *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*.

Preprint(s)

- **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.

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

Publications (refereed)

20. **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.*

19. **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).*

18. **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).*

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 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-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**
Bachelor in Computer Science — *Summer semester 2017 - 36 hours*

Experiences as teaching assistant

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

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*

Department of Mathematics of the National Kapodistrian University of Athens, Greece
Research group: Mathematical Analysis with Dimitrios Thilikos *02/2015*

Internships

Parameterized complexity of modification problems on plane graphs — **UdM - LIRMM**
Supervisor: Dimitrios M. Thilikos — *03 - 06/2014*

Model reduction with many timescales of bio-chemical graphs — **UdM - DIMNP**
Supervisor: Ovidiu Radulescu — *06 - 08/2013*

Algorithms of approximation for the maximum clique problem — **UdM**
Joint with Gaëlle Hisler. Supervisor: Rodolphe Giroudeau — *03 - 06/2013*

Topological methods in combinatorics — **UdM**
Supervisor: Jorge Luis Ramírez Alfonsín — *03 - 06/2012*

Advanced courses and thematic meetings as student

Algorithmic and Enumerative Combinatorics — **RISC, Hagenberg**
5th AEC Summer School — *07/2019*

Analysis of discrete random structures — **Domaine de la Tour, Caen**
ALEA Young — *05/2019*

Algorithmic and Enumerative Combinatorics — **RISC, Hagenberg**
4th AEC Summer School — *07/2018*

Random Discrete Structures and Beyond — **UPC, Barcelona**
BGSMath Monthly Program — *06/2017*

Random Graphs — **IES, Cargèse**
Cargèse Fall School — *09/2015*

Additive Combinatorics — **Freie Universität Berlin**
Block Course — *10/2014*

Conference talks

Analysis of Algorithms — **Taipei**
Chordal graphs with bounded tree-width — *29/06/2023*

Congreso de Jóvenes Investigadores de la Real Sociedad Matemática Española — **León**
Average number of perfect matchings in cubic planar graphs — *09/02/2023*

Algorithmic and Enumerative Combinatorics conference — **Vienna**
Chordal graphs with bounded tree-width — *07/07/2022*

Discrete Mathematics Days — **Santander**
Enumeration of chordal planar graphs and maps — *05/07/2022*

Journées de Combinatoire de Bordeaux — **Bordeaux**
Énumération des cartes planaires biparties 3-connexes — *10/06/2022*

European Conference on Combinatorics, Graph Theory and Applications — **Barcelona/Online**
The expected number of perfect matchings in cubic planar graphs — *08/09/2021*

Workshop on Geometric, Algebraic and Probabilistic Combinatorics — **Montserrat**
From the Ising model on maps to the enumeration of bipartite planar graphs — *12/07/2021*

Analysis of Algorithms — **Klagenfurt/Online**
The expected number of perfect matchings in cubic planar graphs — *15/06/2021*

SFB F50 Statusseminar — **Online**
Ising model on maps and enumeration of some classes of planar graphs — *15/12/2020*

Analysis of Algorithms — **Klagenfurt/Online recording**
Block statistics in subcritical graph classes — `youtube.com/watch?v=-SJRssqq020`

Workshop on Analytic and Enumerative Aspects of Combinatorics — **Caen**
Long cycles in cubic planar graphs — *31/08/2019*

Discrete Mathematics Workshop — **Stellenbosch**
A census of planar maps and graphs — *12/12/2018*

Joint Meeting of the Czech, Slovenian, Austrian, Slovak and Catalan Mathematical Societies — **Bratislava**
Asymptotic enumeration of labelled 4-regular planar graphs — *13/09/2018*

Analysis of Algorithms — **Uppsala**
Maximal independent sets and maximal matchings in series-parallel and related graph classes — *25/06/2018*

Workshop on Enumerative Combinatorics — **Oberwolfach**
Asymptotic enumeration of 4-regular planar graphs — *15/05/2018*

SFB F50 Statusseminar — **Strobl**
Asymptotic study of regular planar graphs — *4/12/2017*

European Conference on Combinatorics, Graph Theory and Applications — **Vienna**
Enumeration of labelled 4-regular planar graphs — *28/08/2017*

Berlin-Poznań seminar on Discrete Mathematics — **Hamburg**
On the enumeration of regular planar graphs — *21/04/2017*

Journées ALÉA — **Marseille**
Énumération des graphes planaires 4-réguliers — *20/03/2017*

FUB-TAU Joint Research Workshop on Graph and Hypergraph Coloring — **Tel Aviv**
On a version of the game of Painter-Builder — *5/03/2017*

Jornadas de Matematica Discreta y Algoritmica — **Barcelona**
Random cubic planar graph revisited — *7/07/2016*

International Symposium on Parameterized and Exact Computation — **Patras**
Variants of plane diameter completion — *16/09/2015*

European Conference on Combinatorics, Graph Theory and Applications — **Bergen**
Triangles in random cubic 3-connected planar graphs — *31/08/2015*

Seminar talks

Analysis and Dynamics Seminar — **University of Denver**
Asymptotic study of chordal graphs with bounded tree-width — *27/10/2023*

LIMDA Seminar — **UPC**
The Implicit Graph Conjecture is false — *04/05/2023*

GAPComb Reading Seminar on Thresholds — **UPC**
Park-Pham's Theorem: a proof of the Kahn-Kalai Conjecture — *16/12/2022*

Séminaire de combinatoire énumérative et analytique de l'IRIF — **Université Paris Cité/Online**
Modèle d'Ising et couplages parfaits sur les graphes planaires cubiques — *17/12/2020*

Probability and Combinatorics Seminar — **Uppsala University**
Random planar graphs — *08/10/2020*

Seminar Arbeitsgemeinschaft Diskrete Mathematik — **Technische Universität Wien**
Long cycles in cubic planar graphs — *22/10/2019*

Seminar Arbeitsgemeinschaft Diskrete Mathematik — **Technische Universität Wien**
Enumeration of labeled 4-regular planar graphs — *12/12/2017*

Seminar Algebra — **Johannes Kepler Universität Linz**
Enumeration of regular planar graphs — *23/11/2017*

LIMDA Joint Seminar — **UPC**
The enumeration of 4-regular planar graphs — *26/04/2017*

Combinatorics reading seminar — **UPC**
Graph limits: graph parameters and connection matrices — *31/01/2017*

Combinatorics reading seminar — **UPC**
Sampling and random walks on expander graphs — *27/10 - 03/11/2016*

Combinatorics reading seminar — **UPC**
The phase transition in random graphs — *12/04/2016*

Seminar Discrete Geometry — **Freie Universität Berlin**
Intrinsic volumes for polyconvex sets — *15/12/2016*

LIMDA Joint Seminar — **UPC**
Variants of plane diameter completion — *18/11/2015*

Research Seminar Combinatorics — **Freie Universität Berlin**
Triangles in random cubic planar graphs — *15/07/2015*

Research Seminar Combinatorics — **Freie Universität Berlin**
A parameterized algorithm for the diameter improvement problem for plane graphs — *27/11/2014*

Séminaire AlGCo — **LIRMM**
Complexité paramétrée et complétion plane à diamètre borné — *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*)