Clément Requilé | Curriculum Vitae

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

Ph.D. in Mathematics   **Freie Universität Berlin**
Supervisor: Juanjo Rué   *11/2017*
Title: Asymptotic study of regular planar graphs

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

Beatriu de Pinós postdoctoral researcher in Mathematics   **UPC**
Research group: Geometric, Algebraic and Probabilistic Combinatorics   *05/2021 - present*

Past affiliations

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   **LIRMM**
Research group: AlGCo (algorithmes, graphes et combinatoire)   *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

▷ **Enumeration of rooted 3-connected bipartite planar maps**, with Marc Noy and Juanjo Rué. *Submitted. arXiv:2202.13929.*

▷ **Enumeration of chordal planar graphs and maps**, with Jordi Castellví and Marc Noy. *Submitted. arXiv:2202.13340.*

▷ **Asymptotic enumeration of labelled 4-regular planar graphs**, with Marc Noy and Juanjo Rué. *Submitted. arXiv:2001.05943.*

Publications

14. **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.*

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. *41st International Symposium on 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. *10th 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.*

Experiences as teaching assistant

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

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

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

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*

Grants

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

Special Research Program (SFB) of the Austrian Science Fund (FWF) F50-02
Algorithmic and Enumerative Combinatorics - Shape characteristics of planar maps and planar graph.
Duration: 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: 10/2017 - 04/2018. Principal investigator: Manuel Kauers.

FU 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. Principal investigator: Clément Requilé.

DAAD - CAMPUS FRANCE Bilateral Project # 57134837
Analytic, probabilistic and geometric methods for random constrained graphs.
Duration: 01/2015 - 12/2016. Principal investigators: Juanjo Rué and Vlady Ravelomanana.

Marie Skłodowska-Curie Career Integration Grant (Europe) FP7-PEOPLE-2013-CIG # 630749
CountGraph - *Enumeration of discrete structures: algebraic, analytic, probabilistic and algorithmic methods for enriched planar graphs and planar maps.*
Duration: 03/2014 - 12/2016 (early termination). Principal investigator: Juanjo Rué.

Internships

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

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

Co-organization of scientific meetings

European Conference on Combinatorics, Graph Theory and Applications   **Barcelona**
Member of the organizing committee (chairs: Guillem Perarnau and Juanjo Rué)   *6 - 10/09/2021*

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*

Advanced courses and thematic meetings as student

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

Aanalysis 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 de Cargèse
Cargèse Fall School
09/2015

Additive Combinatorics
Freie Universität Berlin
Block Course
10/2014

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 of the Universitat Politècnica de Catalunya, Barcelona, Spain
Research group: Discrete Mathematics with Marc Noy
03/2016 – 04/2017

IRIF (Research Institute on the Foundations of Computer Science) 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

Conference talks

2nd 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 2021
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 2020
Klagenfurt/Online recording
Block statistics in subcritical graph classes
youtube.com/watch?v=-SJRssqq020

3rd 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

CSASC 2018
Bratislava
Asymptotic enumeration of labelled 4-regular planar graphs
13/09/2018

Analysis of Algorithms 2018
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, 2017 **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 2017 **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*

10th Jornadas de Matematica Discreta y Algoritmica **Barcelona**
Random cubic planar graph, revisited *7/07/2016*

10th International Symposium on Parameterized and Exact Computation **Patras**
Variants of plane diameter completion *16/09/2015*

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

Seminar talks

Séminaire de combinatoire énumérative et analytique de l'IRIF **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 **Universitat Politècnica de Catalunya**
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*)