

RAÚL PENAGUIÃO



Contact

Address - Zürich, Switzerland
Date of Birth: 30 - 12 - 1993
Nationality: Portuguese

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Education

University of Zürich, Switzerland
Doctoral studies in mathematics - Degree (PhD) in Pure Mathematics
September 2016 - currently

ETH Zürich, Federal University of Zürich, Switzerland
Masters of Science in Mathematics - Degree (MSc) in Pure Mathematics
September 2014 - June 2016
Grade: 5.74/6

Instituto Superior Técnico, University of Lisbon, Lisbon, Portugal.
Degree (BSc) in Applied Mathematics and Computation
September 2011 - August 2014
Grade: 19/20

Research interests Patterns in permutations and related objects.

Universal properties of symmetric functions.

Chromatic invariants on graphs, matroids, permutations and polytopes.

Favourite literature

Aguiar, Marcelo, and Swapneel Arvind Mahajan. Monoidal functors, species and Hopf algebras. Vol. 29. Providence, RI: American Mathematical Society, 2010.

Martin Aigner: Combinatorial Theory, 1979, *Springer*;

Noga Alon, and Joel H. Spencer: The probabilistic Method 3rd edition, 2008, *Wiley-Interscience*;

James R. Munkres: Topology, 2nd Edition, 2000, *Pearson*;

Scientific publications

- *The kernel of chromatic quasisymmetric functions on graphs and nestohedra*, 30th International Conference on Formal Power Series and Algebraic Combinatorics.
 - *The kernel of chromatic invariants on graphs and nestohedra*, submitted for publication.
 - *Substructure algebras and marked permutations*, submitted for publication.
 - *Substructure algebras: marked permutations, marked graphs and other combinatorial presheaves*. In preparation.
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Undergraduate scientific experience

- *Chromatic invariants on random graphs* (2015-2016)
Advisor: Valentin Féray, Zürich University.
 - *Chromatic invariants on graphs* (2015-2016)
Advisor: Valentin Féray, Zürich University.
 - *Quanduli and knot Theory* (2013-2014)
Advisor: Pedro Lopes, University of Lisbon.
 - *Lattice of stable marriages on Bipartite Graphs* (2011-2012)
Advisor: José Fachada, University of Lisbon.
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Employment

University of Zurich, Zürich, Switzerland.
Assistant and Doctoral student
September 2016 - currently

ETH Zürich, Zürich, Switzerland.
Teaching Assistant in Mathematical Methods in Physics I and in Analysis I
September 2015 - December 2015 and March 2016 - May 2016

NovaBase, Lisbon, Portugal.
Technical Assistant
October 2013 - January 2014
External Information: <http://www.novabase.pt/en>

Seminars

- **Chromatic invariants in graphs and nestohedra**, Formal Power Series and Alebraic Combinatorics, Dartmouth USA, (July, 2018).
- **The kernel problem in graphs and nestohedra**, 80th Seminaire Lotharigien Combinatoire, Lyon, (March, 2018).
- **Chromatic functions on random graphs**, Discrete mathematics seminar, University of Zurich, (September, 2016).
- **Flips in triangulations**, Class seminar in "Geometry: Combinatorics and Algorithms", ETH Zürich, (May, 2015).

- **Non-repetitive Sequences in paths and graphs**, Mittagseminar, ETH Zürich, (May, 2015).
- **Quandle Structures On Knots**, Diagonal School, Universidade Nova de Lisboa, (February, 2014).
- **Stable Mariages on Bipartite graphs**, Diagonal School, Universidade Nova de Lisboa, (February, 2012).

Awards

Mathematical Olympiads

- Silver medal in the Ibero-American Mathematical Olympiad for University Students. (2011)
- Silver Medal in the Ibero-American Mathematical Olympiad. (2011)
- Bronze Medal in the International Mathematical Olympiad. (2011)
- Gold Medal in the Portuguese Mathematical Olympiad. (2008, 2010 and 2011)

Programming Team Olympiads

- Gold Medal in the Portuguese Inter-Universitary Marathon. (2011)
 - Bronze Medal in the South-West European Regional Contest. (2011, 2012, 2013)
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Programming skills

- General-purpose: C++ and Python
 - Technical computing systems: Mathematica, MatLab and SAGE math
 - Markup languages: HTML and LaTeX
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Extra-curricular activities

BoyScout, Carcavelos, Portugal. From 1999 to today.
 Instructor: December 2012 - Today
 Clan Guide: 2012 - 2013
 Clan treasurer: 2011 - 2012
 Stone-curlew patrol Secretary: 2005-2011
 External Information: <https://www.facebook.com/escoteiroscaarcavelos>

Some projects

- Organizer of the "Student workshop for permutation patterns in 2019" - <https://sites.google.com/view/permutation-patterns-2019/pre-conference-workshop>
- 228 Problems on www.projecteuler.net
- Organizer of the first edition "Mathematics, Statistics and Computation Journeys", main organizer of the Math exposition - <http://jmec.ist.utl.pt/>
- Organizer of the *permutation patterns pre-conference workshop 2019* - <https://sites.google.com/view/permutation-patterns-2019/pre-conference-workshop>