

## Manuel Francesco Aprile

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### Contact information

Date and place of birth: 23 September 1991, Mascalucia (Italy)  
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Université libre de Bruxelles (ULB)  
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### Research interests

Combinatorial optimization, extended formulations of polytopes, graphs and matroids

### Employment

From 2019: Post-doctoral researcher  
Mathematics Department, ULB, Belgium  
  
From 2014: PhD Student (“assistant doctorant”)  
EPFL, Lausanne, Switzerland

### Education

2018: Ph.D. in Discrete Optimization  
EPFL, Switzerland  
Advisor: Prof. Friedrich Eisenbrand  
Co-advisor: Prof. Yuri Faenza  
  
2014: M. Sc. in Mathematics and Foundation of Computer Science  
University of Oxford, United Kingdom  
Advisor: Prof. Colin McDiarmid  
  
2013: B. Sc. in Mathematics, *summa cum laude*  
University of Catania, Italy  
Advisor: Prof. Giuseppe Nicosia

### Awards and scholarship

2010-13: Winner of the INdAM (National Institute of High Mathematics) scholarship to entirely support my Bachelors studies (12.000 €)  
  
Math Olympics:  
2010: Bronze Medal at National Contest, Cesenatico, Italy.  
2005-09: Selected for the Regional Contest, Sicily, Italy.  
2004: Selected for the National Contest, Bocconi University, Milan, Italy.  
  
Physics Olympics:  
2007-09: Selected for the Regional Contest, Sicily, Italy.

<b>Teaching</b>		Teaching assistant at ULB:
	Autumn 2019:	“Géométrie convexe et discrète” (Master’s level course, in French)
		Teaching assistant at EPFL:
	Spring 2015-2018:	Discrete Optimization
	Fall 2017:	Combinatorial Geometry (Master’s level course)
	Fall 2016:	Combinatorial optimization (Master’s level course)
	Fall 2015:	Algèbre linéaire (in French)
		Activities on teaching:
	June 2017:	SOTL workshop, Zurich (invited speaker)
	Fall 2016:	Science and Engineering Teaching and Learning (semester course)
<b>Student supervision</b>	May 2015:	Instructional Skills Workshop (3 days)
	October 2014:	Teaching toolkit for Doctoral Assistants (1 day)
	Cslovjecsek Jana:	Master project “ <i>Extension complexity of polytopes</i> ” EPFL, Fall 2018
	Gilbert Maystre:	Master project “ <i>Non-repetitive coloring of line graphs</i> ” EPFL, Spring 2017
	Loris Di Natale:	Bachelor project “ <i>On the minimum rainbow subgraph problem</i> ” EPFL, Fall 2016 (jointly with A. Cevallos)
<b>Professional service</b>	Maurice Amendt:	Bachelor project “ <i>Non-repetitive graph coloring</i> ” EPFL, Fall 2015
		Reviewer for journals and international conferences, such as: European Journal of Combinatorics, Discrete Mathematics & Theoretical Computer Science, Discrete Applied Mathematics, IPCO (Integer Programming and Combinatorial Optimization).
<b>Publications</b>		Not yet published:
		<ul style="list-style-type: none"><li>• M. Aprile, S. Fiorini <i>Regular matroids have polynomial extension complexity</i>. <a href="https://arxiv.org/abs/1909.08539">https://arxiv.org/abs/1909.08539</a>, 2019.</li></ul>
		In conferences with published, peer-reviewed proceedings:
		<ul style="list-style-type: none"><li>• M. Aprile, Y. Faenza <i>Extended formulations from communication protocols in output-efficient time</i> International Conference on Integer Programming and Combinatorial Optimization (IPCO). Springer, Cham, 2019.</li><li>• M. Aprile, Y. Faenza, S. Fiorini, T. Huynh, M. Macchia <i>Extension complexity of stable set polytopes of bipartite graphs</i> International Workshop on Graph-Theoretic Concepts in Computer Science. Springer, Cham, 2017.</li><li>• M. Aprile, N. Castro, F. Robledo, P. Romero <i>Analysis of Node-Resilience Strategies under Natural Disasters</i>. International Conference on Design of Reliable Communication Networks, 2017.</li></ul>

- M. Aprile, A. Cevallos, Y. Faenza *On Vertices and Facets of Combinatorial 2-Level Polytopes*. In: R. Cerulli, S. Fujishige, A. Mahjoub (eds) Combinatorial Optimization. ISCO 2016. Lecture Notes in Computer Science, vol 9849. Springer, Cham, 2016.

In journals:

- M. Aprile, Y. Faenza *Extended formulations from communication protocols in output-efficient time* Mathematical Programming B (in revision).
- M. Aprile, A. Cevallos, Y. Faenza *On 2-level polytopes arising in combinatorial settings* SIAM Journal on Discrete Mathematics 32.3, 2018.
- M. Aprile, N. Castro, G. Ferreira, J. Piccini, F. Robledo, P. Romero *Graph fragmentation problem: analysis and synthesis* International Transactions in Operational Research, 2018.

Theses:

- M. Aprile *On some problems related to 2-level polytopes*, Ph.D. thesis, EPFL, 2018.
- M. Aprile *Constructive Aspects of Lovász Local Lemma and Applications to Graph Colouring*, MSc thesis, University of Oxford, 2014.
- M. Aprile *An algorithm for constructing magic squares*, Bachelor thesis, University of Catania, 2013.

## **Presentations**

Workshop on Extended Formulations and Symmetries 2019, Rancagua, Chile (on invitation)  
 IPCO 2019, Ann Arbor, USA  
 Cargese Workshop on Combinatorial Optimization (2017-2019), France (on invitation)  
 Aussois Combinatorial Optimization Workshop (2018-2019), France (on invitation)  
 DRCN 2017, Munich, Germany  
 ISCO 2016, Vietri sul Mare, Italy

## **Languages**

Italian (native), English (proficient), French (proficient).