

Curriculum Vitae of Mathilde Bouvel

PERSONAL INFORMATION

Name: Mathilde Bouvel

Nationality: French

Family situation: Married, mother of three children

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Work address:

Loria, Campus Scientifique, BP 239, 54506 Vandoeuvre-lès-Nancy, France.

• CURRENT POSITIONS

Jan 2020 – Aug 2021 Assistant professor at the Mathematics Institute of the University of Zurich (Switzerland).

Oct 2010 – ... Permanent position as Junior Researcher (*Chargée de recherche*) at CNRS (France). From August 2020, in the Mocqua team at Loria, Nancy. Previously in the combinatorics team at LaBRI, Bordeaux.

• PREVIOUS POSITIONS

June 2014 – Dec 2019 Lecturer at the Mathematics Institute of the University of Zurich (Switzerland).

Aug 2013 – May 2014 Post-doc at the Mathematics Institute of the University of Zurich.

Sept 2010 Post-doc within project ANR GAMMA, at LIAFA, Paris Diderot University (France).

Sept 2007 – Aug 2010 Ph.D. student and teaching assistant at Paris Diderot University.

• EDUCATION

Sept 2006 – Dec 2009 PhD at Paris Diderot University:

Advisers: Dominique Rossin, co-advised by Renzo Pinzani (University of Florence, Italy)

Defense: December 4, 2009

Title: Some combinatorial and algorithmic problems on permutation classes [*in French*]

Sept 2003 – Aug 2007 Student at *École Normale Supérieure de Cachan*.

Including research internships with R. Pinzani (Florence, 2 months), G. Kucherov (Nancy, France, 5 months) and D. Rossin (Paris, 5 months).

Sept 2001 – Aug 2003 Undergraduate studies in *Classes Préparatoires* at *Lycée Henri Poincaré (Nancy, France)*.

• AWARDS Marie Heim-Vögtlin prize 2017.

• FELLOWSHIPS

Jan 2020 – August 2021 Eccellenza Professorial Fellowship of the Swiss National Science Foundation (grant number PCEFP2_186872).

Amount originally awarded: 1 629 314 CHF, for the period Jan 2020 - Dec 2024. (Note that I decided reduce the duration and amount granted, for family reasons.)

June 2014 – Sept 2016 Marie Heim-Vögtlin fellow of the Swiss National Science Foundation (grant number PMPDP2_151254).

Amount awarded: 168 559 CHF.

Aug 2013 – Aug 2015 Fellow of the Forschungskredit of the University of Zurich (grant number FK-13-105).

Amount awarded: 100 000 CHF.

• CURRENT GRANTS

Jan 2020 – August 2021 Eccellenza Professorial Fellowship of the Swiss National Science Foundation (grant number PCEFP2_186872), as above.

• PAST GRANTS

Sept 2017 – Dec 2019 Project 200021_172536 of the SNF (Swiss National Science Foundation) – PI.

Amount awarded: 140 967 CHF.

Jan 2015 – Dec 2016 Swiss-French Germaine de Staël research project of the Swiss academy of Engineering Science (SATW) – PI for Switzerland.

Sept 2011 – Aug 2014 Research project of the French National Research Agency (ANR), *Project name: Psycy* – Member.

Dec 2010 – Nov 2014 Research project of the ANR, *Project name: Magnum* – Member.

Nov 2007 – Oct 2010 Research project of the ANR, *Project name: Gamma* – Member.

• SUPERVISING OF STUDENTS

Sept 2019 – May 2020 Advisor of a Master student, Lucia Croci.

Lucia has studied the enumeration of pattern-avoiding inversion sequences.

Sept 2017 – ... Co-advisor with Valentin Féray (University of Zurich) of a PhD student, Jacopo Borga.

Jacopo studies the (weak) local convergence of permutations.

Sept 2016 – Sept 2017 Advisor of a Master student, Marc Egger.

Marc has been working on the relation between permutation pattern matching and induced subgraph isomorphism.

Sept 2016 – March 2017 Co-advisor with Valentin Féray (University of Zurich) of a PhD student, Lisa Hofer.

Lisa has been working on limiting distributions of pattern occurrences in permutations. She stopped her PhD for personal reasons.

June 2015 – March 2018 Co-advisor with Simone Rinaldi (University of Siena, Italy) of a PhD student, Veronica Guerrini.

Veronica has been working on generating trees and functional equations for sequences between Catalan numbers and Baxter numbers, and beyond these.

• TEACHING ACTIVITIES

2013 – 2019 Lecturer and teaching assistant at the University of Zurich.

Courses taught:

- Calculability and complexity,
- Foundations of Mathematics,
- Combinatorics of words,
- Enumerative combinatorics.

Assitant for:

- Foundations of Mathematics,
- Enumerative combinatorics,
- Analytic combinatorics.

2007 – 2010 Teaching assistant at the computer science department during my PhD.

Courses: Algorithms, Introduction to computer science and programming, Introduction to web programming, Working principles of binary machines

- ORGANIZATION OF SCIENTIFIC MEETINGS

- June 2019 Main organizer of the conference Permutation Patterns in Zurich, Switzerland. (Duration: 1 week, preceded by a 3-day workshop)
- July 2013 Co-organizer (with F. Bassino and D. Rossin) of the conference Permutation Patterns in Paris, France. (Duration: 1 week)
- March 2013 Co-organizer (with A. Boussicault and V. Féray) of the yearly meeting of the working group Aléa at the CIRM, Marseille, France. (Duration: 1 week)
- June 2012 Main organizer of the conference GASCom (Génération Aléatoire de Structures Combinatoires) in Bordeaux, France. (Duration: 3 days)

- PARTICIPATION TO COMMITTEES

- 2019 Member of a hiring committee for a permanent junior teacher-researcher position at Univ. Paris Est.
- 2018 Member of the program committee of the conference *FPSAC 2018*.
- 2014 Member of the program committee of the conference *GASCom 2014*.
- 2012 – ... Member of the steering committee of the series of conferences *Permutation Patterns*.
- 2012 Member of a hiring committee for a permanent junior teacher-researcher position at Univ. Paris 6.

- EDITORIAL AND REVIEWER ACTIVITIES

- 2020 – ... Member of the editorial board of the journal *Annals of Combinatorics*
- 2018 – 2020 Guest editor (with M. Bona, L. Pudwell and V. Vatter) for two special volumes of *Discrete Mathematics and Theoretical Computer Science* (special issues following the conferences *Permutation Patterns 2018* and *2019*).
- 2015 – 2017 Guest editor (with J. Bloom and R. Brignall) for Volume 18 (no. 2) of *Discrete Mathematics and Theoretical Computer Science* (special issue following the conference *Permutation Patterns 2015*).
- 2013 – 2015 Guest editor (with F. Bassino and D. Rossin) for Volume 6 (no. 1-2) of the *Journal of Combinatorics* (special issue following the conference *Permutation Patterns 2013*).
- 2008 – ... Reviewer for the following journals:

Advances in Applied Mathematics,
Combinatorics, Probability and Computing,
Discrete Applied Mathematics,
Discrete Mathematics,
Discrete Mathematics and Theoretical Computer Science,
European Journal of Combinatorics,
Information Processing Letters,
Journal of Combinatorics,
Journal of Combinatorial Theory - Series A (before 2020),

Journal of Discrete Algorithms,
Journal of Statistical Planning,
Journal of Symbolic Computations,
Pure Mathematics and Applications,
RAIRO - Theoretical Informatics and Applications,
Séminaire Lotharingien de Combinatoire,
Theoretical Computer Science,
Transactions on Computational Biology and Bioinformatics.

- 2008 – ... Reviewer for the following conferences:

STACS 2008,
FPSAC 2010,
CPM 2011,
FPSAC 2012,
Analysis of Algorithms 2012,
LAGOS 2013,
SPIRE 2016,
FPSAC 2017,
ANALCO 2019,
FPSAC 2019.

- MEMBERSHIP TO RESEARCH NETWORKS

2006 – ... Member of French Research Network on Mathematical Computer Science (GDR IM).

- CAREER BREAKS

2015 Maternity leave (4 months, January to May 2015) for the birth of my son Oscar.
2017 Maternity leave (4 months, May to September 2017) for the birth of my daughter Agathe.
2020 Maternity leave (6 months, March to September 2020) for the birth of my daughter Iris.

In addition, from September 2017 until now, I reduced my working percentage to 80%.

- BRIEF OVERVIEW OF RESEARCH INTERESTS

My research deals with the study of permutations (and related objects) in enumerative, bijective and analytic combinatorics, in algorithms, in connection with random generation and probability theory, and sometimes with motivation from or applications to bio-informatics.

I am specifically interested in patterns in permutations, in permutation sets that are closed downwards for this relation (called permutation classes), and in substitution decomposition.

Lately, I have specifically developed two main lines of research: enumeration of pattern-avoiding permutations using generating trees, and description of scaling limits of permutation classes.

- PUBLICATIONS IN JOURNALS

1. Counting Phylogenetic Networks of level 1 and 2, with Philippe Gambette, Marefatollah Mansouri. *Journal of Mathematical Biology*, **81**: 1357–1395, 2020.
2. Universal limits of substitution-closed permutation classes, with Frédérique Bassino, Valentin Féray, Lucas Gerin, Mickaël Maazoun, Adeline Pierrot. *Journal of the European Mathematical Society*, **22** (11): 3565–3639, 2020.
3. A decorated tree approach to random permutations in substitution-closed classes, with Jacopo Borga, Valentin Féray, Benedikt Stuffer. *Electronic Journal of Probability*, **25**: 1–52, Paper no. 67, 2020.
4. Some families of trees arising in permutation analysis, with Marni Mishna, Cyril Nicaud. *Electronic Journal of Combinatorics*, **27** (2), Paper P2.20, 2020.
5. Two first-order logics of permutations, with Michael Albert, Valentin Feray. *Journal of Combinatorial Theory, Series A*, **171**, Article 105158, 2020.
6. Enumerating five families of pattern-avoiding inversion sequences; and introducing the powered Catalan numbers, with Nick Beaton, Veronica Guerrini, Simone Rinaldi. *Theoretical Computer Science*, **777**: 69–92, 2019.
7. Slicings of parallelogram polyominoes: Catalan, Schröder, Baxter, and other sequences, with Nick Beaton, Veronica Guerrini, Simone Rinaldi. *Electronic Journal of Combinatorics*, **26** (3): paper number P3.13, 2019.
8. Semi-Baxter and strong-Baxter: two relatives of the Baxter sequence, with Veronica Guerrini, Andrew Rechnitzer, Simone Rinaldi. *SIAM J. Discrete Math.*, **32** (4): 2795–2819, 2018.
9. The Brownian limit of separable permutations, with Frédérique Bassino, Valentin Féray, Lucas Gerin, Adeline Pierrot. *Annals of Probability*, **46** (4): 2134–2189, 2018.

10. An algorithm computing combinatorial specifications of permutation classes, with Frédérique Bassino, Adeline Pierrot, Carine Pivoteau, Dominique Rossin. *Discrete Applied Mathematics*, **224**: 16–44, 2017.
11. Permutation classes and polyomino classes with excluded submatrices, with Daniela Battaglino, Andrea Frosini, Simone Rinaldi. *Mathematical Structures in Computer Science*, **27** (2): 157–183, 2017.
12. A general theory of Wilf-equivalence for Catalan structures, with Michael Albert. *Electronic Journal of Combinatorics*, **22** (4), Paper P4.45, 2015.
13. An algorithm for deciding the finiteness of the number of simple permutations in permutation classes, with Frédérique Bassino, Adeline Pierrot, Dominique Rossin. *Advances in Applied Mathematics*, **64**: 124–200, 2015.
14. Operators of equivalent sorting power and related Wilf-equivalences, with Michael Albert. *Electronic Journal of Combinatorics*, **21** (4), Paper P4.11, 2014.
15. Combinatorics of non-ambiguous trees, with Jean-Christophe Aval, Adrien Boussicault, Matteo Silimbani. *Advances in Applied Mathematics*, **56**: 78–108, 2014.
16. Refined enumeration of permutations sorted with two stacks and a D_8 -symmetry, with Olivier Guibert. *Annals of Combinatorics*, **18**(2): 199–232, 2014.
17. Geometric grid classes of permutations, with Michael Albert, Mike Atkinson, Nik Ruskuc, Vincent Vatter. *Transactions of the American Mathematical Society*, **365** (11): 5859–5881, 2013.
18. On the enumeration of d -minimal permutations, with Luca Ferrari. *Discrete Mathematics and Theoretical Computer Science*, **15**(2): 33–48, 2013.
19. On the inverse image of pattern classes under bubble sort, with Michael H. Albert, Mike D. Atkinson, Anders Claesson, Mark Dukes. *Journal of Combinatorics*, **2**(2): 231–244, 2011.
20. Average-case analysis of perfect sorting by reversals, with Cédric Chauve, Marni Mishna, Dominique Rossin. *Discrete Mathematics, Algorithms and Applications*, **3** (3): 369–392, 2011.
21. Enumeration of Pin-Permutations, with Frédérique Bassino, Dominique Rossin. *Electronic Journal of Combinatorics*, **18**(1), Paper P57, 2011.
22. Deciding the finiteness of the number of simple permutations contained in a wreath-closed class is polynomial, with Frédérique Bassino, Mathilde Bouvel, Adeline Pierrot, Dominique Rossin. *Pure Mathematics and Applications*, **21**(2): 119–135, 2010.
23. Posets and Permutations in the Duplication-Loss Model: Minimal Permutations with d Descents, with Elisa Pergola. *Theoretical Computer Science*, **411**(26-28): 2487–2501, 2010.
24. A variant of the tandem duplication - random loss model of genome rearrangement, with Dominique Rossin. *Theoretical Computer Science*, **410**(8-10): 847–858, 2009.
25. Posets and Permutations in the duplication-loss model, with Elisa Pergola. *Pure Mathematics and Applications*, **19**(2-3): 71–80, 2008.
26. Some statistics on permutations avoiding generalized patterns, with Antonio Bernini, Luca Ferrari. *Pure Mathematics and Applications*, **18**(3-4): 223–237, 2007.
27. The Longest Common Pattern Problem for two Permutations, with Dominique Rossin. *Pure Mathematics and Applications*, **17**(1-2): 55–69, 2006.

- PUBLICATIONS IN CONFERENCE PROCEEDINGS

1. Semi-Baxter and strong-Baxter permutations, with Veronica Guerrini, Andrew Rechnitzer, Simone Rinaldi. *FPSAC 2017, Séminaire Lotharingien de Combinatoire*, **78B**: Article #19, (12 pages), 2017.
2. Slicings of parallelogram polyominoes, or how Baxter and Schröder can be reconciled, with Veronica Guerrini, Simone Rinaldi. *FPSAC 2016, DMTCS Proceedings*, **BC**: 287–298, 2016.
3. Operators of equivalent sorting power and related Wilf-equivalences, with Michael Albert. *FPSAC 2013, DMTCS Proceedings*, **AS**: 671–682, 2013.
4. Combinatorics of non-ambiguous trees, with Jean-Christophe Aval, Adrien Boussicault, Matteo Silimbani. *FPSAC 2013, DMTCS Proceedings*, **AS**: 49–60, 2013.
5. Some simple varieties of trees arising in permutation analysis, with Marni Mishna, Cyril Nicaud. *FPSAC 2013, DMTCS Proceedings*, **AS**: 825–836, 2013.
6. Enumeration of permutations sorted with two passes through a stack and D_8 -symmetries, with Olivier Guibert. *FPSAC 2012, DMTCS Proceedings*, **AR**: 757–768, 2012.
7. Combinatorial specification of permutation classes, with Frédérique Bassino, Adeline Pierrot, Carine Pivoteau, Dominique Rossin. *FPSAC 2012, DMTCS Proceedings*, **AR**: 781–792, 2012.
8. Average-case analysis of perfect sorting by reversals, with Cédric Chauve, Marni Mishna, Dominique Rossin. *CPM 2009, LNCS*, **5577**: 314–325, 2009.
9. Longest Common Separable Pattern between Permutations, with Dominique Rossin, Stéphane Vialette. *CPM 2009, LNCS*, **4580**: 316–327, 2007.
10. Combinatorial Search on Graphs Motivated by Bioinformatics Applications: A Brief Survey, with Vladimir Grebinski, Gregory Kucherov. *WG 2005, LNCS*, **3787**: 16–27, 2005.

- INVITED TALKS

1. Invited speaker Open University Winter Combinatorics Meeting, Milton Keynes, UK, Feb 2019.
2. Invited speaker at the Journées Combinatoires de Bordeaux, Bordeaux, France, Feb 2019.
3. Invited speaker at the winter school on *Combinatorics and interactions*, CIRM, Marseille, France, Jan 2017.
4. Invited speaker in the minisymposium on *Enumerative Combinatorics*, CanaDAM (Canadian Discrete and Algorithmic Mathematics Conference), 4th edition, Memorial University of Newfoundland, Canada, June 2013.
5. Invited speaker at the meeting *Algorithms and Permutations*, Paris, France, Feb 2012.
6. Invited speaker at the workshop *Graph Decomposition: Theoretical, Algorithmic and Logical Aspects*, CIRM, Marseille, France, Oct 2010.
7. Invited speaker at the Journées Combinatoires de Bordeaux, Bordeaux, France, Feb 2009.

- PREPRINTS

1. Random cographs: Brownian graphon limit and asymptotic degree distribution, with Frédérique Bassino, Valentin Féray, Lucas Gerin, Mickaël Maazoun, Adeline Pierrot.
2. Scaling limits of permutation classes with a finite specification: a dichotomy, with Frédérique Bassino, Valentin Féray, Lucas Gerin, Mickaël Maazoun, Adeline Pierrot.

These preprints, as well as my published articles, are available on Arxiv and/or on my web site.