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Laure Daviaud

Postdoctoral Research Fellow in Computer Science

Positions

2016 - 2017 **Postdoctoral Research Fellow** at Warsaw Univ., MIMUW, *with M.Bojańczyk*
Working on the ERC project "A unified theory for finite state machines" led by M.Bojańczyk

2015 - 2016 **Postdoctoral Research Fellow** at ENS Lyon, LIP, *with C.Riba*

2014 - 2015 **Postdoctoral Research Fellow** at Aix-Marseille Univ., LIF, *with P-A.Reynier and J-M.Talbot*

2011 - 2014 **PhD** at Univ. Paris VII - CNRS, LIAFA, *with T.Colcombet and J-É.Pin*
Working on the ERC project "Games and automata for logic extensions" led by T.Colcombet

Research activities

Research interests

Automata theory, verification, logic, quantitative models and transducers, streaming models, weighted automata, tropical algebra and semigroups of matrices, algebraic language theory and topology

Publications

Peer-reviewed international journals

[1] *Approximate comparison of functions computed by distance automata*, T.Colcombet and L.Daviaud, Theory Comput. Syst., 58(4):579–613, 2016.

Peer-reviewed international conferences

[2] *The shortest identities for max-plus automata with two states*, L.Daviaud and M.Johnson, to appear in MFCS 2017

[3] *Comparison of max-plus automata and joint spectral radius of tropical matrices*, L.Daviaud, P.Guillon and G.Merlet, to appear in MFCS 2017

[4] *Which classes of origin graphs are generated by transducers*, M. Bojańczyk, L.Daviaud, B. Guillon and V. Penelle, to appear in ICALP 2017

[5] *Degree of sequentiality of weighted automata*, L.Daviaud, I.Jecker, P-A.Reynier and D.Villevalois, in FOSSACS 2017: Foundations of Software Science and Computation Structures - 20th International Conference, Proceedings volume 10203 of Lecture Notes in Computer Science, pages 215–230, 2017.

[6] *A generalised twinning property for minimisation of cost register automata*, L.Daviaud, P-A.Reynier and J-M.Talbot, in LICS 2016, Proceedings of the 31st Annual ACM/IEEE Symposium on Logic in Computer Science, pp. 857–866, ACM, 2016.

[7] *Varieties of cost functions*, L.Daviaud, D.Kuperberg and J-É.Pin, in STACS 2016: 33th International Symposium on Theoretical Aspects of Computer Science, vol. 47 of LIPIcs, pp. 30:1-30:14, Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, 2016.

[8] *Classes of languages generated by the kleene star of a word*, L.Daviaud and C.Paperman, in MFCS 2015: Mathematical Foundations of Computer Science 2015 - 40th International Symposium, Part I, vol. 9234 of Lecture Notes in Computer Science, pp. 167–178, Springer, 2015.

[9] *Size-change abstraction and max-plus automata*, T.Colcombet, L.Daviaud and F.Zuleger, in MFCS 2014: Mathematical Foundations of Computer Science 2014 - 39th International Symposium, Part I, vol. 8634 of Lecture Notes in Computer Science, pp. 208–219, Springer, 2014.

[10] *Approximate comparison of distance automata*, T.Colcombet and L.Daviaud, in STACS 2013: 30th International Symposium on Theoretical Aspects of Computer Science, vol. 20 of LIPIcs, pp. 574-585, Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, 2013.

PhD thesis

[11] *Comportements asymptotiques des automates max-plus et min-plus.*
`http://www.mimuw.edu.pl/~ldaviaud/thesemanuscrit.pdf`

Submitted or in preparation

[12] *Undecidability of MSO + "ultimately periodic"*, M.Bojanczyk, L.Daviaud, B.Guillon, V.Penelle and Sreejith A.V.

[13] *Identities in Upper Triangular Tropical Matrix Semigroups and the Bicyclic Monoid*, L.Daviaud, M.Johnson and M. Kambites, arXiv:1612.04219

[14] *Classes of languages generated by the Kleene star of a word*, L.Daviaud, C.Paperman, journal version - 31 pages - submitted to Information and Computation

[15] *Profinite equations for cost functions*, L.Daviaud, D.Kuperberg and J-E.Pin - 40 pages

Lectures

Invited speaker

- PGMO Days 2016, special session *Tropical Methods* (Paris-09/11/16)
- ILAS 2016, mini-symposium *Tropical Algebra and beyond* (Leuvain-12/07/16)
- Conference "Topology and languages" (Toulouse-22/06/16)
- AMS-EMS-SPM International meeting 2015, session *Algebraic Theory of Semigroups and Applications* (Porto-11/06/15)

Tutorials

- Invited tutorial at the conference MFPS (Mathematical Foundations of Programming Semantics) (Ljubljana-13/06/17)
- Presentation for 3rd and 4th year French students to promote research internships in the University of Warsaw (november 2016)

Presentations in conferences and seminars

International conferences (DICE 2016, MFCS 2014, 2015, STACS 2013, HIGHLIGHTS of Logic, Games and Automata 2013, 2014) and various seminars (Manchester, Bruxelles, Warsaw, Bordeaux, Marseille, Lyon, Créteil, Marnes-la-Vallée, Cachan, Rouen...)

Supervision

Supervision of a research internship of Emilie Grienenberger, 3rd year student, *ENS Lyon*
For 7 weeks in June and July 2016
I devised a research project and supervised the student helping her to carry out original research, and write a thesis in preparation for an oral examination.
Research in the field of automata theory and complexity analysis.

Project participation

- ERC consolidator grant LIPA (2016-2017)
- ERC starting grant GALE (2011-2014)
- ANR (French national project) FREC (2011-2014)

Teaching activities

Duties: Preparation and delivery of lectures and computer laboratory work, creation, update and correction of materials and exams (written and oral), organisation and coordination tasks

2017 **Teaching assistant** - *University of Warsaw*
4th year students in computer science - 28h
. ***Complexity theory***: Turing machines, Boolean circuits, complexity classes...
Classes given in English
→ *Creation of the material (exercise sheets written in English)*
→ *In each class: reminders of the lecture and support to students in solving exercises*

2011 - 2014 **Teaching assistant** - *Université Paris VII*
1st year students in mathematics, computer or social sciences - 192h
. ***Web development***: HTML, PHP, CSS, database
Computer laboratory work and project supervision - 52h
→ *Creation of exercise sheets for computer laboratory work*
→ *Supervision of a project:* each group of students (2 or 3) had to code a participative website with an interface for users to register, connect, give comments and for owners to moderate, with a particular focus on the security of the website
→ *Organisation of the oral examinations of the project* (involving 7 examiners and 50 groups)
. ***Algorithmic and programming***: Introduction to algorithmic and programming with JAVA
Computer laboratory work - 88h
→ *Creation of exercise sheets for computer work*
→ *Supporting students in solving the exercises*
→ *Creation and correction of a computer laboratory exam*
. ***Object-oriented programming***: Data types, object-oriented programming with JAVA
Exercises - 26h
→ *Creation and correction of exercise sheets and exams*
. ***Low-level behaviour of a computer***: Management of the memory, variables and recursion
Exercises - 26h
→ *Updates of exercise sheets, correction of the exams*

2014 **Oral examiner** - *Aix-Marseille Université*
2nd year students in mathematics/computer science - 10h
Creation of exercices and interview of the students (on general concepts in algorithmic)

2008 **Teaching internship** - *Lycée Pierre de Fermat, Toulouse*
1st year students (classe préparatoire mathematics) - 3 weeks
Lectures in arithmetic (divisability, $\gcd$ for $\mathbb{Z}$ and polynomials)

Pedagogical activities, volunteer work and administrative tasks

Science promotion

. Presentation in a conference organised for the Polish Minister of Research and Science "Konferencja programowa Narodowego Kongresu Nauki", Poznan, 23-24/02/2017
Regarding the benefits of ERC grants
. Speaker, at *"Filles et Maths : une équation lumineuse"* (2013)
Promotion of maths studies for women; talks with groups of teenage girls
. Tour guide, at *"Festival de la science, Paris-Montagne"* (2012 and 2013)
In charge of introducing science concepts to groups of children and teenagers

Organisation

. Part of the organisation team of conferences *HIGHLIGHTS in Logic, Games and Automata*
(Paris, 2013 and 2014)
(Université Paris VII, 2014)
. Organisation of a seminar session dedicated to the interns (ENS Lyon, 2016)

Volunteer teacher

Homework help in mathematics for children and teenagers of Priority Education Zones (2 hours per week from 2013 to 2015)

Education

2011 - 2014 **PhD supervised by Thomas Colcombet and Jean-Éric Pin**
Automata theory, quantitative models, tropical algebra, semigroup theory
LIAFA, Université Paris VII-CNRS

2010 - 2011 **Master 2nd year MPRI** - Master Parisien de Recherche en Informatique, *ENS Cachan*
Master's degree in Computer Science with high honours, 17.2/20, rank 4 over 68

2009 - 2010 **Agrégation de Mathématiques**, *ENS Cachan*
Highest French teaching competitive exam in mathematics, rank 99 over 2332

2008 - 2009 **Master 1st year** - Fundamental and applied mathematics
Université d'Orsay, Paris XI

2005 - 2008 **Bachelor's degree** in Mathematics
Université d'Orsay, Paris XI