

CURRICULUM VITAE

Flavio D'Alessandro

Current address:

Department of Mathematics “G. Castelnuovo” University of Rome “La Sapienza”,
Piazzale Aldo Moro 4, 00185 Rome, ITALY.

Education

- 1997 – Ph. D. in Computer Science, University of Paris 7, Paris, France.
Advisor: Pascal Weil.
- 1997 – Ph. D. in Mathematics, University of Naples “Federico II”.
Advisor: A. de Luca.
- 1992 – Laurea in Matematica *cum laude*, University of Rome “La Sapienza”.
Advisor: A. de Luca.

Employment

- November 2000 – present, Assistant Professor in Computer Science, University of Rome “La Sapienza”.
- September 1998– September 1999, Assistant Professor in Computer Science, University of Paris 7, Paris (France).
- 1998, Entitled as a associate professor in Computer Science, (“qualification à fonction de maîtres de conférences”), *Comité Nationale des Universités (C.N.U.)*, *Ministère de l'Education Nationale français*.

Scientific stays

- Visiting Professor, *Department of Mathematics*, Bogazici University, Istanbul, October 2009-February 2010.
- *Department of computer science “LIAFA”*, University of Paris 7, November 2008.
- *Department of computer science “Johann Wolfgang Goethe”*, University of Frankfurt, February 2007.
- *Department of computer science “LIAFA”*, University of Paris 7, April 2007.
- *Department of computer science “LIAFA”*, University of Paris 7, October-November 2005.

- *Department of computer science “LIAFA”*, University of Paris 7, July 2001.
- *Department of computer science “TUCS”*, University of Turku, Finland, August 2001.
- *Department of computer science “TUCS”*, University of Turku, Finland, August-October 2000.

Research interests:

1. **Theory of finite automata and context-free languages:** Counting functions of semi-linear and context-free languages, regularity problem for context-free languages, synchronization of oriented colored graphs and the Cerny Conjecture.
2. **Algebraic combinatorics of monoids and discrete structures:** vector partition functions, free non commutative groups, free inverse monoids.

International scientific activities

- Coordinator in chief of the projects “AST 2009 Ricercatori” and “AST 2010”, University of Rome “La Sapienza”, “Metodi algebrici e combinatori in teoria dei linguaggi formali e delle strutture discrete”.
- Member of the european project (2005-2010) “*AutoMatha*” of ESF (European Science Foundation).
- Member of the european project CRUI/DAAD “Programma Vigoni: Riduzione della complessità mediante l’introduzione di strutture”, 2007-2008.
- Member of the national project PRIN “Linguaggi formali e automi: teoria ed applicazioni” funded by the italian Ministry of Research (2005–2009).

Talks in international conferences

- “*WORDS 2011*”, Praha, September 2011.
- “*3rd International Workshop Non-Classical Models of Automata and Applications (NCMA 2011)*”, Milano, July 2011.
- “*DLT 2010, Developments in Language Theory*”, London Ontario (Canada), August 2010.
- “*WORDS 2009*”, Salerno, Italy, September 2009.
- “*MFCS 2009*”, Novy Smolensk (Slovakia), August 2009.
- “*AUTOMATHA 2009*”, Liegi (Belgium), June 2009.
- “*ICTCS 2009 Eleventh Italian Conference on Theoretical Computer Science*”, Cremona (Italy), September 2009.
- “*DLT 2008, Developments in Language Theory*”, Kyoto, Japan, September 2008.
- International Workshop “*Around Cerny Conjecture*”, Wroclow University, Wroclow, Poland, June 2008.
- “*1st Istanbul Design Conference*”, Koç University, Istanbul, Turkey, June 2008.
- “*AUTOMATHA 2007*”, University of Palermo, Italy, 2007.
- “*DLT 2006, Developments in Language Theory*”, Santa Barbara, California, USA, 2006.
- “*DLT 2005, Developments in Language Theory*”, Palermo, Italy, July, 2005.
- WASAM a Satellite workshop of “*ICALP 2004*”, Turku, Finland, 2004.
- “*DLT 2004, Developments in Language Theory*”, Auckland New Zealand, 2004.
- “*International Conference on Group Theory*”, Gaeta, Rome, Italy, 2003.
- “*DLT 2003, Developments in Language Theory*”, Szeged, Hungary, 2003.
- “*First joint meeting of the American Mathematical Society and Unione Matematica Italiana*”, Pisa, June 2002.
- 9th Italian conference of algebraic combinatorics, Taormina, Italy, 2002
- “*WORDS 1999*”, International conference in combinatorics on words and formal languages, Rouen, France, September, 1999.
- 4th Italian conference of algebraic combinatorics, Taormina, Italy, 1997.
- 2nd Italian conference of algebraic combinatorics, Milan, Italy, 1995.

- International conference in Theoretical Informatics “Journées Montoises”, University of Mons (Belgium) november 1994.
- International conference in Automata, Semigroups and Formal Languages, (ASMICS Project), University of Porto june 1994.

Invited seminars

- “Cerny Conjecture, Formal Languages, Synchronizing Automata”, February 2010, (Istanbul Discrete Mathematics Meetings), Istanbul center for mathematical sciences, Istanbul.
- “On the vector partition functions”, December 2009, Department of mathematics, Bogazici University, Istanbul.
- “Cerny conjecture, synchronizing automata, formal languages”, November 2009, Department of computer science, Bogazici University, Istanbul.
- “On the synchronization problem for locally strongly transitive automata”, Department of Theoretical computer science, University of Rome “La Sapienza”, May 2009.
- “Cerny conjecture, synchronizing automata, formal languages”, Department of computer science, University of Milan, Italy, june 2008.
- “On the Cerny conjecture”, April 2nd 2008, Department of mathematics, Bosphorus American University, Istanbul.
- “On the Cerny conjecture”, April 1st 2008, Department of mathematics, Koç University, Istanbul.
- “On the synchronization problem for finite automata”, Department of Theoretical computer science, University of Rome “La Sapienza”, April 21th 2008.
- “The Cerny conjecture”, Department of mathematics, Politecnico di Milano, february 2008.
- “On the synchronization problem for finite automata”, Department of Statistics, University of Rome “La Sapienza”, january 2008.
- “Bounded context-free languages”, Department of computer science, University of Frankfurt “Wolfgang Goethe”, february 2006.
- “On the growth function of context-free languages”, Department of computer science, University of Milan, Italy january 2006.
- “On the growth function of context-free languages”, Department of Mathematics, University of Florence, Italy june 2006.
- “On the growth function of context-free languages”, Department of Mathematics, University of Rome “La Sapienza”, Italy march 2006.

- “Free groups of quaternions” Laboratoire LABRI, University of Bordeaux, France, october 2005.
- “Free groups of quaternions”, Laboratoire LIAFA, University of Paris 7, Paris, France, october 2005.
- “Automata with multiplicities in the *tropical semi-ring*”, talk presented in the work group “*Systèmes à events discretés*”, responsables: Jean Mairesse, Sylvaine Lombardy, november 2005, Laboratoire LIAFA, University of Paris 7, Paris, France.
- “Unavoidable sets, well quasi orders and derivation systems”, Laboratoire LARIA, University of Amiens, France, november 2005.
- “Free groups of quaternions”, University of Milan, Italy october 2005.
- “Unavoidable sets and well quasi orders”, Laboratoire LIAFA, University of Paris 7, Paris, France, june 2004.
- “Open problems in the theory of codes” Department of Mathematics, University of Rome, “La Sapienza”, Italy march 2003.
- “The commutatively equivalence conjecture in the theory of codes” Department of Mathematics, University of Rome “Tor Vergata”, may, 2002.
- “Commutativity in the free inverse monoid”, Laboratoire LIAFA, University of Paris 7, Paris, France, may 1997.
- “Commutativity in the free inverse monoid”, Laboratoire LIFAR, University of Rouen, France, june 1997.
- “The Finite power property for rational sets of the free group”, Department of computer science, University of Milan, Milan, Italy february 1998.
- “The Finite power property for rational sets of the free group”, University of Marne-La-Vallée, Paris, France, april 1997.

PUBLICATIONS

International journals

1. D’ALESSANDRO F., A note on the multiplicative group of a division ring, *International Journal of Algebra and Computation*, 1997, vol. 1, 51–53.
2. CHOFFRUT C., D’ALESSANDRO F., Commutativity in free inverse monoids, *Theoretical Computer Science*, 1998, vol. 204, 35–54.
3. D’ALESSANDRO F., A Combinatorial Problem on Trapezoidal Words, *Theoretical Computer Science*, 2002, vol. 273, 11–33.
4. D’ALESSANDRO F., SAKAROVITCH J., The finite power property in the free group, *Theoretical Computer Science*, 2003, vol. 293 (1), 55 – 82.
5. D’ALESSANDRO F., Free groups of quaternions, *International Journal of Algebra and Computation*, 2004, vol. 14 (1), 69–86.
6. D’ALESSANDRO F., PASKU E., A combinatorial property for semigroups of matrices, *Semigroup Forum*, 2003 vol. 67, 22 - 33.
7. D’ALESSANDRO F., On the complexity of Simon automata over the Dyck language, *Journal of Automata, Languages, and Combinatorics*, 2003, vol. 8 (3), 465 – 476.
8. D’ALESSANDRO F., VARRICCHIO S., Well Quasi-orders and context-free languages, *Theoretical Computer Science*, 2004, vol. 327 (3), 255 – 268.
9. D’ALESSANDRO F., VARRICCHIO S., Well quasi-orders, Unavoidable sets and Derivation systems, *Theoretical Informatics and Application*, 2006, vol. 40, 407 – 426
10. D’ALESSANDRO F., D’ANDREA A., A non commutativity statement for algebraic quaternions, *International Journal of Algebra and Computation*, Vol. 16, No. 3 (2006) 461-474.
11. D’ALESSANDRO F., INTRIGILA B., VARRICCHIO S. “On the structure of the counting function of sparse context-free languages ”, *Theoretical Computer Science*, 2006, vol. 356, 104–117.
12. D’ALESSANDRO F., RICHOMME G., VARRICCHIO S., Well quasi-orders generated by a word-shuffle rewriting, *Theoretical Computer Science*, 2007, vol. 377, 73–92.
13. CHOFFRUT C., D’ALESSANDRO F., VARRICCHIO S., On the separability of sparse context-free languages, *Theoretical Computer Science*, 2007, vol. 381, 274–279.

14. D'ALESSANDRO F., VARRICCHIO S., On the growth of context-free languages, *Journal of Automata, Languages, and Combinatorics*, 2008, vol. 8 (3), 1–9.
15. C. CHOFFRUT, D'ALESSANDRO F., VARRICCHIO S., Bounded rational languages of trace monoids, *Theory of comput. sys.*, 2010, vol. 46, 351–369.
16. D'ALESSANDRO F., INTRIGILA B., VARRICCHIO S. On the Parikh counting function of sparse context-free languages. *Theoretical Computer Science*, 2009, vol. 410, 5158–5181.
17. D'ALESSANDRO F., ZINNO PILO A., Sulla struttura combinatoria dei linguaggi bounded, *Rendiconti di matematica e applicazioni*, 2008, SerieVII, vol. 28, 1–27.
18. CARPI A., D'ALESSANDRO F., Strongly transitive automata and Černý conjecture. *Acta Informatica*, 2009, vol. 46 (8), 591–611.
19. D'ALESSANDRO F., INTRIGILA B., VARRICCHIO S., Quasi-polynomials, Semi-linear set, and Linear Diophantine equations, *to appear in Theoretical Computer Science*.

Proceedings

- 1c. CARPI A., DALESSANDRO F., On the Hybrid Cerny-Road coloring problem and Hamiltonian paths, *“DLT 2010, Developments in Language Theory”*, London, Ontario (Canada), 17-20 August, 2010, p. 1-12.
- 2c. CARPI A., D'ALESSANDRO F., Locally strongly transitive automata and the Hybrid Cerny-Road coloring problem, *“ICTCS 2010 12th Italian Conference on Theoretical Computer Science”*, Camerino (Italy), September 2010.
- 3c. CARPI A., D'ALESSANDRO F., Synchronizing automata and independent systems of words, *“ICTCS 2009 Eleventh Italian Conference on Theoretical Computer Science”*, Cremona (Italy), 14 – 18 September 2009.
- 4c. D'ALESSANDRO F., INTRIGILA B., VARRICCHIO S. Counting problems for semi-linear sets on the set of integers, *“WORDS 2009, 7th International Conference on Combinatorics on words”*, Salerno (Italy), 14 – 18 September 2009.
- 5c. CARPI A., D'ALESSANDRO F., The synchronization problem for locally strongly transitive automata, *“MFCS 2009, Mathematical Foundations of Computer Science”*, Novy Smolek (Slovacchia), 24 – 28 August 2009, LNCS vol. 5734, pp. 211 – 222, Springer-Verlag, Heidelberg.
- 6c. CARPI A., D'ALESSANDRO F., The synchronization problem for strongly transitive automata, *“DLT 2008, Developments in Language Theory”*, Kyoto

(Japan), 16 – 19 September 2008, LNCS vol. 5257, pp. 240 – 251, Springer-Verlag, Heidelberg.

7c. D’ALESSANDRO F., VARRICCHIO S., Well Quasi-orders and formal languages, “*DLT 2008, Developments in Language Theory*”, Kyoto (Japan), 16 – 19 September 2008, LNCS vol. 5257, pp. 84 – 95, Springer-Verlag, Heidelberg.

8c. D’ALESSANDRO F., RICHOMME G., VARRICCHIO S., On the shuffle closure of finite sets, “*DLT 2006, Developments in Language Theory*”, Santa Barbara, California, 26 – 29 June 2006, LNCS vol. 4036, pp. 260 – 269, Springer-Verlag, Heidelberg.

9c. D’ALESSANDRO F., VARRICCHIO S., Avoidable sets and well quasi orders, *Proceedings of “DLT 2004, Developments in Language Theory”*, Auckland, New Zeland, 13 – 17 december 2004, LNCS vol. 3340, Springer-Verlag, Heidelberg.

10c. D’ALESSANDRO F., VARRICCHIO S., On Well Quasi-orders On Languages, “*DLT 2003, Developments in Language Theory*”, Szeged (Hungary), 13 – 15 luglio 2003, LNCS vol. 2710, pp. 230 – 241, Springer-Verlag, Heidelberg.

11c. D’ALESSANDRO F., SAKAROVITCH J., The finite power property for rational sets of the free group, short version. “Idempotency”, Proceedings of a workshop held at the Basic Research Institute in Mathematical Sciences (BRIMS), Hewlett-Packard Laboratory, Bristol, Cambridge University Press, 1997, pp. 80–87.

12c. D’ALESSANDRO F., INTRIGILA B., The commutative equivalence of bounded context-free and regular languages, “*WORDS 2011, 8th International Conference on Combinatorics on words*”, Praga (Repubblica ceca), 12 – 16 September 2011.

13c. BERTONI A., BIANCHI P., D’ALESSANDRO F., Regularity of languages defined by formal series with isolated cut point, “*3rd International Workshop Non-Classical Models of Automata and Applications (NCMA 2011)*”, Milano, 18–19 July 2011.

Submitted papers

1s. CARPI A., DALESSANDRO F., Independent sets of words and the synchronization problem, 2010.

Book

D’ALESSANDRO F., de LUCA A., Teoria algebrica degli Automi (*work in progress*)

TEACHING ACTIVITY

Supervision (“Tesi di laurea specialistica e tesi triennali”):

- Francesco Piesco,
Title: ‘Su di alcune questioni di conteggio per i linguaggi context-free’,
(specialistica) Dept. of Math “Guido Castelnuovo”, University of Rome
“La Sapienza”, (work in progress)
- Enrico Poncetta,
Title: ‘Su di un teorema di Rabin e Shepherdson per gli automi a due vie’
(triennale), february 2010, Dept. of Math “Guido Castelnuovo”, Univer-
sity of Rome “La Sapienza”
- Giorgia Marson,
Title: “Synchronizing automata and Cerny conjecture” (triennale), jan-
uary 2009, Dept. of Math “Guido Castelnuovo”, University of Rome “La
Sapienza”
- Alessandra Zinnopilo,
Title: “On the growth function of algebraic languages” (specialistica),
july 2007, Dept. of Math “Guido Castelnuovo”, University of Rome “La
Sapienza”
- Claudio Stirpe,
Title: “On the periodicity properties for finite length sequences” (trien-
nale), september 2006, Dept. of Math “Guido Castelnuovo”, University
of Rome “La Sapienza”
- Claudia De Felici,
Title: “The finite power property for formal languages” (specialistica),
march 2005, Dept. of Math “Guido Castelnuovo”, University of Rome
“La Sapienza”
- Eleonora Ciampini,
Title: “On well quasi-orders for formal languages” (triennale), septem-
ber 2004, Dept. of Math “Guido Castelnuovo”, University of Rome “La
Sapienza”
- Alessandra Croene,
Title: “On the Equivalence problem for codes” , (specialistica), march
2003, Dept. of Math “Guido Castelnuovo”, University of Rome “La
Sapienza”

Some courses taught since 2000:

- Doctoral course titled “Algebraic and combinatorial methods in group the-
ory and in formal language theory”, in collaboration with T. Ceccherini-
Silberstein, Dept. Math., University of Rome “La Sapienza”, Academic
Year 2003-2004.
- master course in automata theory, Faculty of Science and Arts, Bosphorus
University, Istanbul (Turkey), 2009-2010.

- master course in code theory, Faculty of Science and Arts, Bosphorus University, Istanbul (Turkey), 2008-2009.
- Assistant in the course of “Foundations of Architecture of computers”, University of Paris 7, academic year 1998-1999.
- Course titled “Automata Theory”, Dept. Math. “Guido Castelnuovo”, University of Rome “La Sapienza”, Academic Year 2011-2012.
- Course titled “Foundations of Information theory and variable length codes”, Dept. Math. “Guido Castelnuovo”, University of Rome “La Sapienza”, Academic Year 2010-2011.
- Course titled “Foundations of computer science”, Dept. Math. “Guido Castelnuovo”, University of Rome “La Sapienza”, Academic Year 2000-2001.