

Curriculum vitae

Name: **Nicola**
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Born on: Dec, 29-th 1966
Status: Married with one daughter
Current Position: Associate Professor
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Administration, Services, Advising

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References

Education

- May 00:** *Ph.D.* in Computer Science. Thesis: *On the Complexity of Propositional Proof Systems*
Advisor: Prof. M.L. Bonet. Evaluation: *Summa Cum Laude*. Universitat Politècnica de Catalunya. Barcelona, Spain.
- Dec 92:** Laurea (B. Sc. with final thesis and dissertation *A sublanguage of LISP: the Recursive Primitive LISP*) in Computer Science. Evaluation: *Summa Cum Laude*. Advisor. Prof. S. Caporaso. Università degli Studi di Bari. Bari, Italy.

Career

- Since Jan 05:** Associate Professor. Dept. of Computer Science. *University of Rome "La Sapienza"*. Rome, Italy.
- May 01 - Dec 04:** Associate Professor (Titular de Universidad). Departament de Llenguatges i Sistemes Informàtics (Computer Science). *Universitat Politècnica de Catalunya*. Barcelona, Spain.
- Jan 02 - Jan 03** Research Fellow (Post Doc) at the Dept. of Computer Science of the *University of Toronto*. Toronto, Ontario, Canada. (Resp. Prof. Steve. Cook). On leave from *Universitat Politècnica de Catalunya*.
- Sep 00 - May 01** Member of the *Institute for Advanced Study. School of Mathematics (Special Year in Computational Complexity*, resp. Prof. Avi Wigderson). Princeton, New Jersey, USA.
- Feb 99 - Sept 00** PhD Student and Part - Time Assistant Professor. Departament de Llenguatges i Sistemes Informàtics (Computer Science). *Universitat Politècnica de Catalunya*.
- Jan 96 - Feb 99** *Marie Curie Fellow* as PhD Student (European Community FP5,TMR programme (under 20). Project title: *A Structural Complexity Approach to Propositional Proof Complexity*) at the Departament de Llenguatges i Sistemes Informàtics (Computer Science). *Universitat Politècnica de Catalunya*.
- Oct 94 - May 00:** PhD Student at Departament de Llenguatges i Sistemes Informàtics (Computer Science). *Universitat Politècnica de Catalunya*. [**Until Dec 95**] Granted by Università degli Studi di Bari, Italy
- Jul 93 -Oct 94** Assistant Researcher at Dept. of Computer Science of Università degli Studi di Bari, Bari, Italy (Supervision Prof. S. Caporaso).
- Jan 93 - Jul 93** Resarcher at SASIAM (School for Advanced Studies in Industrial and Applied Mathematics) at TECNOPOLIS, CSATA, Valenzano, Bari, Italy (grant offered by IBM).

Research

Research Interests: Theoretical Computer Science.

Main Research Fields: Computational Complexity (Proof and Circuit Complexity), Logic in computer Science. Automated Theorem Proving. Satisfiability Problems

Main Research Visits

March 2010, 15 days: Czech Academy of Science Mathematical Institute. Invited by P. Pudlák.

March 2009, 15 days: Czech Academy of Science Mathematical Institute. Invited by J. Krajicek.

July 2007, 15 days: Liverpool University Dept of Computer Science. Invited by M. Zito.

June 2004, 15 days: Oxford University. Mathematical Institute. Invited by Neil Thapen and supported by a LMS (*London Mathematical Society*) Grant.

Jul 2003, one month . Abdus Salam International Centre for Theoretical Physics, Trieste, Italia. Invited by R. Zecchina and supported by the project: *Thematic Institute of the Complex Systems Network of Excellence (EXYSTENCE): “Algorithms and challenges in hard combinatorial problems and in optimization under ‘uncertainty’.*

Main Invited Talks

Aug 10: MFCS+CSL 10, Workshop Parametrized Complexity of Computational Reasoning. MFCS+CSL 2010. Brno, Czech Republic.

Jul 10: FLOC 10 Workshop Propositional Proof Complexity: Theory and Practice. FLoc 2010. Edinburgh, UK.

Aug 09: Barriers in Computational Complexity Workshop. *Center For Computational Intractability.* Princeton University. Princeton. New Jersey (absent for health problems).

Mar 06: Complexity of Boolean Functions Workshop *International Conference and Research Center for Computer Science, Dagstuhl* Germany. (Absent for the born of my daughter)

Apr 05: Workshop New directions in Proof Complexity. *Isaac Newton Institute for Mathematical Sciences* Cambridge, UK.

Jun 03: Space Complexity of Random Formulae in Resolution at Random Graals 2003 - 2nd Bertinoro Workshop on Randomized Graphs and Algorithms Bertinoro - University of Bologna. Italy.

Mar 03: The Propositional Satisfiability Problem – Algorithms and Lower Bounds *International Conference and Research Center for Computer Science, Dagstuhl* Germany.

Mar 02 Complexity of Boolean Functions Workshop *International Conference and Research Center for Computer Science, Dagstuhl Germany.*

Oct 01: Space Complexity in Resolution at the **Workshop on Circuit and Proof Complexity. International Center for Mathematical Study.** Edinburgh (UK)

Dec 00: Monotone Simulations of Nonmonotone proofs at **Workshop on Proofs and Computations.** Institute for Advanced Study. Princeton, New Jersey.

Jun 99: Optimality of the width-size trade-off for general Resolution. Workshop on Logical Complexity Theory. Ludwig-Maximilians-Universitat Munchen. Institut fur Informatik. Munich, Germany

Research Projects

12-14 Principal Investigator (Italian Side): Italy-German Integrated Action (CRUI-DAAD). Title of the Project: **Parameterized Proof Complexity.** Universities Involved: La Sapienza Rome- Leibniz Univeristat Hannover (German leader, Olaf Beyersdorff). Amount 21000 euro for two years on both sides.

11-13 Principal Investigator. Project "The Limits of Theorem Proving", granted with 90000 euro by the **John Templeton Foundation.**

09-11: Principal Investigator the in research project "Complexity and Compact Representability of discrete structures". (In Italian) granted by "La Sapienza" University (8000+16000 Euros).

07-08: Participation in research project granted by "La Sapienza" University: "Compression bounds in Combinatorics and Computational Complexity (in italian).

05-06 Participation in the project granted by "La Sapienza" University: "Efficient algorithms on advanced models of computation and communication" (in italian).

03-05: Participation in the project " Classical and Multi-Valued Logics: Foundations and Computational Aspects" (In Spanish) granted by Spanish Ministry of Education.

01-03: Participation in the project "Complexity of Algorithms and Logical Calculi" (In Spanish) granted by Spanish Ministry of Education.

Major Research Grants Received *ad Personam*

02-03 PostDoc at the University of Toronto supported by a Canadian NSERC (National Science and Engineering Research Council) grant.

00-01 Membership at the Institute for Advanced Study supported by a USA NSF (National Science and Foundation)

96-99 3 years - Marie Curie Fellowship. Granted by European Community under the Training and Mobility of Researcher (under 20) project. (Title: "A Structural Complexity approach to propositional Proof Complexity").

94-95 One year grant from Università degli Studi di Bari for specialization abroad (used for Phd studies at the Universitat Politecnica de Catalunya).

Teaching

Undergraduate Courses

- Data Bases (UPC:1999, 2000)
- Introduction to Programming (UPC: 2001, 2003, 2004, La Sapienza 2005-2009)
- Algorithms and Data Structures (La Sapienza: 2008)
- Advanced Programming (La Sapienza: 2005-2007)
- Introduction to Logic (UPC: 2001, 2003, 2004)
- Proof Theory (La Sapienza, 2006, 2009)
- Models and Optimization. (La Sapienza, 2010)

Graduate Courses

- Complexity (UPC: 2003)
- Proof Complexity (UPC: 2004)

International Graduate Schools, Invited

- NoNa Summer School in Complexity Theory (Proof Complexity) (August 2009, St Petersburg Russia). Organizer. A. Kulikov
- Salerno Weekly PhD Course on Proof Complexity (March 2009) Salerno, Italy. Organizer: G. Persiano

Publications

Journals

[J16] Olaf Beyersdorff, Nicola Galesi and Massimo Lauria.
A Lower Bound for the Pigeonhole Principle in Tree-like Resolution by Asymmetric Prover-Delayer Games

Information Processing Letters. 110(23):1074-1077 2010

[J15] N. Galesi, M Lauria.

Optimality of size-degree trade-offs for Polynomial Calculus

ACM Transactions on Computational Logic. 12(1): 2012.

[J14] N. Galesi, M. Lauria

On the Automatizability of Polynomial Calculus.

Theory of computing Systems 47(2):491–506. 2011

[J13] J.Buresh-Oppenheim, N. Galesi, A. Magen, T. Pitassi. S. Hoory
Rank Bounds and Integrality Gaps for Cutting Planes Procedures .

Theory of Computation. 2(1) pp. 65–90, 2006.

[J12] N. Galesi, N. Thapen.

Resolution and Pebbling Games

Selected Papers of SAT 05, Lecture Notes in Computer Science 3596, pp. 76–90, 2006.

[J11] N. Galesi, O. Kullmann.

Polynomial SAT decision, hypergraph transversals and Hermitian rank

Selected Papers of SAT 04, Lecture Notes in Computer Science 3542, pp. 89–104., 2005

[J10] J.L Esteban, N. Galesi, J. Messner.

On the Complexity of Resolution with Bounded Conjunctions.

Theoretical Computer Science. 21(2-3)pp. 347-370 2004

[J9] E. Ben-Sasson , N. Galesi

Space Complexity for Random Formulae in Resolution.

Random Structures and Algorithms, 2003. Vol 23(1). 2003 pp.92-109.

[J8] A. Atserias, N. Galesi, P. Pudlak.

Monotone Simulations of nonmonotone Propositional Proofs.

Journal of Computer and System Science.

[J7] M. L. Bonet, N. Galesi.

Degree Lower Bounds for a Modified Pigeonhole Principle.

Archive for Mathematical Logic.

[J6] M. L. Bonet, N. Galesi.

Optimality of Size-Width tradeoffs for Resolution.

Computational Complexity.

[J5] A. Atserias, N. Galesi, R. Gavaldà.

Monotone Proofs of the Pigeon Hole Principle.

Mathematical Logic Quarterly. 47(4) pp. 461-474 (2001).

[J4] M. L. Bonet, J.L. Esteban, N. Galesi, J.Johannsen.

On the Relative Complexity of the Resolution Refinements and Cutting Planes Proof Systems.

SIAM Journal on Computing. 30(5) pp. 1462-1484. (2000).

[J3] S. Caporaso, M. Zito, N. Galesi.

A Predicative and Decidable Characterization of the Polynomial Classes of Languages.

Theoretical Computer Science Vol. 251(1-2) pp. 83-99 (2001).

[J2] M.L. Bonet, N. Galesi.

Linear Lower Bounds and Simulations in Frege Systems with Substitutions.

In **Selected Papers of 11-th Computer Science Logic.** Edited by W. Thomas y M. Nielsen,

Lecture Notes in Computer Science. Vol. 1414 pp. 115-128 (1998).

[J1] N. Galesi.

A syntactic characterization of bounded-rank decision trees in terms of decision lists.

RAIRO - Theoretical Informatics and Applications. Vol 31 (2) pp.149-158 (1997).

Conference Proceedings

[C15] Olaf Beyersdorff, Nicola Galesi, Massimo Lauria and Alexander Razborov.

Parameterized Bounded-Depth Frege is Not Optimal

To appear in ICALP 2011

[C14] Lorenzo Carlucci, Nicola Galesi and Massimo Lauria.

Paris-Harrington tautologies

To appear in IEEE 26th Conference on Computational Complexity, 2011.

[C13] Olaf Beyersdorff, Nicola Galesi and Massimo Lauria.

Parameterized Complexity of DPLL Search Procedures

To appear in SAT 2011

[C12]. N. Galesi, O.Kullmann. Polynomial SAT Decision, hypergraph transversal and Hermitian Rank. Proceedings of **SAT 2004**).

[C11] N. Galesi, N. Thapen.

The complexity of treelike Systems over λ -local Formulae.

IEEE Conference on Computational Complexity 2004: 68-74

[C10] J. Buresh-Oppenheim, N. Galesi. A. Magen, S. Hoory, T. Pitassi.

Rank Bounds and Integality Gaps for Cutting Planes Procedures.

41-th IEEE Symposium on Foundations of Computer Science (FOCS 03) pp. 318-327 (2003).

[C9] J.L. Esteban, N. Galesi, J. Messner.

On the Complexity of Resolution with Bounded Conjunctions.

Proceedings of the **International Colloquium on Automata, Languages and Programming (ICALP 02)**. Lecture Notes in Computer Science 2380, pp. 220-231, 2002

[C8] E. Ben-Sasson, N. Galesi.

Space Complexity for Random Formulae in Resolution.

In Proceedings of the **IEEE Conference on Computational Complexity 2001 (CCC 01)**, pp. 42-51.

[C7] A. Atserias, N. Galesi, P. Pudlak.

Monotone Simulations of nonmonotone Propositional Proofs.

IEEE Conference on Computational Complexity 2001 (CCC 01), pp. 36-41.

[C6] A. Atserias, N. Galesi, R. Gavaldà.

Monotone Proofs of the Pigeon Hole Principle.

International Colloquium on Automata and Language Programming, (ICALP 00). Lecture Notes in Computer Science Vol. 1853. pp. 151-162 (2000).

[C5] M.L. Bonet, N. Galesi.

A Study of Proof Search Algorithms for Resolution and Polynomial Calculus.

40-th IEEE Symposium on Foundations of Computer Science (FOCS 99) pp.422-431 (1999).

[C4] M.L. Bonet, J.L. Esteban, N. Galesi, J. Johannsen.

Exponential Separations between Restricted Resolution and Cutting Planes Proof Systems.

39-th IEEE Symposium on Foundations of Computer Science (FOCS 98) pp. 638-647 (1998).

[C3] M.L. Bonet, N. Galesi.

Linear Lower Bounds and Simulations in Frege Systems with Substitutions.

11-th Computer Science Logic. pp. 109-119 (**CSL 97**)

- [C2] S. Caporaso, M. Zito, N. Galesi, E. Covino.
Syntactic Characterization in LISP of the Polynomial Complexity Classes and Hierarchy.
 Proceedings of the 3rd **Italian Conference on Algorithms and Complexity (CIAC 97)**.
 Lecture Notes in Computer Science. 1203, pp. 61-73 (1997)
- [C1] V. De Florio, N. Galesi, F.P. Murgolo, V. Spinelli.
Towards an implementation of the Linda Model into the Parallel Virtual Machine.
 Conference Proceedings of the **European Conference of Convex Users Group**. Bilbao, Spain,
 pp. 1-18 (1993).

Manuscripts and Technical Reports

- [M1] N. Galesi, M. Lauria.
Extending Polynomial Calculus with k -DNF Resolution
 Electronic Colloquium on Computational Complexity 2007

Thesis

- 00:** N. Galesi. *On the Complexity of Propositional Proof Systems* PhD Thesis. May 2000. Universitat Politecnica de Catalunya.
- 92:** N. Galesi. *A sublanguage of LISP: the Recursive Primitive LISP*. Tesi di Laurea (B.Sc Final Thesis) (in italian). Università degli Studi di Bari (December 1992).

Administration, Services, Advising

Administration

- Since 09:** Member of the *Italian Committee for the Computer Science Olympic Games*.
- 05-09:** Member of the *Restricted Departmental Committee* (Giunta di Dipartimento), Dept of Computer Science. Università La Sapienza
- Since 07:** Member of the *Teaching Committee* of the Department of Computer Science. Università La Sapienza Roma.
- Since 07:** Member of the *Committee of the PhD Studies* at the Dept. of Computer Science, University of Rome "La Sapienza"

Program Committees, Editorial Boards

- 2012** PC member of the CSL *Computer Science Logic* Conference.
- 2012:** PC member of IEEE Conference on Computational Complexity (Chair: Venkat Guruswami)
- 2010:** PC Member of the Computability in Europe (CiE 2010) Conference
- 2009:** PC Member of the International Conference on Theory and Applications of Satisfiability Testing (SAT 2009) Conference.

Since 08: Member of the Editorial Board of the Journal JSAT- Journal on Satisfiability Boolean Modeling and Computation

2006: PC Member of the *Italian Conference on Algorithms and Complexity* (CIAC 2100)

Since 05: Evaluator for the Catalan Research Agency AGAUR

Organization

12: Organizer of the Workshop *SAT Interactions* Dagstuhl - Leibniz Center for Informatics.

11: Organizer of the *RatLocc 2011: Workshop on Ramsey Theory in Logic, Complexity and Combinatorics* Bertinoro Residential Center. University of Bologna. Bertinoro, Italy.

09: Organizer of the *RatLocc 2009: Workshop on Ramsey Theory in Logic, Complexity and Combinatorics* Bertinoro Residential Center. University of Bologna. Bertinoro, Italy.

Since 08: Organizer and Responsible of the Theory Seminar (SeT) at the Dept of Computer Science La Sapienza University.

06,08: Coach for the "La Sapienza" Student Team competing at the *ACM International Collegiate Programming Contest*.

Advising

09-10: PostDoc host for Olaf Beyersdorff. PhD at Humboldt-Universitat Zu Berlin.

05-09: PhD advisor for Massimo Lauria. Dept of Computer Science. University La Sapienza Rome. Title of the Thesis: *Degree lower bounds for Algebraic Proof Systems*. Now PostDoc. at Dept of Computer Science. University La Sapienza Rome.

07: PostDoc host for Alan Skelley (PhD At University of Toronto). Now at Google California.

09: Advisor for Final Undergrad *Thesis in Mathematics* for Silvia Pragliola. Now PhD student at Dept of Computer Science, University of Liverpool.

Referee service

Journals: Journal of the ACM, SICOMP, Computational Complexity, Theoretical Computer Science, Theory of Computing systems, Information Processing Letters, Journal of Symbolic Logic, ACM Transactions on Computational Logic.

Conferences: IEEE Conference on Computational Complexity (CCC), ACM Symposium on Theory of Computing (STOC), IEEE Symposium on Foundations of Computer Science (FOCS), International Colloquium on Automata, Languages and Programming. (ICALP), IEEE Conference in Logic in Computer Science (LICS), Computer Science Logic (CSL).

1 References

- **Toniann Pitassi.** University of Toronto. Department of Computer Science email: *toni@cs.toronto.edu*; (Full Professor)
- **Maria Luisa Bonet** Universitat Politècnica de Catalunya. Departament de Llenguatges i Sistemes Informàtics. *email: bonet@lsi.upc.edu* (Full Professor)
- **Pavel Pudlák.** Academy of Science of Czech Republic. email: *pudlak@math.cas.cz*. (Full Professor)