

# Scientific–Teaching Curriculum and Scientific Publications

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## 1 Presentation

- Born: November, 9th, 1965, in Magenta (Milano), Italy.

**MSc** On July, 16th, he receives an MSc *with honor* in Information Science at the Dipartimento di Scienze dell'Informazione dell'Università degli Studi di Milano, with a thesis on “The Complexity of Counting and Ranking Functions Defined on Classes of Formal Languages”.

- On November, 1991, he wins the competition for the admission to the VII cycle of the PhD Program in Computer Science, Università degli Studi di Torino/Milano.

**PhD** On October, 1996, he receives a PhD in Computer Science with a thesis on “Space, Reversals, and Ambiguity Bounded Turing Machines”.

- On January and April, 1997 he wins two grants from the Italian CNR.

**Post-Doc** On April, 1997, he wins a two-years POST-DOC position at the Dipartimento di Scienze dell'Informazione, Università degli Studi di Milano.

**Assistant Professor** On April, 1999, he wins an Assistant Professor position at the Università degli Studi di Milano – Bicocca. On July, 1999 he joins the Dipartimento di Informatica, Sistemistica e Comunicazione.

- On October, 2002 he becomes a Confirmed Assistant Professor.

**Associate Professor** On November, 2002, he wins an Associate Professor Position at the Università degli Studi di Milano. On December 2002, he joins the Dipartimento di Scienze dell'Informazione.

- On December 2005, he becomes a Confirmed Associate Professor.
- On October, 1st, 2017, he joins the Dipartimento di Fisica “Aldo Pontremoli”, Università degli Studi di Milano.

**ASN Full professor** On November 23rd, 2020, he receives the *National Scientific Habilitation (ASN)* for Full Professorship in Computer Science (Settore Concorsuale 01/B1 - INFORMATICA).

- Since October, 1st, 2021, he joins the Dipartimento di Informatica “Giovanni Degli Antoni”, Università degli Studi di Milano.

## 2 Scientific Activity

His scientific activity mainly develops along the following (briefly sketched) lines:

- **Descriptive Complexity of Formal Systems.** Study of the economy of formal language description by several types of automata and grammars.
- **Quantum computing.** Study of the computational and descriptive power of several finite memory models of quantum computation. Physical realization of models of quantum finite automata by photonic technology.
- **Distributed Algorithms.** Study of distributed algorithms for swarm of robots solving two-dimensional pattern formation problems.
- **Descriptive Complexity.** Study of the expressivity of first order logical frameworks for formal language representation (e.g., XML), and relations with efficient parallel parsing algorithms.
- **Discrete Algorithms.** Study of combinatorial optimization problems.
- **Parallel Complexity.** Study of efficient parallel algorithms on several computational models (boolean and threshold circuits, linear arrays) solving formal language and linear algebra problems.
- **Structural Complexity.** Study of the computational power of Turing Machines working within very limited amounts of computational resources.
- **Graph Theory and Combinatorics.** Study of the chromatic properties of families of chordal graphs. Study of the connections constants between families of polynomials.

## 3 International Collaborations

Among several international collaborations, the following gave rise to scientific publications:

- Since 2018:
  - School of Electrical Engineering and Computer Science, University of Ottawa, Ontario, Canada, responsible Prof. Paola Flocchini.
  - School of Computer Science at Carleton, University of Ottawa, Ontario, Canada, responsible Prof. Nicola Santoro.
- Since 2007: Institut für Informatik, J.W. Goethe Universität, Frankfurt am Main, Institut für Informatik, J. Liebig Universität Gießen, Germany, responsible Prof. M. Holzer, M. Kutrib, A. Malcher.
- Since 1998: L.I.A.F.A., Université Paris VII, Paris, France, responsible Prof. C. Choffrut.
- Since 1995: Department of Computer Science, P.J. Safarik University, Kosice, Slovakia, responsible Prof. V. Geffert.

## 4 UniMi Interdepartmental Collaborations

- Since 2018: Collaboration with Prof. Matteo Paris and Stefano Olivares of “Applied Quantum Mechanics Group - Quantum Technology Lab” Dipartimento di Fisica, Università degli Studi di Milano and with Prof. Beatrice Palano, Dipartimento di Informatica, Università degli Studi di Milano, on the physical realization of finite memory quantum devices by photonic technology.

In particular, such a collaboration has led to one of the first physical realizations in the world of a quantum finite state automaton based on photonic technology.

- Since 2021: Collaboration with Prof. Stefano Olivares of “Applied Quantum Mechanics Group - Quantum Technology Lab”, Dipartimento di Fisica, Università degli Studi di Milano, with Prof. Beatrice Palano and Dr. Nicola Basilico, Dipartimento di Informatica, Università degli Studi di Milano, on the project “Self-organizing Photonic Quantum Links - S-O PhoQuLis” on implementations of self-organizing swarm of robots for quantum information exchange.

## 5 Awards and Grants

- He receives the Best Paper Award at the *19th International Conference on Implementation and Application of Automata*, July 30th – August 2nd, 2014, Giessen, Germany, for the paper:  
M.P. Bianchi, C. Mereghetti, B. Palano. On the power of one-way automata with quantum and classical states. In: Proc. *19th International Conference on Implementation and Application of Automata*. Lecture Notes in Computer Science, vol. 8587, pp. 84-97, Springer, 2014.
- In 2019, he receives a grant for conference participations from the group INdAM - GNCS (Gruppo Nazionale per il Calcolo Scientifico) dell’Istituto Nazionale di Alta Matematica “Francesco Severi”.
- In 2008, he receives a grant from the European Project “Automata: from Mathematics to Applications”, responsible: Prof. Jean-Eric Pin, for visiting Univerité Paris VII, Paris, France.
- He receives the economical incentives for years 2022–2024, provided by the 2nd Call for Year 2022 stipulated by Art. 2 of DPR 232/2011 in connection with the Law 205/2017. Such economical incentives are awarded for academic and scientific merits, after a positive evaluation by a scientific committee.
- He receives the economical incentives for years 2021 and 2022, provided by the 2nd Call for Year 2022 stipulated by Art. 2 of DPR 232/2011 in connection with the Law 205/2017. Such economical incentives are awarded for academic and scientific merits, after a positive evaluation by a scientific committee.
- He receives the economical incentives, stated in Notice No. 4928/2020 dell’11/12/2020 – Università degli Studi di Milano. Such economical incentives are awarded for academic and scientific merits, after a positive evaluation by a scientific committee.
- He receives the economical incentives for years 2019 and 2020 provided by Art. 6, Sub. 14, and Art. 8 of the Law Dec. 30th, 2010, n. 240, DPR Dec. 15th, n. 232, and by Art. 1, Sub. 629, of the Law Dec. 27th, 2017, n. 205.. Such economical incentives are awarded for academic and scientific merits, after a positive evaluation by a scientific committee.
- He receives the economical incentives for years 2017 and 2018 provided by Art. 6, Sub. 14, and Art. 8 of the Law Dec. 30th, 2010, n. 240, DPR Dec. 15th, n. 232, and by Art. 1, Sub. 629, of the Law Dec. 27th, 2017, n. 205.. Such economical incentives are awarded for academic and scientific merits, after a positive evaluation by a scientific committee.
- He receives the economical incentives for years 2011-2013 provided by Art. 29, Sub. 19, of the Law 240/2010. Such economical incentives are awarded for academic and scientific merits, after a positive evaluation by a scientific committee.

## 6 International and National Scientific Organization Memberships

- He is member of the *IFIP Working Group 1.2 – Descriptive Complexity*. Homepage of the International Federation for Information Processing: <http://www.ifip.org>  
*IFIP Working Group 1.2 – Descriptive Complexity* membership is upon invitation after a positive evaluation of the scientific activity by an international committee of experts.
- He is member of the EUROPEAN CEN-CENELEC FOCUS GROUP ON QUANTUM TECHNOLOGY for the definition of standards within Quantum Computing research and technology.
- He is member of the group INdAM - GNCS (Gruppo Nazionale per il Calcolo Scientifico), Istituto Nazionale di Alta Matematica “Francesco Severi”.
- He is a member of the European Association for Theoretical Computer Science (EATCS).
- He is a Mathematical Reviewer for the *American Mathematical Society*.
- He is a founding member of the “QUANTUM Committee” for promoting and disseminating Quantum Mechanics and its applications. The Committee is officially formally registered. The Committee headquarter is at the Dipartimento di Fisica, Università degli Studi di Milano.
- He is member of the Research Group “Pure and Applied Quantum Mechanics” at the Dipartimento di Fisica, Università degli Studi di Milano.

## 7 Research Fellowships, Visiting Professorships

- Years 1997, 1998: research fellow at the *Laboratoire d’Informatique Algorithmique: Fondements et Applications (LIAFA)* dell’Université Denis Diderot, Paris, France.
- Visiting professor at the PhD School *The Week of Doctoral Studies*, Novy Smokovec, Slovakia, May 21-25, 2012, organized by the Faculty of Science, P.J. Safarik University, Kosice, Slovakia.
- Years 2008, 2011: Visiting professor at the “Research meeting, ETH-Zürich”, Pitztal, Austria.

## 8 Invited Talks

- Invited speaker at the *International Conference Descriptive Complexity of Formal Systems (DCFS07)*, High Tatras, Slovakia, with the talk “The Descriptive Power of Sublogarithmic Resource Bounded Turing Machines”, July 20–22, 2007.
- Invited speaker at the *18 Theorietag der Fachgruppe “Automaten und Formale Sprachen” der Gesellschaft für Informatik*, Giessen, Germany, with the talk “Descriptive complexity issues concerning regular languages”, September 30th – October 2nd, 2008.
- Invited speaker at the *International Workshop ABCDays on List Automata, Forgetting Automata, and Restarting Automata*, Prague, Czech Republic, with the talk “Representing regular languages by constant height pushdown automata and straight line programs”, March 27–29, 2011.
- Invited speaker at *The Week of Doctoral Studies*, Novy Smokovec, Slovakia, organized by the Faculty of Science, P.J. Safarik University, Kosice, Slovakia, with the talk “Lower Limits of Computation”, May 21–25, 2012,

- Invited speaker at the Dipartimento di Fisica “Aldo Pontremoli”, Università degli Studi di Milano, with the talk “Quantum Finite Automata”, May 2017.
- Invited speaker at the Dipartimento di Fisica “Aldo Pontremoli”, Università degli Studi di Milano, with the talk “Theoretical Computer Science and Quantum Automata” given at the course “Quantum Information Processing” of the MSc Program in Physics, June 2018.

## 9 Scientific and Organizing Direction of Conferences, Schools, Scientific Editorships

- He is chair of the *3rd International Workshop on Non-Classical Models of Automata and Applications (NCMA)*, July 18 – 19, 2011, Milan, Italy. For this conference, he is also member of the organizing committee, editor of the conference proceedings, and of the special issue of the conference published on the international Journal “RAIRO-Informatique Theorique et Applications, Paris, France, EDP Sciences”.
- He is member of the scientific and organizing committee of the *International Conference on Descriptive Complexity of Formal Systems (DCFS05)*, Como, Italy, June 30th – July 2nd, 2005, sponsored by: IFIP Working Group 1.2 on Descriptive Complexity, and by Departments DICo and DSI, Università degli Studi di Milano. With B. Palano, G. Pighizzini and D. Wotschke, he is editor of the conference proceedings.
- He is member of the scientific and organizing committee of the *Summer School on Quantum Computing*, Vietri sul Mare, Salerno, Italy, September 11 – 15, 2000, sponsored by the Italian Chapter of the *EATCS*, by the *European Educational Forum*, and by the *I.I.A.S.S. "Eduardo R. Caianiello"*.

## 10 International Conference PC Memberships

He is member of the scientific committee of the following international conferences:

- 25th International Conference on Descriptive Complexity of Formal Systems (DCFS 2023), Potsdam, Germany.
- 13th International Workshop on Non-Classical Models of Automata and Applications (NCMA 2022), Debrecen, Hungary.
- 23rd Italian Conference on Theoretical Computer Science (ICTCS 2022), Rome, Italy.
- 25th International Conference on Developments in Language Theory (DLT 2021), Porto, Portugal.
- 12th International Workshop on Non-Classical Models of Automata and Applications (NCMA 2020), Vienna, Austria.
- 46th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM 2020), Limassol, Cyprus
- 21st International Conference on Descriptive Complexity of Formal Systems (DCFS 2019), Košice, Slovakia.
- 23rd International Conference Implementation and Application of Automata (CIAA 2018), Charlotetown, Canada.

- 42nd International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM 2016), Harrachov, Czech Republic.
- 7th Workshop on Non-Classical Models of Automata and Applications (NCMA 2015), Porto, Portugal.
- 20th International Conference Implementation and Application of Automata (CIAA 2015), Umea, Sweden.
- 19th International Conferences on Implementation and Application of Automata (CIAA 2014), Giessen, Germany.
- 40th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM 2014), High Tatras, Slovakia.
- 4th International Workshop on Non-Classical Models of Automata and Applications (NCMA 2012), Fribourg, Switzerland.
- 14th International Workshop on Descriptive Complexity of Formal Systems (DCFS 2012), Braga, Portugal.
- 13th International Workshop on Descriptive Complexity of Formal Systems (DCFS 2011), Giessen, Germany.
- 3rd International Workshop on Non-Classical Models of Automata and Applications (NCMA 2011), Milano, Italy.
- 1st Workshop on Non-Classical Models of Automata and Applications (NCMA 2009), Wroclaw, Poland.
- 34th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM 2008), High Tatras, Slovakia.

## 11 Participation and Talks at International Conferences

He attends some of the most important national and international conferences in Theoretical Computer Science and Formal Language, giving talks on his research results. Among conference participations, we point out:

- *28th, 12th, 10th, 9th International Conference on Developments in Language Theory (DLT)*, Göttingen - Germany 2024, Kyoto - Japan 2008, Santa Barbara - California 2006, Palermo - Italy 2005.
- *28th, 18th International Conference on Implementation and Application of Automata (CIAA)*, Akita - Japan 2024, Halifax - Canada 2013.
- *13th, 3rd, 2nd, 1st International Workshop on Non-classical models of automata and applications (NCMA)*, Famagusta - Cyprus 2023, Milano - Italy 2011, Jena - Germany 2010, Wroclaw - Poland 2009.
- *47th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM)*, Bolzano-Bozen - Italy 2021.

- *22nd, 15th, 13th, 10th, 9th, 8th, 7th, 3rd, 1st International Workshop on Descriptive Complexity of Formal Systems (DCFS)*, Vienna - Austria, 2020, London Ontario - Canada 2013, Giessen - Germany 2011, Charlottetown - Canada 2008, High Tatras - Slovakia 2007, Las Cruces - New Mexico 2006, Como - Italy 2005, Vienna - Austria 2001, Magdeburg - Germany 1999.
- *16th International Conference on Computability in Europe 2020 (CiE)*, Salerno - Italy 2020.
- *11th International Conference on Unconventional Computation and Natural Computation (UCNC)*, Milano - Italy 2013.
- *15th International Symposium on Theoretical Aspects of Computer Science (STACS)*, Paris - France 1998.
- *20th, 19th International Symposium on Mathematical Foundations of Computer Science (MFCS)*, Praga - Czech Rep. 1995, Košice - Slovakia 1994.
- *10th International Conference on Fundamentals of Computation Theory (FCT)*, Dresda - Germany 1995.
- *23rd, 22nd, 20th, 13th, 11th, 7th, 6th, 4th Italian Conference on Theoretical Computer Science (ICTCS)*, Rome 2022, Bologna 2021, Como 2019, Varese 2012, Crema 2009, Torino 2001, Prato 1998, L'Aquila 1992.
- *3rd International Symposium on Algorithmic Foundations of Dynamic Networks (SAND)*, Patras - Greece 2024.
- *27th International Conference on Principles of Distributed Systems (OPODIS)*, Tokyo - Japan 2023.
- *20th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS)*, Tokyo - Japan 2018.
- *ERATO International Conference on Quantum Information Science*, Kyoto - Japan 2003.
- *Conventional and Non Conventional Computing (Quantum and DNA)*, Torino - Italy 2000.
- *Journées Montoises d'Informatique Theorique*, Mons - Belgium 1998.
- *9th International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC)*, Vienna - Austria 1997.
- *V, III, II Incontro di Combinatoria Algebrica*, Prato - Italy 1998, Prato - Italy 1996, Milano - Italy 1995.

## 12 Project Directions and Participations

He is **director** of the following projects:

- In 2011–2012, he is **scientific responsible** of the international research project “Descriptive complexity of Non-Classical Computational Models”, founded upon a competition within *Programma Vigoni, Ateneo Italo-Tedesco (CRUI-DAAD): Conferenza dei Rettori delle Università Italiane-Deutscher Akademischer Austausch Dienst*. During the project, he works at the University of Giessen in June 2011 and January 2012.
- In 2008–2011, he is **responsible** of the project PUR: “Tecniche formali per l’analisi di sistemi computazionali e applicazioni”.

- In 2003–2006, he is **responsible** of the project FIRST: “Tecniche Sintattiche e Combinatorie per l’Analisi di Sistemi”.

He is member of the following projects:

- Since 2023, he is member of the Interdepartmental Project: sostegno ricerca 2023, linea 2B “Logical and formal investigations of new models of computation”.
- Since 2021, he is member of the Interdepartmental Project: sostegno ricerca 2021, linea 2B “Logical and formal investigations of new models of computation”.
- Since 2019, he is member of the Interdepartmental Project: sostegno ricerca 2019, linea 2B “Logical and formal investigations of new models of computation”.
- Since 2017, he is member of the Interdepartmental Project: sostegno ricerca 2017, linea 2B “Aspetti algebrici e computazionali nella logica e nelle sue applicazioni”.
- Since 2015, he is member of the Interdepartmental Project: sostegno ricerca 2015, linea 2B “Aspetti algebrici e computazionali nella logica e nelle sue applicazioni”.
- In 2013–2015, he is member of the project PRIN: “Automati e linguaggi formali: aspetti matematici e applicativi”.
- In 2008, he receives a grant from the European Project “Automata: from Mathematics to Applications”, responsible: Prof. Jean-Eric Pin, for visiting Université Paris VII, Paris, France.
- In 2007–2008, he is a member of of the international research project “Reducing Complexity by Introducing Structures”, founded upon a competition within *Programma Vigoni, Ateneo Italo-Tedesco (CRUI-DAAD): Conferenza dei Rettori delle Università Italiane-Deutscher Akademischer Austausch Dienst*. During the project, he works at the University of Frankfurt in February and June 2007, February and October 2008.
- In 2006–2008, he is a member of the project M.I.U.R. COFIN: “Linguaggi formali e Automati: aspetti matematici e applicativi. Metodi Probabilistici in Ambito di Linguaggi Formali”.
- In 2003–2004, he is a member of the project M.I.U.R. COFIN: “Linguaggi formali e automi: metodi, modelli e applicazioni”.
- In 2002–2004, he is a member of the project FIRB: “Complessità descrittoria di automi e strutture correlate”.
- In 2001–2003, he is a member of the project M.I.U.R. COFIN: “Linguaggi formali e automi: teoria e applicazioni”.
- In 1998–2000, he is a member of the project MURST 40%: “Modelli di calcolo innovativi: metodi sintattici e combinatori”.
- In 1996–1998, he is a member of the European project ESPRIT 6317: “Algebraic and Syntactic Methods in Computer Science (ASMICS 2)”.
- In 1994–1996, he is a member of the European project ESPRIT 3166: “Algebraic and Syntactic Methods in Computer Science (ASMICS)”.

### 13 Directions of Researches from Qualified Public and Private Institutions, and ICT

He is the scientific supervisor of some applicative projects, among which:

- October 2001 – January 2002: for the *Consorzio Milano Ricerche (CMR)* and in collaboration with the *Agenzia Nazionale per la Protezione dell’Ambiente (ANPA)* and with the *Dipartimento di Scienze Ambientali*, Università degli Studi di Milano – Bicocca, he is the scientific supervisor of a project aiming to develop an automatic planning of waste management.
- May 1999 – March 2000: for the *CNR* (see above) and in collaboration with the *Dipartimento di Scienze Ambientali*, Università degli Studi di Milano – Bicocca, he is the scientific supervisor of a project aiming to redesign the hydrogeological informatic system in use by the same Dipartimento di Scienze Ambientali and by other Organizations.
- January 2012 – December 2012: for the *Trussardi S.p.A.* and in collaboration with *Openy Research*, he is the scientific supervisor of a project aiming to design a performance management system for the application of new business models.

### 14 Reviewing for: International Journals, Conferences, Textbooks, International Scientific Projects

- He is reviewer for the main journals (Theoretical Computer Science, Information and Computation, Theory of Computing Systems, Journal of Computer and System Science, Fundamenta Informaticae, Natural Computing, RAIRO-ITA, . . . ), and for the main international conferences in Theoretical Computer Science and Formal Languages Theory (STACS, MFCS, DCFS, FCT, DLT, CIAA, LATA, SOFSEM, NCMA, CiE, AFL, . . . ).
- He is scientific reviewer for McGraw-Hill, Addison-Wesley, Jackson Libri. In particular:
  - he is scientific reviewer for Pearson Education, of the I Italian edition of “Intro to Python”, P. Deitel, H. Deitel,
  - he is scientific reviewer for Jackson Libri, of the II Italian edition of “Introduction to Algorithms”, T. Cormen, C. Leiserson, R. Rivest,
  - for Addison-Wesley, he translates the II Italian edition of “Computer Networks and Internets”, D. Comer.
- He is reviewer of the research project “Formal Systems: Measures, Structures and Effective Implementations”, Principal Investigator: Prof. Cezar Campeanu, Prince Edward Island University, Canada.

### 15 PhD, MSc, BSc Theses Supervisions

Supervisor and Co-supervisor of the Following PHD THESES

N.	Student	Thesis Title	PhD Program	Cycle	
1	Caterina Feletti	Distributed computing on mobile entities: algorithmic investigations	Computer Science	XXXVIII	Co-supervisor
2	Priscilla Raucci [Pass with Distinction]	Descriptive complexity of classical and quantum Computational model	Computer Science	XXXVII	<b>Supervisor</b>
3	Giovanna Lavado	Descriptive complexity and Parikh equivalence	Computer Science	XXVII	Co-supervisor
4	Maria P. Bianchi	Descriptive complexity of classical and quantum unary automata	Computer Science	XXV	Co-supervisor
5	Beatrice Palano	Synthesis of unary quantum automata from periodic events	Computer Science	XIV	Co-supervisor

BSC THESES supervision and co-supervision, next page

## Supervisor of the Following MSc THESES

N.	Student	Thesis Title	MSc Program	A.Y.
1	Stefano Clemente	Faulty robots: a study of their computational power	Informatica	2023/24
2	Valerio Buzzelli	Computational and descriptonal power of quantum finite automata	Informatica	2023/24
3	Matteo Salvi	Un'implementazione di automi quantistici usando Qibo	Informatica	2022/23
4	Lucia Mambretti	Distributed systems of mobile robots: a model-driven systematic study	Matematica	2021/22
5	Caterina Feletti	Regular polygon formation for swarms of robots	Informatica	2016/17
6	Stefano Sarioli	Architetture neuromorfiche	Informatica	2016/17
7	Federico Innocenti	Automi quantistici e periodicità	Informatica	2009/10
8	Pietro Salmi	Realizzazione di rete di sensori e attuatori wireless a 2,4 GHz	Scienze dell'Informazione	2007/08
9	Eugenio Chiriaco	Automi a stati finiti quantistici con linguaggio di controllo	Informatica	2003/04
10	Luca Lacerenza	Crittografia quantistica	Scienze dell'Informazione	2002/03

## Supervisor of the Following BSc THESES

N.	Student	Thesis Title	BSc Program	A.Y.
1	Andrea Cosentino	Decidability problems on quantum automata	Informatica	2023/24
2	Mattia Sidereo	Gestione e automazione di processi SQL	Informatica	2019/20
3	Viviana Vitali	Realizzazione fisica di automi quantistici	Fisica	2018/19
4	Andrea Paciolla	Architetture MICROFRONTEND nel fintech	Inform. per la Com. Dig.	2018/19
5	Serena Torresani	CERTIFEEED: web application for communication and cooperation	Comunicazione Digitale	2017/18
6	Diana Lazzarin	Analisi di una web application secondo i modelli di business ...	Comunicazione Digitale	2015/16
7	Francesco Abbatangelo	Creazione di un automa a stati finiti	Informatica	2015/16
8	Jacopo Zemella	Parallelismo e Haskell	Informatica	2015/16
9	Fabio Marino	Sviluppo di un'applicazione multiplatforma per Internet banking	Comunicazione Digitale	2013/14
10	Anna Toja	Progettazione e implementazione di un'estensione di DI MOL-CMS	Comunicazione Digitale	2011/12
11	Oltion Osmani	Integrazione di tecnologie web a supporto dell'attività di ricerca ...	Comunicazione Digitale	2009/10
12	Claudia Zucchi	Approfondimento sulle tecnologie per l'accessibilità alle immagini web	Comunicazione Digitale	2006/07
13	Simone Cacciola	Problemi di l'accessibilità di elementi dinamici nelle pagine web	Comunicazione Digitale	2006/07
14	Giorgia Bello	MONITOR-PROCESSI: un sistema di acquisizione ed elaborazione ...	Comunicazione Digitale	2006/07
15	Andrea Messini	Strumenti per ottimizzare la progettazione e l'aggiornamento di siti ...	Comunicazione Digitale	2005/06
16	Daniela Campanozzi	Accessibilità degli strumenti di collaborazione a distanza	Comunicazione Digitale	2005/06
17	Saverio Stocco	Struttura, funzionamento ed evoluzione di AUTOFORM ...	Comunicazione Digitale	2005/06
18	Valerio Di Domenico	Progetto LAINATE.NET	Comunicazione Digitale	2005/06
19	Maria P. Bianchi	Automi quantistici per linguaggi multiperiodici	Informatica	2005/06
20	David Balaban	Interfaccia grafica per la manipolazione di un database di parametri ...	Comunicazione Digitale	2005/06

Moreover, he has been co-supervisor of:

- 8 MSc Theses among Computer Science and Business (Univ. Bicocca) MSc programs, and
- 12 BSc Theses in the Computer Science BSc programs.

## 16 External Reviewer for International and National PhD Theses

He is external reviewer of the following PhD Theses:

- Title: “On Some Aspects of Quantum Computational Models”, Author: Amandeep Singh Bhatia, defended at the Computer Science and Engineering Department, Thapar Institute of Engineering and Technology, Patiala, India.
- Title: “Applications of Algebraic Automata Theory to Quantum Finite Automata”, Author: Mark Mercer, defended at McGill University Montreal, Quebec, Canada.
- Title: “Operator Precedence Languages: Theory and Applications”, Author: Federica Panella, defended at Politecnico di Milano.

## 17 PhD and MSc Tracks Responsibility, BSc and MSc Student Tutoring

- Within the PhD Program in Computer Science, Università degli Studi di Milano, he is responsible of the Curriculum “Models, Algorithms and Complexity”.
- Within the MSc Program in Computer Science, Università degli Studi di Milano, he is responsible of the curriculum “Foundations and Algorithms”.

- Since A.Y. 2023/2024 he is Tutor (Reference Professor) for the BSc Program in Physics.
- In A.Y.'s 2014/2015, 2016/2016, 2016/2017 he is Tutor (Reference Professor) for the BSc Program in Computer Science for Digital Communications.

## 18 Teaching Activity: PhD, Masters, MSc, BSc Programs Courses

He holds the following courses (at the Università degli Studi di Milano, unless otherwise stated):

- A.Y. (Academic Year) 2024/2025
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Quantum Information and Computing**, BSc Computer Science.
  - **Computer Programming and Lab**, BSc Physics.
- A.Y. 2023/2024
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Computer Programming and Lab**, BSc Physics.
- A.Y. 2022/2023
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Data Structures and Algorithms for Physics of Data**, MSc Physics.
  - **Computer Programming and Lab**, BSc Physics.
- A.Y. 2021/2022
  - **Finite memory quantum computational devices: from theory to practice** (in English), PhD Computer Science.
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Data Structures and Algorithms for Physics of Data**, MSc Physics.
  - **Computer Programming and Lab**, BSc Physics.
- A.Y. 2020/2021
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Data Structures and Algorithms for Physics of Data**, MSc Physics.
  - **Computer Programming and Lab**, BSc Physics.
- A.Y. 2019/2020
  - **Quantum Computing: Theory, Models and Methods** (in English), PhD Computer Science.
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Computer Programming and Lab**, BSc Physics.
- A.Y. 2018/2019
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Computer Programming and Lab**, BSc Physics.
  - **Statistics and Informatics**, BSc Science and Environmental Policies.

- A.Y. 2017/2018
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Computer Programming**, BSc's Comp. Science, Digital Comm., Comp. Science for Music
  - **Computer Programming and Lab**, BSc Physics.
- A.Y. 2016/2017
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Parallel and Distributed Algorithms**, MSc Computer Science.
  - **Computer Programming**, BSc Computer Science for Digital Communication, BSc Computer Science for Music
- A.Y. 2015/2016
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Parallel and Distributed Algorithms**, MSc Computer Science.
  - **Computer Programming**, BSc Computer Science for Digital Comm.
- A.Y. 2014/2015
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Parallel and Distributed Algorithms**, MSc Computer Science.
  - **Computer Programming**, BSc Computer Science for Digital Communication.
- A.Y. 2013/2014
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Computer Programming**, BSc Computer Science, BSc Digital Communication.
  - **Physics and Informatics**, BSc Chemical and Toxicological Safety Sciences.
- A.Y. 2012/2013
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Computer Programming**, BSc Computer Science, BSc Digital Communication.
  - **Computer Programming Lab**, BSc Computer Science.
  - **Physics and Informatics**, BSc Chemical and Toxicological Safety Sciences.
- A.Y. 2011/2012
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Computer Programming I**, BSc Digital Communication.
  - **Computer Programming Lab** (6 cfu), BSc Computer Science.
- A.Y. 2010/2011
  - **Elements of Complexity Theory** (in English), PhD Computer Science.
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Computer Programming I**, BSc Digital Communication.

- A.Y. 2009/2010
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Computer Programming I**, BSc Digital Communication.
- A.Y. 2008/2009
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Foundations of Computer Architecture and Programming**, BSc Digital Communication.
- A.Y. 2007/2008
  - **Object Oriented Programming**, Master in “Management, communication and development with ICT”.
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Foundations of Computer Architecture and Programming**, BSc Digital Communication.
- A.Y. 2006/2007
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Theoretical Computer Science**, Lectures for High school teachers – Corsi speciali D.M. 85.
  - **Foundations of Computer Architecture and Programming**, BSc Digital Communication.
- A.Y. 2005/2006
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Foundations of Computer Architecture and Programming**, BSc Digital Communication.
  - **Data Base and Information Systems**, BSc Economy and Business, Statistics and Informatics, Università degli Studi di Milano – Bicocca.
- A.Y. 2004/2005
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Computer Programming and Lab**, BSc Digital Communication.
- A.Y. 2003/2004
  - **Theoretical Computer Science**, MSc Computer Science.
  - **Computer Programming and Lab**, BSc Digital Communication.
- A.Y. 2002/2003
  - **Introductory Quantum Computing** (in English), PhD Computer Science.
  - **Data Base and Computer Networks** (5 cfu), Master in Bioinformatics, Università degli Studi di Milano – Bicocca.
  - **Theoretical Computer Science**, MSc Computer Science. For this course, with Prof. Alberto Bertoni, he is the author of Lecture Notes [\[114\]](#).
  - **Computer Programming Lab I**, BSc Environmental Sciences, Università degli Studi di Milano – Bicocca.

- A.Y. 2001/2002
  - **Data Base and Computer Networks**, Master in Bioinformatics, Università degli Studi di Milano – Bicocca.
  - **Data Base**, IFTS-2001, “SAP e Commercio Elettronico”.
  - **Data Base and Information Systems**, BSc Computer Science, Università degli Studi di Milano – Bicocca. For This course, he is the author of the Lecture Notes [111].
  - **Computer Programming Lab I**, BSc Environmental Sciences, Università degli Studi di Milano – Bicocca.
- A.Y. 2000/2001
  - **Elements of Data Base**, BSc Computer Science, Università degli Studi di Milano – Bicocca.
  - **Computer Science I and II**, BSc Environmental Sciences, Università degli Studi di Milano – Bicocca.
- A.Y. 1999/2000
  - **Computer Programming II**, BSc Environmental Sciences, Università degli Studi di Milano – Bicocca.
  - **Computer Programming Lab**, BSc Environmental Sciences, Università degli Studi di Milano – Bicocca.
  - **Computer Science I and II**, BSc Environmental Sciences, Università degli Studi di Milano – Bicocca.

In A.Y. 1998/1999, he is teaching assistant for the following courses at the BSc Computer Science, Università degli Studi di Milano:

- **Computer Programming and Lab I**,
- **Theoretical Computer Science**.

Beside academic teaching, in 1996, 1997, 1998, he holds courses of:

- **Introductory Computer Science**, Training courses sponsored by European Community within FSE Projects – Provincia Autonoma di Trento.

He also holds High School Mathematics courses.

## 19 Teaching Related Activity

- With Prof. A. Bertoni and B. Palano, he is the author of the Lecture Notes in *Parallel Algorithms* for the course of “Parallel and Distributed Algorithms”, MSc Computer Science, Università degli Studi di Milano.
- With Prof. A. Bertoni, he is aauthor of the Lecture Notes in *Theoretical Computer Science* [114] for the course “Theoretical Computer Science” – MSc Computer Science, Università degli Studi di Milano.
- He is author of the Lecture Notes in *Data Base and Information Systems* [111] for the course “Data Base and Information Systems” – BSc Computer Science, Università degli Studi di Milano – Bicocca.
- He is member of the project “Didattica web-centrica 2003” for supporting Computer Science didactic at the Università degli Studi di Milano in A.Y. 2003/2004 – responsible Prof. Gian Paolo Rossi.

## 20 Organizing Activity and Teaching/Scientific Responsibilities

- From 2008 to 2021, he is member of the Scientific Committee of the PhD Program in Computer Science, Università degli Studi di Milano.
- Until 2010, he is president of the Committee for evaluating admission of students from other Universities for BSc Programs in Computer Science, Digital Communication, Computer Science for Music, Università degli Studi di Milano.
- In A.Y. 2016/2017, he is member of the “Admission Test” Committee for BSc Programs in Computer Science, Computer Science for Digital Communication, Computer Science for Music, Università degli Studi di Milano.
- On PhD Program Grants for internationalization at the Università degli Studi di Milano, he invites at the Dipartimento di Scienze dell’Informazione:
  - In 2010, Prof. Viliam Geffert - Dept. Computer Science, P.J. Šafárik University, Košice, Slovakia, holding the cycle of seminars “Descriptive complexity of finite state automata”,
  - In 2009, Prof. Juraj Hromkovič - Dept. Computer Science, ETH Zürich, Switzerland, holding the cycle of seminars “Algorithms for NP-hard problems”,
  - In 2008, Prof. Juraj Hromkovič - Dept. Computer Science, ETH Zürich, Switzerland, holding the cycle of seminars “Design of randomized algorithms”,
  - In 2006, Prof. Alexander Meduna - Dept. Computer Science, Brno University of Technology, Czech Republic, holding the cycle of seminars “New Variants of Automata and Grammars”.

## 21 Memberships in Academic Competition Committees

### Tenured Assistant Professor Positions and Research Grants Competitions

- On November 2008 he is member of the committee of the competition for a tenured position of Assistant Professor at the Dipartimento di Informatica, Sistemistica e Comunicazione of the Università degli Studi di Milano “Bicocca”.
- On May 2013 he is member of the committee of the competition for a Type B Research Grant at the Dipartimento di Informatica of the Università degli Studi di Milano.

### PhD Positions Competitions

- On October 2009 he is member of the committee of the competition for the admission to the PhD Program in Computer Science at the Università degli Studi di Milano.
- On December 2013 he is member of the committee of the competition for the admission to the PhD Program in Computer Science at the Università degli Studi di Milano.
- In 2011–2013, he is a member of internal committees for the evaluation of Doctoral Theses at the PhD Program in Computer Science, Università degli Studi di Milano.

### Student Collaborations and Tutoring Positions Competitions

- He has been president and member of several committees of competitions for positions of tutoring and student collaborations.

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Next pages

**Scientific Publications by CARLO MEREGHETTI**

## Publications by CARLO MEREGHETTI

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## INTERNATIONAL JOURNALS

- [1] C. Feletti, L. Mambretti, C. MEREGHETTI, B. Palano. Computational power of autonomous robots: transparency vs. opaqueness. *Theoretical Computer Science*, 1036:115153, 2025.  
DOI: <https://doi.org/10.1016/j.tcs.2025.115153>
- [2] C. MEREGHETTI, B. Palano, P. Raucci. Latvian quantum finite state automata for unary languages. *International Journal of Foundations of Computer Science*, 36:419-455, 2025.  
DOI: <https://doi.org/10.1142/S0129054124430032>
- [3] C. MEREGHETTI, B. Palano, P. Raucci. Unary quantum finite state automata with control language. *Applied Sciences*, 14:1490, 2024.  
DOI: <https://doi.org/10.3390/app14041490>
- [4] M. Kutrib, A. Malcher, C. MEREGHETTI, B. Palano. Iterated uniform finite-state transducers on unary languages. *Theoretical Computer Science*, 969:114049, 2023.  
DOI: <https://doi.org/10.1016/j.tcs.2023.114049>
- [5] M. Kutrib, A. Malcher, C. MEREGHETTI, B. Palano. Iterated uniform finite-state transducers: descriptonal complexity of nondeterminism and two-way motion. *Journal of Automata Languages and Combinatorics*, 28(1-3):59-88, 2023.  
DOI: <https://doi.org/10.25596/jalc-2023-059>
- [6] C. Feletti, C. MEREGHETTI, B. Palano. Uniform circle formation for fully, semi-, and asynchronous opaque robots with lights. *Applied Sciences*, 13(13):7991, 2023.  
DOI: <https://doi.org/10.3390/app13137991>
- [7] M. Kutrib, A. Malcher, C. MEREGHETTI, B. Palano. Computational and descriptonal power of non-deterministic iterated uniform finite-state transducers. *Fundamenta Informaticae*, 185:337-356, 2022.  
DOI: <https://doi.org/10.3233/FI-222113>
- [8] M. Kutrib, A. Malcher, C. MEREGHETTI, B. Palano. Descriptonal complexity of iterated uniform finite-state transducers. *Information and Computation*, 284:104691, 2022.  
DOI: <https://doi.org/10.1016/j.ic.2021.104691>
- [9] A. Candeloro, C. MEREGHETTI, B. Palano, S. Cialdi, M.G.A. Paris, S. Olivares. An enhanced photonic quantum finite automaton. *Applied Sciences*, 11(18):8768, 2021.  
DOI: <https://doi.org/10.3390/app11188768>
- [10] C. MEREGHETTI, B. Palano. Guest Column: Quantum Finite Automata: From Theory to Practice. *ACM SIGACT News*, 52(3):38-59, 2021.  
DOI: <https://doi.org/10.1145/3494656.3494666>

- [11] S. Jakobi, K. Meckel, C. MEREGHETTI, B. Palano. The descriptive power of queue automata of constant length. *Acta Informatica*, 58:335-356, 2021.  
DOI: <https://doi.org/10.1007/s00236-021-00398-7>
- [12] C. MEREGHETTI, B. Palano, S. Cialdi, V. Vento, M.G.A. Paris, S. Olivares. Photonic realization of a quantum finite automaton. *Physical Review Research*, 2(1), 013089, 2020.  
DOI: <https://doi.org/10.1103/PhysRevResearch.2.013089>
- [13] Z. Bednářová, V. Geffert, C. MEREGHETTI, B. Palano. Boolean language operations on nondeterministic automata with a pushdown of constant height. *Journal of Computer and System Science*, 90:99-114, 2017.  
DOI: <https://doi.org/10.1016/j.jcss.2017.06.007>
- [14] M.P. Bianchi, C. MEREGHETTI, B. Palano. Quantum finite automata: Advances on Bertoni's ideas. *Theoretical Computer Science*, 664:39-53, 2017.  
DOI: <https://doi.org/10.1016/j.tcs.2016.01.045>
- [15] M.P. Bianchi, C. MEREGHETTI, B. Palano. On the power of one-way automata with quantum and classical states. *International Journal of Foundations of Computer Science*, 26:895-912, 2015.  
DOI: <https://doi.org/10.1142/S0129054115400055>
- [16] M. Kutrib, A. Malcher, C. MEREGHETTI, B. Palano, M. Wendlandt. Deterministic input-driven queue automata: finite turns, decidability, and closure properties. *Theoretical Computer Science*, 578:58-71, 2015.  
DOI: <https://doi.org/10.1016/j.tcs.2015.01.012>
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DOI: <https://doi.org/10.1016/j.tcs.2014.07.004>
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DOI: <https://doi.org/10.1016/j.ic.2014.03.002>
- [19] A. Malcher, K. Meckel, C. MEREGHETTI, B. Palano. Descriptive complexity of pushdown store languages. *Journal of Automata Languages and Combinatorics*, 17:225-244, 2012.  
DOI: <https://doi.org/10.25596/jalc-2012-225>
- [20] M.P. Bianchi, M. Holzer, S. Jakobi, C. MEREGHETTI, B. Palano, G. Pighizzini. On inverse operations and their descriptive complexity. *Journal of Automata Languages and Combinatorics*, 17:61-81, 2012.  
DOI: <https://doi.org/10.25596/jalc-2012-061>
- [21] C. Choffrut, A. Malcher, C. MEREGHETTI, B. Palano. First-order logics: some characterizations and closure properties. *Acta Informatica*, 49:225-248, 2012.  
DOI: <https://doi.org/10.1007/s00236-012-0157-z>
- [22] Z. Bednářová, V. Geffert, C. MEREGHETTI, B. Palano. The size-cost of Boolean operations on constant height deterministic pushdown automata. *Theoretical Comp. Sci.*, 449:23-36, 2012.  
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- [23] A. Malcher, C. MEREGHETTI, B. Palano. Descriptive complexity of two-way pushdown automata with restricted head reversals. *Theoretical Computer Science*, 449:119-133, 2012.  
DOI: <https://doi.org/10.1016/j.tcs.2012.04.007>
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DOI: <https://doi.org/10.3233/FI-2011-583>
- [25] V. Geffert, C. MEREGHETTI, G. Pighizzini. One pebble versus  $\epsilon \log n$  bits. *Fundamenta informaticae*, 104:55-69, 2010.  
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- [32] C. MEREGHETTI, B. Palano. Quantum finite automata with control language. *Theoretical Informatics and Applications*, 40:315-332, 2006.  
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## BOOK CHAPTERS

- [50] M.P. Bianchi, C. MEREGHETTI, B. Palano. Complexity of Promise Problems on Classical and Quantum Automata. Eds. C.S. Calude, R. Freivalds, K. Iwama, Computing with New Resources. Essays Dedicated to Jozef Gruska on the Occasion of His 80th Birthday, Lecture Notes in Computer Science 8808, 161-175, Springer, 2014.  
DOI: [https://doi.org/10.1007/978-3-319-13350-8\\_12](https://doi.org/10.1007/978-3-319-13350-8_12)
- [51] C. MEREGHETTI, B. Palano. Quantum automata and periodic events. Ed. C. Martin-Vide, Mathematics, Computing, Language, and Life: Frontiers in Mathematical Linguistics and Language Theory. Vol. 2: Scientific Applications of Language Methods, 563-584, Imperial College Press, London, 2010.  
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- [52] C. MEREGHETTI, G. Pighizzini. The world of unary languages. A quick tour. Eds. C. Martin-Vide and V. Mitrana, *Grammars and Automata for String Processing: from Mathematics and Computer Science to Biology, and Back*, 275-284, Taylor and Francis, London, 2003.  
DOI: <https://doi.org/10.1201/9780203009642.ch27>

## SPECIAL ISSUES AND PROCEEDINGS EDITORSHIPS

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- [54] R. Freund, M. Holzer, C. MEREGHETTI, F. Otto, B. Palano. Third Workshop on Non-Classical Models for Automata and Applications (NCMA'11), Milan, Italy, July 18–July 19, 2011. *Proceedings Osterreichischen Computer Gesellschaft, book@ocg.at series*, 2011.  
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## INTERNATIONAL CONFERENCE PROCEEDINGS

- [56] M. Kutrib, A. Malcher, C. MEREGHETTI, B. Palano. Two-way finite automata with translucent input letters. In *26th International Conference on Descriptive Complexity of Formal Systems (DCFS'25)*, *Proceedings*, Lecture Notes in Computer Science -, pp. -, Springer, 2025. In press.  
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