Alberto Policriti

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Curriculum Vitae et Studiorum

Education

1980–1984 **"Laurea" degree in Mathematics**, *University of Turin*, Italy, *cum laude.*

1986 **CNR fellowship**, *Courant Insitutute of Mathematical Sciences,*, New York University, New York.

1986-1988 **Master in Computer Science**, *Courant Insitutute of Mathematical Sciences,*, New York University, New York.

1988-1990 **Ph.D. in Computer Science**, *Courant Insitutute of Mathematical Sciences,*, New York University, New York.
Advisor prof. M. Davis

Academic, Administrative, and Visiting Positions

1986-1990 ENIDATA fellowship at CIMS-NYU

1989-1992 Researcher, University of Udine

1991 Visiting member Robotics lab. NYU

1992 Visiting member Robotics lab. NYU

1992-2000 Associate Professor, University of Udine

1998-2001 vice-Director of the Dept. of Mathematics and Computer Science

2000-today Full Professor, University of Udine

2001 (Sep.-Oct.) Visiting member at the Computer Science Department, University of Stanford

2002 (Mar.) Visiting member at the NYU Bioinformatics Laboratory

2002-2006 Coordinator Biotechnology Program, University of Udine

2005 (Jul.) Visiting member at the "Laboratoire de Génomique Analitique", University "Pierre et Marie Curie", Paris

2006 (June) Scottish Informatics and Computer Science Alliance Distinguished Visitor

2004-06-07-08-10-12 Director of the summer school BCI (Biology, Computation and Information)

2008-2017 Coordinator of the PhD program in Informatics, Udine

2013 Chairmar Annual Meeting of the Bioinformatics Italian Society

Dpt. of Mathematics, Computer Science and Physics, University of Udine. Applied Genomics Institute.
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2013-14-15-16-17-18	Steering Committee Member of International Work-Conference on Bioinformatics and Biomedical Engineering
2015-2018	Vice President IGA (Institute of Applied Genomics)
2016 (Sept.-Oct.)	Visiting member at the "Laboratoire de Génomique Analitique", University "Pierre et Marie Curie", Paris
2017	Bioinformatics Technical Chairman, Computational Intelligence Methods for Bioinformatics and Biostatistics
2016-2019	Vice Director Scuola Superiore di Udine
2019-today	Director Scuola Superiore di Udine
2020-today	Member of the "Nucleo di valutazione" (external evaluation board) Scuola Internazionale Superiore di Studi Avanzati (SISSA)

Ph.D. students

A. Dovier	*Computable Set Theory and Logic Programming*, Ph.D. in Computer Science, Pisa-Udine
A. Montanari	*Metric and Layered Temporal Logic*, Ph.D., University of Amsterdam (co-promotor, promotor prof. J.F.A.K. van Benthem)
G. D'Agostino	*Modal Logic and Set Theory: Translation, Bisimulation and Interpolation*, Ph.D., University of Amsterdam (co-promotor, promotor prof. J.F.A.K. van Benthem)
C. Piazza	*Computing in Non Standard Set Theories* Ph.D. in Computer Science, Udine
R. Gentilini	*Graph Algorithms for Massive Data Sets* Ph.D. in Computer Science, Udine
N. Vitacolonna	*Intervals: decidability, algorithms, and games* Ph.D. in Computer Science, Udine (co-advisor A. Montanari)
A. Casagrande	*Hybrid Systems: a first-order approach to verification and approximation techniques.* Ph.D. in Computer Science, Udine (co-advisor T. Villa)
S. Scalabrin	*Floating inside the genomes: from physical maps to transposable elements annotation* Ph.D. in Computer Science, Udine
M. Zantoni	*Bioinformatics support in a DNA sequence process* Ph.D. in Computer Science, Udine
C. Del Fabbro	*Repeated sequences in bioinformatics: assembly, annotation and alignments* Ph.D. in Computer Science, Udine
F. Vezzi	*Next Generation Sequencing Revolution Challenges: Search, Assemble, and Validate Genomes* Ph.D. in Computer Science, Udine
A. Tomescu	*Sets as Graphs* Ph.D. in Computer Science, Udine
F. Nadalin	*Paired is better: local assembly algorithms for NGS paired reads and applications to RNA-seq* Ph.D. in Computer Science, Udine
R. Vicedomini	*Alignment and reconciliation strategies for large-scale* de-novo *assembly* Ph.D. in Computer Science, Udine
F. Galvan	*First Quantization Table Detection in Double Compressed JPEG Images* Ph.D. in Computer Science, Udine (co-advisor S. Battiato)
N. Prezza	*Compressed Computation for Text Indexing* Ph.D. in Computer Science and Mathematical and Physical Sciences, Udine
S. Silvetti	*Combining Machine Learning and Formal Methods for Complex Systems Design*, Udine (co-advisor L. Bortolussi)
E. Pippia	*Optimization and ModelingTechniquesfor Food Service Appliances*, Udine
E. Scapin	*Task-related models to teach and assess the learning of iteration in the high school*, Udine. (co-advisor C. Mirolo)

Research

Topics

- Set-Theoretic Decidability and Combinatorial Problems
- Algorithms and Data-Structures for Compressed Computation
- Automated Deduction and Logic Decision Problems
- Languages for the Specification and Verification of Reactive Systems
- Algorithms and Techniques for Model Checking
- Algorithmic Aspects of Computational Biology and Bioinformatics
- Systems Biology

Research statement

I started my research in Logic with special focus on set-theoretic decision procedures, deductive systems, and algorithms. My recent research interests have expanded to the (many) areas of interaction between Computer Science and Biology. In particular, I am now interested in the role and function of algorithmic ideas in Life Sciences. I had experiences in sequencing projects, in the analysis of epigenomic data, and in the application of verification and model-checking techniques to problems in Computational Biology. Starting from these experiences my main interests are now in the application of compressed computation techinques to large collections of (genomic) data, as well as in the design of new (bioinformatics) tools based on algorithmic ideas and methodologies.

Editorial board

- Algorithms
- International Journal on Data Mining and Bioinformatics
- Transactions on Computational Systems Biology
- Le Matematiche
- Network Modeling Analysis in Health Informatics and Bioinformatics
- Conference Papers in Computer Science
- Scientifica - Computational Biology
- (Former) LNAI book series of the Association of Logic, Language, and Information

Other activities

- 1996-2004 Director of the Computer Science lab. at the School of Sciences of the University of Udine.
- 2001-today Director of the Laboratory for Bioinformatics, Verification, and Parallel Computation, Dipartimento di Matematica e Informatica, Università di Udine.
- Referee and program committee member for many international conferences and journals (including: Journal of Symbolic Computation, Communication on Pure and Applied Mathematics, Journal of Automated Reasoning, Theoretical Computer Science, Discrete Mathematics, Journal on Computational Biology, Bioinformatics, BMC-Bioinformatics Proceedings of the American Mathematical Society, PLOS ONE).
- 2004-2013 Member of the Scientific Commission of the *Gruppo Nazionale per il Calcolo Scientifico* of the *Istituto Nazionale di Alta Matematica*.
- 2005-2008 Chairman of the *E. W. Beth Dissertation Prize* of the European Association for Logic, Language and Information.
- 2006 Member of the Bioinformatics Scientific Commission of the *CBM* (*Centro di Biomedicina Molecolare*), Trieste.
- Co-founder and Director of the Bioinformatics division of the *IGA* (*Istituto di Genomica Applicata*), Parco Scientifico e Tecnologico "L. Danieli", Udine.
- 2009-2010 Member of the committee of the *E. W. Beth Dissertation Prize* of the European Association for Logic, Language and Information.
- 2010 Member of the committee of the *Premio Tesi di Dottorato su argomenti di Informatica Teorica* of the Italian Chapter of the European Association of Theoretical Computer Science.
- European coordinator of the IEEE CS Technical Committee on Bioinformatics.
- 2013-2017 Member of the Council of the European Association for Theoretical Computer Science.

Support and Projects

1. "Fondo per gli Investimenti della Ricerca di Base (FIRB03).
   Project *LIBI: International Laboratory of BioInformatics* Technological Research Units:- CINECA - INFN - SPACI/CACT-ISUFI, University of Lecce - IBM Semea Sud. Industrial partner, IBM. Scientific Research Units: - CNRBA (Istituto Tecnologie Biomediche, CNR, Section of Bari) - UNIBO (University of Bologna) - UNIMI (University of Milan) - CBM (Centro di Biomedicina Molecolare, Trieste). A. Policriti will operate as member of CBM.
2. Fondo speciale per la ricerca regionale in FVG, 02 - 04, *Formal verification, certification and model checking for reactive, concurrent, and embedded systems.* A. Policriti coordinator.
3. Fondo attrezzature di laboratorio, 02 - 05, Laboratory for Bioinformatics, Verification, and Parallel Computation. A. Policriti coordinator.
4. Istituto Nazionale di Alta Matematica. Inter-group project 2003: *Metodi matematici e algoritmici per l'analisi di sequenze di nucleotidi e amminoacidi.* A. Policriti coordinator.
5. Gruppo Nazionale Calcolo Scientifico project 2004: Bioinformatica: *Metodi computazionali e basi di dati per l'analisi di sequenze proteiche e di DNA.* A. Policriti coordinator.
6. PRIN-Cofin project, 2004-06: *Computational Tools for Building and Checking Biological Systems Models* (in *Sybilla: Systems Biology: modellazione, linguaggi e analisi*). A. Policriti local coordinator.
7. PRIN-Cofin project, 2007-09: *Biological systems, automata based hybrid models and model checking techniques* (in *BISCA: Biologically-inspired systems and calculi and their applications*). A. Policriti local coordinator.
8. L.R. 11/2003 project, 2007: *BIOcheck A Scalable Computational Tool for Building and Checking Biological Models*. A. Policriti coordinator.
9. INTAS european project *Algebraic and deduction methods in non-classical logic and their applications to Computer Science*. A. Policriti coordinator.
10. Progetto bandiera *Epigen*: Sviluppo di algoritmi e software per l'analisi del metiloma. Principal Investigator.
11. COST action *SeqAhead*. Member representative of Italy.
12. Electrolux: "Algoritmi e tecniche di manipolazione dati per la gestione di sistemi per la ristorazione".
13. National Biodiversity Future Center and received funding from the European Union Next-GenerationEU (PIANO NAZIONALE DI RIPRESA E RESILIENZA (PNRR) – MISSIONE 4 COMPONENTE 2, INVESTIMENTO 1.4 – D.D. 1034 17/06/2022, CN00000033).

Teaching

1992/93
1. *Teoria degli algoritmi e della calcolabilità* (S.M.F.N.);
2. *Lectures on Automated Deduction* (S.M.F.N.);

1993/94
1. *Teoria degli algoritmi e della calcolabilità* (S.M.F.N.);
2. *Trattamento dell'informazione nell'impresa* (S.M.F.N.);
3. *Informatica generale* (Lettere);

1994/95
1. *Documentazione automatica* (S.M.F.N.);
2. *Informatica generale* (Lettere);
3. organization of the course: *Introduction to Multimedia* by J. T. Schwartz;

1995/96
1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Teoria degli Algoritmi e della Calcolabilità (avanzato)* (S.M.F.N.);
3. *Informatica generale* (Lettere);
4. *Informatica* (Scuola di specializzazione in Anestesia e Rianimazione, Medicina);

1996/97
1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Teoria degli Algoritmi e della Calcolabilità (avanzato)* (S.M.F.N.);
3. *Informatica generale* (Lettere);
4. *Informatica* (Scuola di specializzazione in Anestesia e Rianimazione, Medicina);

1997/98

1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Algoritmi e Strutture Dati (avanzato)* (S.M.F.N.);
3. *Informatica generale* (Lettere);
4. *Informatica* (Scuola di specializzazione in Anestesia e Rianimazione, Medicina);
5. *Automated Deduction* Ph.D. course, Valencia (Spain);
6. Organization of the course *Termporal verification of reactive systems* by Z. Manna;

1998/99

1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Algoritmi e Strutture Dati (avanzato)* (S.M.F.N.);
3. Coordinatore dei corsi di Informatica per la Facoltà di Lettere;
4. *Informatica* (Scuola di specializzazione in Anestesia e Rianimazione, Medicina);
5. *Temporal Logics* Ph.D. course at Pisa and Udine;
6. *Temporal Logics and Model Checking* Ph.D. course, Valencia (Spagna);

1999/00

1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Algoritmi avanzati I* (S.M.F.N.);
3. *Informatica* (Scuola di specializzazione in Anestesia e Rianimazione, Medicna);
4. Organization of the course: *Hybrid Systems* by M. Antoniotti, A. Balluchi, L. Benvenuti and T. Villa
5. Organization of the course: *Logic and Games* by J.F.A.K. van Benthem;

2000/01

1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Model Checking I* (S.M.F.N.);
3. *Model Checking II* (S.M.F.N.);
4. Organization of the course: *Computing with Modal Logics* by Maarten de Rijke;
5. Summer course *Metric and Layered Temporal Logics for Time Granularities* at the European Summer School on Logic Language and Information 2000, Birmingham (UK);

2001/02

1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Model Checking I* (S.M.F.N.);
3. *Model Checking II* (S.M.F.N.);
4. Organization of the courses: *Topics in Computational Biology: Systems Biology* by B. Mishra and *Model-checking methods for infinite state systems* by W. Thomas;
5. Summer course *Model Checking and its Complexities* at the European Summer School on Logic Language and Information 2002, Trento (I);

2002/03

1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Informatica generale* (Biotecnologie, Interfacoltà);
3. *Model Checking* (S.M.F.N.);
4. *Algoritmi avanzati* (S.M.F.N.);
5. *Storia dell'Informatica* (S.S.I.S.S.);

2003/04

1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Informatica generale* (Biotecnologie, Interfacoltà);
3. *Model Checking* (S.M.F.N.);
4. *Algoritmi avanzati* (S.M.F.N.);
5. *Algoritmi e complessità* (S.M.F.N.);
6. *Storia dell'Informatica* (S.S.I.S.S.);
7. *Modelli di calcolo e programmazione* (S.S.I.S.S.);
8. Organization of the summer school BCI (Biology, Computation and Information);

2004/05

1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Informatica generale* (Biotecnologie, Interfacoltà);

3. *Model Checking* (S.M.F.N.);
4. *Algoritmi avanzati* (S.M.F.N.);
5. *Algoritmi e complessità* (S.M.F.N.);
6. *Storia dell'Informatica* (S.S.I.S.S.);
7. *Modelli di calcolo e programmazione* (S.S.I.S.S.);
8. Organization of the summer school BCI (Biology, Computation and Information);

2006/07 Sabbatical.

2007/08

1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Informatica generale* (Biotecnologie, Interfacoltà);
3. *Model Checking* (S.M.F.N.);
4. *Bioinformatica* (Biotecnologie Sanitarie);
5. *Algoritmi avanzati* (S.M.F.N.);
6. *Modelli di calcolo e programmazione* (S.S.I.S.S.);
7. Organization of the summer school BCI (Biology, Computation and Information);

2008/09

1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Informatica generale* (Biotecnologie, Interfacoltà);
3. *Bioinformatica* (Biotecnologie Sanitarie);
4. *Algoritmi avanzati* (S.M.F.N.);
5. *Modelli di calcolo e programmazione* (S.S.I.S.S.);
6. *Systems Biology* (PhD program in Informatics);

2009/10

1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Informatica generale* (Biotecnologie, Interfacoltà);
3. *Bioinformatica* (Biotecnologie Sanitarie);
4. *Algoritmi e complessità* (S.M.F.N.);

2010/11

1. *Algoritmi e Strutture Dati* (S.M.F.N.);
2. *Informatica generale* (Biotecnologie, Interfacoltà);
3. *Bioinformatica* (Scuola Superiore di Udine);
4. *Algoritmica II* (S.M.F.N.);

2011/12

1. *Algoritmi e Strutture Dati* (corso di laurea in Informatica);
2. *Bioinformatica* (corso di laurea in Biotecnologie);
3. *Algoritmica II* (corsi di laurea in Informatica e Matematica).

2012/13

1. *Algoritmi e Strutture Dati* (corso di laurea in Informatica);
2. *Bioinformatica* (corso di laurea in Biotecnologie);
3. *Algoritmica II* (corsi di laurea in Informatica e Matematica).

2013/14

1. *Laboratorio di Algoritmi e Strutture Dati* (corso di laurea in Informatica);
2. *Bioinformatica* (corso di laurea in Biotecnologie);
3. *Algoritmica II* (corsi di laurea in Informatica e Matematica);
4. Organizzazione del ciclo di lezioni tenute da A. Tomescu su *Algoritmi per la Bioinformatica*

2014/15

1. *Corso di dottorato: Logic, Sets, and Graphs* (Università di Pisa);
2. *Laboratorio di Algoritmi e Strutture Dati* (corso di laurea in Informatica);
3. *Bioinformatica* (corso di laurea in Biotecnologie);
4. *Algoritmica II* (corsi di laurea in Informatica e Matematica).

2015/16

1. *Laboratorio di Algoritmi e Strutture Dati* (corso di laurea in Informatica);
2. *Bioinformatica* (corso di laurea in Biotecnologie);

3. *Algoritmica II* (corsi di laurea in Informatica e Matematica).

2016/17

1. *Laboratorio di Algoritmi e Strutture Dati* (corso di laurea in Informatica);
2. *Bioinformatica* (Scuola Superiore e dottorato);
3. *Bioinformatica* (corso di laurea triennale e magistrale in Biotecnologie);
4. *Algoritmica* (corsi di laurea in Informatica e Matematica).

2017/18

1. *Laboratorio di Algoritmi e Strutture Dati* (corso di laurea in Informatica);
2. *Bioinformatica* (corso di laurea triennale e magistrale in Biotecnologie);
3. *Algoritmica* (corsi di laurea in Informatica e Matematica).

2018/19

1. *Laboratorio di Algoritmi e Strutture Dati* (corso di laurea in Informatica);
2. *Bioinformatica* (corso di laurea triennale e magistrale in Biotecnologie);
3. *Algoritmica* (corsi di laurea in Informatica e Matematica).

2019/20

1. *Algorithms for massive data* (corso di laurea in Data Science & Scientific Computing);
2. *Bioinformatica* (corso di laurea triennale e magistrale in Biotecnologie);
3. *Seminario di Informatica* (Scuola Superiore)
4. *Algoritmica* (corsi di laurea in Informatica e Matematica).

2020/21

1. *Algorithms for massive data* (corso di laurea in Data Science & Scientific Computing);
2. *Bioinformatica* (corso di laurea triennale e magistrale in Biotecnologie);
3. *Foundations of Neural Networks* (corsi di laurea in Artificial Intelligence and Cybersecurity, Informatica e Matematica)
4. *Algoritmica* (corsi di laurea in Artificial Intelligence and Cybersecurity, Informatica e Matematica).

2021/22

1. *Algorithms for massive data* (corso di laurea in Data Science & Scientific Computing);
2. *Bioinformatica* (corso di laurea triennale e magistrale in Biotecnologie);
3. *Foundations of Neural Networks* (corsi di laurea in Informatica e Matematica)
4. *Algoritmica* (corsi di laurea in Artificial Intelligence and Cybersecurity, Informatica e Matematica).

2022/23

1. *Algorithms for massive data* (corso di laurea in Data Science & Scientific Computing);
2. *Bioinformatica* (corso di laurea triennale e magistrale in Biotecnologie);
3. *Foundations of Neural Networks* (corsi di laurea in Informatica e Matematica)
4. *Algoritmica* (corsi di laurea in Artificial Intelligence and Cybersecurity, Informatica e Matematica).