

Annalisa Massini

Curriculum Vitae

*"Ma, soprattutto, bisognerebbe imparare a dubitare,
a diventare scettici." - Margherita Hack*

Appointments

- 2001–today **Associate Professor**, INF01, Computer Science Department - *Sapienza* University of Rome.
1st november 2001
- 1996–2001 **Researcher**, K05B, Computer Science Department - *Sapienza* University of Rome.
8th January 1996 - 31st October 2001

Education

- 1993 **PhD in Computer Science**, V cycle, Computer Science Department - University of Rome *La Sapienza*, PhD thesis: *High efficiency self-routing interconnection networks*.
Advisor Prof. G. A. De Biase
- 1989 **Laurea degree in Mathematics**, University of Rome *La Sapienza*, Thesis: *Binary redundant number representation for a parallel arithmetic on optical and electronic computers*.
Supervisor Prof. G. A. De Biase

Research interests

Research interests include: computer networks, mobile sensor networks, system level verification, parallel architecture and parallel arithmetic units, interconnection networks, GPU based simulations.

Scholarship

- 1994–1996 **PostDoc Scholarship**, Computer Science Department - University of Rome *La Sapienza*.
- 1993–1994 **Scholarship**, Hewlett Packard, realization of a prototype for Information Appliance.
- 1993–1994 **Scholarship**, National Research Council (CNR), n. 201.12.61 - 21/7/89 for Focused Project *Sistemi Informatici e Calcolo Parallelo* on the topic *Design of HW modules for numerical signal processing elaboration - Studio e progetto di moduli HW per l'elaborazione numerica di segnali*.
overlapping with the PhD Scholarship - not accepted

Teaching

- 2008/09 - **Digital System Design**, *Bachelor degree in Computer Science*, *Sapienza* University of Rome.
today
- 2007/08 - **Intensive Computation**, *Master degree in Computer Science 2007/08 - today*, *Sapienza* University of Rome.
today
- 2020/21 **Operating Systems**, *Bachelor degree in Mathematics*, *Sapienza* University of Rome.

Other courses **Computer Architecture, Advanced Parallel Architectures, Telecommunication Networks.**

Maternity leave

Mandatory maternity leave from 16/5/2003 to 16/10/2003
Mandatory maternity leave from 30/4/2001 to 30/09/2001
Mandatory maternity leave from 22/10/1997 to 26/03/1998
Mandatory maternity leave from 7/2/1996 to 7/7/1996

Institutional activities

Department and Faculty

- 1996–today Computer Science Department member
- 2020–today Member of the Monitoring Committee of the Faculty I3S (support to the Quality Team and the teaching and research University Evaluation Committee).
- 2019–2021 Member of the committee for teaching and research activities of the graduate and undergraduate program
- 2014–2021 Elected member of the department board as representative of the associate professors for the Department and the Faculty (I3S)
- 2011–today UGOV responsible for the Computer Science Department
- 2011–today VQR responsible for the Computer Science Department
- 2009–2010 Member of the Evaluation committee of Faculty of Mathematics, Physics and Natural Sciences (SMFN) for the Computer Science Department
- 2004–2007 Member of the Committee for the transfer to the Bachelor degree programs in Computer Science

Committee

- 2012–oggi Member of the Committee for the admission to the Specialization School in Fisica Medica, the Committee for the admission to the Degree of Specialization in Fisica Medica
- 2013 Member of the Committee for the admission to TFA A042 and selection of Tutors for the TFA A042.

PhD school

- 2001–today Member of the PhD Faculty board
 - 2019 Member of the PhD admission committee in Computer Science Program (XXXIV cycle) Sapienza University of Rome
- 2018–2022 Advisor for the PhD Program in Computer Science of Daniele Izzi, Sapienza University of Rome, XXXIV cycle, *On Communication Problems for Multistage Interconnection Networks*
- 2017–2021 Advisor for the PhD Program in Computer Science of Viviana Arrigoni, Sapienza University of Rome, XXXIII cycle, *Network performance analysis through Boolean Network Tomography and parallelization of fundamental operations in numerical linear algebra*
- 2012–2015 Co-advisor (with prof. Dario Tedesco) of Lucio Badiali, International PhD Course in Novel Physics Methodologies for Environmental Research XXVI ciclo, Seconda Università di Napoli, *A predictive model for lava effusion rate using machine learning methodology*
- 2010 Member of the PhD admission committee in Computer Science Program (XXVI cycle) Sapienza University of Rome

2006 Chair of the PhD admission committee in Computer Science Program (XXII cycle) Sapienza University of Rome

Projects participation

EU Research Projects

2013–2016 FP7-ICT-2011-9 - ICT-2011.5.2 – PAEON – *Project Title: Model Driven Computation of Treatments for Infertility Related Endocrinological Diseases* *Project Duration: 36 Months, 01/02/2013 – 31/01/2016* **Task responsible** for task T1.2 – Project Monitoring

2012–2015 FP7-ICT-2011-8 - ICT-2011.6.1 – SMARTHG – *Project Title: Energy Demand Aware Open Services for Smart Grid Intelligent Automation* *Project Duration: 36 Months, 01/10/2012 – 30/09/2015* **Task responsible** for T1.3 – Quality Assurance

National projects

2009–2011 MIUR PRIN 2008 "Autonomic Security" - **Participant**

2006–2012 Project under the MIUR Program (Art. 12 del Decreto Ministeriale 8 agosto 2000 n. 593 - Bando Aerospazio Lazio) Title: Integrated system for management and control of TRANsport of Dangerous Materials - TRAMP (DM 24283) **Responsible for the management of training activities and for the Project reporting** Teacher of the Computer Networks course

International projects

2021– Project JPMorgan Chase Research Award 2021 - PI Novella Bartolini - *Understanding inter-dependent market dynamics: vulnerabilities and opportunities* - Role: co-PI and participant to the research activities

2020–2022 Project JPMorgan Chase Research Award 2020 - PI Novella Bartolini - *The impact of trading strategies and market rules on fairness of financial markets - A framework for fairness assessment in financial markets* - Role: co-PI and participant to the research activities

2015–2019 Project NATO G4936 Science for Peace and Security - PI Novella Bartolini - *Hybrid Sensor Networks for Emergency Critical Scenarios* - Role: participant to the research activities

Other projects

2020–2022 Project POR FESR 2014-2020, Progetti strategici Aerospazio - *Satellite Driven Fire Simulator (SDFS)* - Role: participant to the research activities of Sapienza University of Rome unit

2018–2019 Project Bando Aerospazio regione Lazio - SCAPR (POR FESR Aerospazio e sicurezza) - *A system for hostile UAV detection in critical areas* - Role: participant to the research activities of Sapienza University of Rome unit

2017–2018 **Scientific responsible** of project CINECA ISCRA (Italian SuperComputing Resource Allocation) class C, n. HP10CDHUFS, dal titolo "Design and development of an application for the parallelization of bioinformatics pipelines for NGS data analysis - PaPi-NGS". Computational CINECA hours given: 35.000 on MARCONI A1

2016–2017 **Scientific responsible** of project CINECA ISCRA (Italian SuperComputing Resource Allocation) class C n. HP10C0ICO0 "Parallelization and optimization of bioinformatics pipelines for Next Generation Sequencing data analysis - popNGS". Computational CINECA hours given: 100.000 on GALILEO.

2011–2013 **Scientific responsible** for the agreement between the Computer Science Department of Sapienza University of Rome and the National Institute for Geophysics and Vulcanology (INGV) on High Performance Computation on GPGPU based architectures on the cloud and optimization of software for seismic and acoustic modelling.

Local projects

2001–today Research projects funded by Sapienza University **Participant and/or Proponent**

Other activities

Reviewer

- 1998–oggi Reviewer for international journals: Theoretical Computer Science, Journal of Computational and Applied Mathematics, Pervasive and Mobile Computing, Int'l Journal of Software Engineering and Knowledge Engineering, ACM Transactions on Parallel Computing, Network (MPDI), Journal of Parallel and Distributed Computing, International Journal of Computers and Applications, Networks, IEEE Transactions on Parallel and Distributed Systems, IEEE COMPUTER, Robotics and Autonomous Systems, Discrete Mathematics, Optical Engineering, IEEE/ACM Transaction on Networking, Journal of Visual Languages and Computing
- 1996–oggi Reviewer per international conferences: International Performance Computing and Communications Conference (IPCCC), International Conference on Computing, Networking and Communication (ICNC), Haifa Verification Conference (HVC), Vehicular Technology Conference (VTC), Conference on Distributed Computing in Sensor Systems (DCoSS), International Parallel and Distributed Processing Symposium (IPDPS), SIROCCO, Aracne, European Symposium on Algorithms (ESA), International Conference on Communications in Computing (CIC), International Conference on Algorithms and Complexity (CIAC)

Journals

- C1 V. Arrigoni, N. Bartolini, A. Massini, F. Trombetti *A Bayesian Approach to Network Monitoring for Progressive Failure Localization* IEEE-ACM Transactions on Networking, p. 1-14, 2022
- C2 V. Arrigoni, N. Bartolini, A. Massini *Topology Agnostic Bounds on Minimum Requirements for Network Failure Identification* IEEE ACCESS, vol. 9, p. 6076-6086, 2021
- C3 F. Mari, A. Massini, I. Melatti, E. Tronci *A Constraint Optimization-Based Sense and Response System for Interactive Business Performance Management* Applied Artificial Intelligence, vol. 35, p. 353-372, 2021
- C4 T. Mancini, F. Mari, A. Massini, I. Melatti, E. Tronci *On checking equivalence of simulation scripts* The Journal of Logical and Algebraic methods in Programming, vol. 120, 2021
- C5 N. Bartolini, T. He, V. Arrigoni, A. Massini, F. Trombetti, H. Khamfroush *On Fundamental Bounds on Failure Identifiability by Boolean Network Tomography* IEEE-ACM TRANSACTIONS ON NETWORKING, vol. 28, p. 588-601, 2020
- C6 A. Pappagallo, A. Massini, E. Tronci *Monte carlo based statistical model checking of cyber-physical systems: A review* INFORMATION, vol. 11, p. 1-24, 2020
- C7 S. Gioiosa, M. Bolis, T. Flati, A. Massini, E. Garattini, G. Chillemi, M. Fratelli, T. Castrignanó *Massive NGS data analysis reveals hundreds of potential novel gene fusions in human cell lines* GIGASCIENCE, vol. 7, p. 1-8, 2018
- C8 T. Mancini, A. Massini, E. Tronci *Parallelization of Cycle-Based Logic Simulation* Parallel Processing Letters, 27(2): 1-16, 2017
- C9 T. Mancini, F. Mari, A. Massini, I. Melatti, I. Salvo, E. Tronci *On minimising the maximum expected verification time*, Information Processing Letters, 122, 1, 8-16, 2017
- C10 T. Mancini, F. Mari, A. Massini, I. Melatti, E. Tronci *SyLVaaS: System Level Formal Verification as a Service*, Fundamenta Informaticae 149(1-2): 101-132, 2016
- C11 T. Mancini, F. Mari, A. Massini, I. Melatti, E. Tronci *Anytime system level verification via parallel random exhaustive hardware in the loop simulation*, Microprocessors and Microsystems - Embedded Hardware Design 41: 12-28, 2016
- C12 N. Bartolini, A. Massini, S. Silvestri *P&P: an asynchronous and distributed protocol for mobile sensor deployment*, Wireless Networks, 18(4), 381-399, 2012
- C13 N. Bartolini, T. Calamoneri, A. Massini, S. Silvestri *On adaptive density deployment to mitigate the sink hole problem in mobile sensor networks*, ACM Springer Mobile Networks and Applications, 16:134-145, 2011
- C14 N. Bartolini, T. Calamoneri, E. G. Fusco, A. Massini, S. Silvestri *Push and Pull: Autonomous Deployment of Mobile Sensors for a Complete Coverage* Wireless Networks, 16(3), 607 - 625, 2010
- C15 T. Calamoneri, A. Massini, L. Torok, I. Vrto *Antibandwidth of Complete k-ary Trees* Discrete Mathematics, Vol. 309, No. 22, 6408-6414, 2009
- C16 T. Calamoneri, A. Massini *Nearly Optimal Three Dimensional Layout of Hypercubes* Networks, 47(19), pp. 1-8, 2006
- C17 T. Calamoneri, A. Massini *Efficient Algorithms for Checking the Equivalence of Multistage Interconnection Networks* Journal of Parallel and Distributed Computing, 64, 135 - 150, 2004

- C18 T. Calamoneri, A. Massini, I. Vrto *New results on Edge-Bandwidth* Theoretical Computer Science, 307, 503-513, 2003
- C19 A. Massini *All-to-all personalized communication on multistage interconnection networks* Discrete Applied Mathematics, 128, 435-446, 2003
- C20 T. Calamoneri, A. Massini *Optimal Three-Dimensional Layout of Interconnection Networks* Theoretical Computer Science, 255, 263-279, 2001
- C21 G. Bongiovanni, G. A. De Biase, A. Massini, A. Monti *The shuffled mesh a flexible and efficient model for parallel computing* Telecommunication Systems, Vol 13-1, 21-27, 2000
- C22 T. Calamoneri, A. Massini *An Optimal Layout of Multigrid Networks* Information Processing Letters, 72, 137-141, 1999
- C23 G. A. De Biase, A. Massini *A virtually nonblocking self-routing permutation network which routes packets in $O(\log_2 N)$* Telecommunication Systems, 10, 135-147, 1998
- C24 G. A. De Biase, C. Ferrone, A. Massini *An $O(\log_2 N)$ depth asymptotically nonblocking self-routing permutation network* IEEE Trans. on Comp., vol. 44, 1047-1050, 1995
- C25 A. Clementi, G. A. De Biase, A. Massini *Fast parallel arithmetic on cellular automata* Complex Systems, vol. 8, 435-441, 1994
- C26 G. A. De Biase, A. Massini *High efficiency redundant binary number representations for parallel arithmetic on optical computers* Optics & Laser Technology - Special Issue on Optical Computing, vol.26, n. 4, 219-224, 1994
- C27 G. A. De Biase, A. Massini *Redundant Binary Number Representation for an Inherently Parallel Arithmetic on Optical Computers* Applied Optics, vol. 32, 659-664, 1993
- C28 G. A. De Biase, A. Massini *Parallel Optical Arithmetic on Images by a Redundant Binary Number Representation* Applied Optics, vol. 29, 1587-1589, 1990

Conferences

- C1 D. Izzi, A. Massini *All-to-All Personalized Communication on Fat-Trees Using Latin Squares* Proc. Int. Conf. on Software, Telecommunications and Computer Networks (SoftCOM). p. 1-6, Split, Croatia, 2022
- C2 V. Arrigoni, F. Maggioli, A. Massini, E. Rodolà *Efficiently Parallelizable Strassen-Based Multiplication of a Matrix by its Transpose* Proc. 50th International Conference on Parallel Processing (ICPP), p. 1-12, 2021
- C3 V. Arrigoni, N. Bartolini, A. Massini, F. Trombetti *Failure localization through progressive network tomography* Proc. IEEE INFOCOM, vol. 2021, p. 1-10, Vancouver, BC, Canada - online, 2021
- C4 F.G. Cabangcla, D. Izzi, A. Massini *A New Perspective for Rearrangeability of MINs* Proc. Int. Conf. on Software, Telecommunications and Computer Networks (SoftCOM). p. 1-6, Hvar, Croatia, 2021
- C5 D. Izzi, A. Massini *Optimal all-to-all personalized communication on Butterfly networks through a reduced Latin square* Proc. IEEE 22nd Int. Conf. on High Performance Computing and Communications, (HPCC-SmartCity-DSS 2020) p. 1065-1072, Fiji, 2020
- C6 V. Alimguzhin, T. Mancini, A. Massini, S. Sinisi, E. Tronci *In silico clinical trials through AI and statistical model checking* Proc. 1st Workshop on Artificial Intelligence and Formal

Verification, Logic, Automata, and Synthesis, OVERLAY vol. 2509, p. 17-22, CEUR-WS, ISSN: 1613-0073, Rende, Italy, 2019

- C7 A. Calabrese, T. Mancini, A. Massini, S. Sinisi, E. Tronci *Generating T1DM virtual patients for in silico clinical trials via AI-guided statistical model checking* Proc. Workshop CEUR, vol. 2538, Rende, Italy, 2019
- C8 V. Arrigoni, A. Massini *Hybrid Solver for Quasi Block Diagonal Linear Systems* Proc. of Parallel Processing and Applied Mathematics. Lecture Notes on Artificial Intelligence, Springer, Bialystok, Poland, 2019
- C9 T. Mancini, F. Mari, A. Massini, I. Melatti, I. Salvo, S. Sinisi, E. Tronci, R. Ehrig, S. Röblitz, and B. Leeners *Computing personalised treatments through In Silico Clinical Trials. A case Study on downregulation in assisted reproduction* Proc. 25th Int Workshop on Experimental Evaluation of Algorithms for Solving Problems with Combinatorial Explosion, RCRA, vol. 2271, CEUR-WS, Oxford, UK, 2018
- C10 T. Mancini, E. Tronci, I. Salvo, F. Mari, A. Massini, I. Melatti *Computing Biological Model Parameters by Parallel Statistical Model Checking* Proc. IWBBIO (2), 542-554, 2015
- C11 T. Mancini, F. Mari, A. Massini, I. Melatti, E. Tronci *SyLVaaS: System Level Formal Verification as a Service* Proc. PDP, 476-483, 2015
- C12 T. Mancini, F. Mari, A. Massini, I. Melatti, E. Tronci *Simulator Semantics for System Level Formal Verification* Proc. Gandalf, 86-99, 2015
- C13 R. Ehrig, T. Dierkes, S. Schäfer, S. Röblitz, E. Tronci, T. Mancini, I. Salvo, V. Alimguzhin, F. Mari, I. Melatti, A. Massini, T. Krüger, M. Egli, F. Ille, B. Leeners *An integrative approach for model driven computation of treatments in reproductive medicine* Proc. 15th Int. Symposium on Mathematical and Computational Biology, (BIOMAT), Roorkee, Uttarakhand, India, 2015
- C14 T. Mancini, F. Mari, A. Massini, I. Melatti, E. Tronci *Anytime System Level Verification via Random Exhaustive Hardware In The Loop Simulation* Proc. 17th Euromicro Conf. on Digital Systems Design (DSD 2014) Verona, Italy, 2014
- C15 T. Mancini, I. Salvo, F. Mari, I. Melatti, A. Massini, S. Sinisi, E. Tronci, F. Daví, T. Dierkes, R. Ehrig et al. *Patient-Specific Models from Inter-Patient Biological Models and Clinical Records* Formal Methods in Computer-Aided Design (FMCAD), Lausanne, Switzerland, 2014
- C16 T. Mancini, F. Mari, A. Massini, I. Melatti, E. Tronci *System Level Formal Verification via Distributed Multi-Core Hardware in the Loop Simulation* Proc. 22nd Euromicro Int. Conf. on Parallel, Distributed and Network-Based Computing (PDP 2014) Turin, Italy, 2014
- C17 T. Mancini, F. Mari, A. Massini, I. Melatti, F. Merli, E. Tronci *System Level Formal Verification via Model Checking Driven Simulation* Proc. CAV 2013 - 25th Int. Conf. on Computer Aided Verification, Saint Petersburg, Russia , 2013
- C18 F. Alessi, A. Massini, R. Basili *High Performance Parallelization of COMPSYN on a Cluster of Multicore Processors with GPUs* Proc. 2nd Int. Workshop on Advances in High-Performance Computational Earth Sciences: Applications and Frameworks (IHPCES), Int. Con. on Computational Science, Omaha, Nebraska, USA, 2012
- C19 F. Alessi, A. Massini, R. Basili *Accelerating the Production of Synthetic Seismograms by a Multicore Processor Cluster with Multiple GPUs* Proc. 20th Euromicro Int. Conf. on Parallel, Distributed and Network-Based Computing (PDP 2012) Garching, Germany, 2012

- C20 N. Bartolini, T. Calamoneri, A. Massini, S. Silvestri *Variable density deployment and topology control for the solution of the sink-hole problem* Proc. ICST QShine 2009, Las Palmas de Gran Canaria, Spain, 2009
- C21 N. Bartolini, A. Massini, S. Silvestri *P&P protocol: local coordination of mobile sensors for self-deployment* Proc. ACM Int. Conf. on Modeling, Analysis and Simulation of Wireless and Mobile Systems (ACM MSWIM 2009), Tenerife, Canary Island, Spain, 2009
- C22 N. Bartolini, T. Calamoneri, T. La Porta, A. Massini, S. Silvestri *Autonomous deployment of heterogeneous mobile sensors* Proc. IEEE International Conference on Network Protocols (IEEE ICNP 2009), Princeton, New Jersey, USA, 2009 **Best Paper Award winner**
- C23 A. Massini, M. T. Raffa *Using the LCP based Decomposition for Permutation Routing on $(2 \log N - 1)$ Stage Interconnection Networks* Proc. International Conference on Parallel and Distributed Computing and Networks (PDCN2009), Innsbruck, Austria, 2009
- C24 N. Bartolini, T. Calamoneri, E.G. Fusco, A. Massini, S. Silvestri *Autonomous deployment of self-organizing mobile sensors for a complete coverage* Proc. 3rd International Workshop on Self-Organizing Systems (IWSOS 2008), Vienna, Austria, 2008
- C25 N. Bartolini, T. Calamoneri, E. G. Fusco, A. Massini, S. Silvestri *Snap and Spread: a self-deployment algorithm for mobile sensor networks* Proc. 4th IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS '08), Santorini, Greece, 2008
- C26 T. Calamoneri, A. Massini, L. Torok, I. Vrto *Antibandwidth of complete k -ary tree* Proc. of 5th Cracow Conference on Graph Theory, Poland, Electronic Notes in Discrete Mathematics, 24, pp. 259-266, 2006
- C27 T. Calamoneri, A. Massini *Nearly optimal three-dimensional layout of hypercube networks* Proc. of Graph Drawing 03, Italy, Lecture Notes in Computer Science, vol. 2912, 64-75, 2003
- C28 G. A. De Biase, A. Massini *Parallel Sorting of n -strings in Kn Time* Proc. International Conference on Communications in Computing - CIC'2002, Las Vegas, Nevada, USA, 24-27, 2002
- C29 T. Calamoneri, A. Massini *A New Approach to the Rearrangeability of $(2 \log N - 1)$ Stage MINs* Proc. International Conference on Applied Informatics (AI2001), Austria, 2001
- C30 A. Massini *All-to-all personalized communication on multistage interconnection networks* International Conference on Communications in Computing - CIC'2000, Las Vegas, Nevada, USA, 217-223, 2000
- C31 T. Calamoneri, A. Massini *Efficiently checking the equivalence of multistage interconnection networks* Proc. 11th International Conference on Parallel and Distributed Computing Systems (PDCS'99), Cambridge, Massachusetts, USA, 23-30, 1999
- C32 A. Clementi, G. A. De Biase, A. Massini *Pipelined addition, accumulation and multiplication of binary numbers on cellular automata* Proc. Fourth Joint Conference on Information Science (JCIS'98), RTP, North Carolina, USA, 134-141, 1998
- C33 G. Bongiovanni, G.A. De Biase, A. Massini, A. Monti *The shuffled mesh: a flexible and efficient model for parallel computing* Proc. 6th International Conference on Telecommunication Systems, Nashville, USA, 652-654, 1998
- C34 T. Calamoneri, A. Massini *On three-dimensional layout of interconnection networks* Proc. of Graph Drawing 97, Roma, Italy, 64-75, 1997

- C35 G. A. De Biase, A. Massini *Parallel Arithmetic on Optical Computers by Redundant Binary Number Representation* Proc. of International Conference on Application of Photonic Technology, Plenum Press, Toronto, Canada, 101-108, 1995
- C36 G. A. De Biase, C. Ferrone, A. Massini *A quasi-nonblocking self-routing network which routes packets in $\log_2 N$ time* Proc. of IEEE INFOCOM'93, S. Francisco, California, USA, 1375-1381, 1993