

## CV SUMMARY – DANILO ARDAGNA

**DATE OF BIRTH** 08/06/1973

### EDUCATION

2004 **PhD Degree** in Computer Engineering, Politecnico di Milano, Italy  
2000 **Master of Science Degree** in Computer Engineering, Politecnico di Milano, Italy (Final Grade 100/100 cum laude)

### CAREER

Dec 2014 – **Associate Professor**, Politecnico di Milano, Italy  
2006 – 2014 **Assistant Professor**, Politecnico di Milano, Italy  
2004 – 2006 **Post-Doc Researcher** (Assegnista di Ricerca), Politecnico di Milano, Italy  
2001 – 2004 **Ph.D. Student**, Politecnico di Milano, Italy

### HABILITATION

Type of habilitation	Country	SSD	Date of achievement
Full Professor	Italy	INF/01	21/07/2023
Full Professor	Italy	ING-INF/05	26/07/2018

### RESEARCH INTERESTS

- **Big Data and Artificial Intelligence Applications, Edge Computing, and HPC:** Bayesian optimization methods, scheduling policies, machine learning performance modelling
- **Green and Cloud computing:** design and runtime management, performance and energy trade-off, system optimization and game theory
- **Service Oriented Architectures:** model driven development, Web services composition
- **Autonomic Computing:** self-management techniques, dynamic resource allocation policies
- **Design of IT Architectures:** cost analysis of IT architectures, system optimization

### LEADERSHIP IN COMPETITIVE RESEARCH PROJECTS

Project Acronym	Time Period	Funding Institution	Funding Scheme	Role of the applicant	Budget for the applicant's institution
AI-SPRINT	2021-	EU Commission	H2020 RIA	Project Coordinator	1.05Mln
ANDREAS	2020-2022	EU Commission	H2020 – TETRAMAX technology transfer	Responsible for POLIMI research unit	25k
ATMOSPHERE	2017-2019	EU Commission	H2020 RIA – Europe-Brazil collaboration	Responsible for POLIMI research unit	180k
EUBRA-BIGSEA	2016-2017	EU Commission	H2020 RIA – Europe-Brazil collaboration	Responsible for POLIMI research unit	240k
DICE	2015-2018	EU Commission	H2020 RIA	Responsible for POLIMI research unit	530k
MODAClouds	2012-2015	EU Commission	FP7 - IP	WP Leader – Proposal co-editor	780k

### SCIENTIFIC PRODUCTION AND METRICS

- **Scientific Productivity:** 135 peer-reviewed publications (153 entries on Scopus, 276 co-authors according to Scopus), including 52 journal papers:
  - Author/Co-author of 31 top-ranked Q1 journal papers (including IEEE Transactions on Cloud Computing, IEEE Transactions on Software Engineering, IEEE Transactions on Services Computing, IEEE Transactions on Dependable and Secure Computing, IEEE Transactions on Control Systems Technology, Computer Networks, INFORMS Journal on Computing, European Journal of Operational Research)
  - Author/Co-author of 83 scientific publications on peer-reviewed conferences and workshops including 2 top-level A++/A+ conference (WWW, IEEE ICAC)
  - Inventor/Co-inventor of one international patent with IBM
- **Publication Impact:** Google Scholar: h-index 37, citations 6627. Scopus: h-index 29, citations 3203. Last access September 27, 2023

**AWARDS AND RECOGNITIONS (SELECTION OF PAST 10-YEARS)**

1. **Included in the World's Top 2% Scientist ranking** (according to "Updated science-wide author databases of standardized citation indicators," November 2022)
2. *D. Ardagna*, F. Filippini, F. Magugliani, M. Cicala, K. K. Materka, M. Riedl, P. Skrzypek. **Best project award**. The **ANDREAS project** has been selected by the **TETRAMAX Consortium** in the context of the 3rd call for **Value Chain Technology Transfer Projects** within the H2020 TETRAMAX cascade funding, for its **exceptional contribution** and **innovation in power and cost management** of deep learning training workloads. January 2022
3. *D. Ardagna*, S. Bernardi, E. Gianniti, S. Karimian Aliabadi, D. Perez-Palacin, J. I. Requeno. Modeling Performance of Hadoop Applications: A Journey from Queueing Networks to Stochastic Well Formed Nets. 16<sup>th</sup> International Conference on Algorithms and Architectures for Parallel Processing (ICA3PP 2016) Proceedings. 614-629. Granada, Spain. 2016. **Best paper award**
4. A. Evangelinou, M. Ciavotta, G. Kousiouris, *D. Ardagna*. A Joint Benchmark-Analytic Approach For Design-Time Assessment of Multi-Cloud Applications. In Cloud Forward (CF2015) Proceedings. 67- 77. Pisa, Italy. 2015. **Best collaboration paper award** (European projects track)
5. **Google Cloud for Education** May 2022
6. **Windows Azure Research Pass** October 2013. Joint work with Prof. Elisabetta Di Nitto, DEEP-SE Cloud initiative
7. **AWS in Education research grant** March 2014. Joint work with Prof. Elisabetta Di Nitto, DEEP-SE Cloud initiative
8. **IBM SUR Grant** October 2016. Joint work with Prof. Cristina Silvano and Prof. Letizia Tanca. P8 based cluster for Big Data research

**INVITED TALKS AND SEMINARS (SELECTION OF PAST 10-YEARS)**

1. AI-SPRINT: Open Source Tools for AI@EDGE. European Commission. EU-SW Forum. Bruxelles, 2/12/2022
2. AI-SPRINT: Future challenges of the Cognitive Cloud. European Commission. Digital Autonomy in the Computing Continuum. HORIZON-CL4-2022-DATA-01-03 call presentation. Online, 11/11/2021
3. Performance Prediction of GPU-based Deep Learning Applications. Spanish Supercomputing Network 13<sup>th</sup> Users Conference 2019, Zaragoza, Spain, 19/9/2019
4. Cloud and Multi-Cloud Computing: Current Challenges and Future Applications. A Quality of Service Perspective, 23/5/2015. PESOS Workshop at ICSE 2015
5. Model Driven Development and QoS Assessment of Cloud Applications, Polytechnic University of Catalonia, Barcelona, Spain, 7/5/2014
6. Model Driven Development and QoS Assessment of Cloud Applications, IBM T.J. Watson Research Center, Yorktown Heights, NY, USA, 15/10/2013
7. QoS Modeling and Evaluation in Cloud Environments, University of Austria at Timisoara, Timisoara, Romania, 24/9/2013
8. QoS Modeling and Evaluation in Cloud Environments, 7th Advanced Summer School in Service Oriented Computing, Crete, Greece, 4/7/2013

**TEACHING EXPERIENCE (SELECTION OF PAST 5-YEARS)**

Institution name	Course name	Credits	No. of students	Reference Study Course	Time period	Students Evaluation
POLIMI	COMPUTING INFRASTRUCTURES	5	267	Computer Eng	2021-22	-
POLIMI	ALGORITHMS AND PARALLEL COMPUTING	10	147	Math Eng	2021-22	2.8/4
POLIMI	COMPUTING INFRASTRUCTURES	5	204	Computer Eng	2021-22	3.2/4
POLIMI	ALGORITHMS AND PARALLEL COMPUTING	10	272	Math Eng	2021-22	3.1/4
POLIMI	ALGORITHMS AND PARALLEL COMPUTING	10	224	Math Eng	2020-21	3.2/4
POLIMI	COMPUTING INFRASTRUCTURES	5	303	Computer Eng	2019-20	3.3/4
POLIMI	ALGORITHMS AND PARALLEL COMPUTING	10	182	Math Eng	2019-20	2.5/4
POLIMI	MULTIDISCIPLINARY PROJECT	5	31	Computer Eng	2018-19	3.3/4
POLIMI	ALGORITHMS AND PARALLEL COMPUTING	10	154	Math Eng	2018-19	2.2/4

### INSTITUTIONAL RESPONSIBILITIES (SELECTION OF PAST 10-YEARS)

- 2023 – **Member** of the PhD Board for the Computer Science and Engineering Program at Politecnico di Milano  
2022 – **Member** of the European Open Ecosystem for Research and Innovation (EGI) Working Group on Artificial Intelligence  
2022 – Executive Board **Member** of the Italian Computing and Data Infrastructure (ICDI) Working Group  
2022 – **Member** of the CINI Working Group on System and Service Quality  
2022 – **Member** of the National Research Center in High-Performance Computing, Big Data and Quantum Computing (Spoke Future HPC)  
2020 – **Member** of the Research Support Group of the Computer Science Research Area  
2022 – 2023 **Member** of the PhD Applications Evaluation Committee for the Computer Science and Engineering Research Area at Politecnico di Milano  
2021 – 2022 **Member** of the evaluation committee for the assessment of RTD-B candidates to Associate Professor role Promotion at Politecnico di Milano

### SUPERVISION OF MASTER, DOCTORAL STUDENTS AND POSTDOCTORAL RESEARCHERS

- 2010 – **Advisor/Co-advisor** of 9 Doctoral Students and 7 Postdoctoral Researchers at Politecnico di Milano.  
**Selection**  
2023 – Supervisor for PhD Student Laura De Giorgi (funded by Tinvention)  
2023 – Supervisor for PhD Student Riccardo Cavadini (co-funded by E4 Company)  
2022 – Supervisor for PhD Student Abednego Wamuhindo Kambale (co-funded by Luxottica)  
2018 – 2019, 2015-2018 Postdoctoral research advisor (PhD supervision) for Dr. Eugenio Gianniti (R&D Free2move eSolutions)  
2017 – 2020 Postdoctoral research advisor for Dr. Marco Lattuada (R&D STMicroelectronics)  
2017 – 2018 Postdoctoral research advisor for Dr. Enrico Barbierato (RTD-A, Università Cattolica)  
2016 – 2017 Postdoctoral research advisor for Dr. Athanasia Evangelinou (European Commission Officer, HPC research unit)  
2013 – 2016 Supervisor for PhD Student Giovanni Paolo Gibilisco (R&D Akams)  
2012 – 2016 Postdoctoral research advisor for Dr. Michele Ciavotta (Associate Professor, Università Milano Bicocca)  
  
2012 – **Opponent Member** of 7 Doctoral Examination Committees at The University of Melbourne, Polytechnic University of Catalonia, University of Lille, INRIA-IRISA, University of Calgary, Università Tor Vergata  
  
2001 – **Advisor/Co-advisor** of 110+ Master Students in Computer Science Engineering, Politecnico di Milano, Italy

### ORGANIZATION OF SCIENTIFIC MEETINGS (SELECTION OF PAST 10-YEARS)

- 2023 **Tutorials Co-chair**, ACM SIGMETRICS 2023 Orlando, Florida, USA  
2021 **General Chair**, IFIP WG 7.3 Performance 2021, Milan, Italy  
2020 **General Chair**, IFIP WG 7.3 Performance 2020, Milan, Italy  
2015 **General Chair**, ICGreen 2015, Milan, Italy

### COMMISSIONS OF TRUST (SELECTION OF PAST 10-YEARS)

- 2022 **Expert Reviewer, European Commission**, EuroHPC project OPTIMA (Optimizing Industrial Applications for Heterogeneous HPC systems)  
2022 **Expert Reviewer, European Commission**, H2020 Center of Excellence project POP2 (Performance Optimisation and Productivity 2)  
2019 **Expert Reviewer**, SPEC 2019 Award program committee  
2019 **Expert Reviewer**, Barcelona Computing Center Stars program evaluator and **chair** of the **evaluators** group, Spain  
2017 **Expert Reviewer, European Commission**, ERC Consolidator grants  
2016 **Expert Reviewer**, Netherlands Research Council for the Engineering and Applied Sciences Executive Board  
2015 **Expert Reviewer**, Netherlands Research Council for the Engineering and Applied Sciences Executive Board

- 2013 **Expert Reviewer**, Netherlands Organisation for Scientific Research Executive Board
- 2013 **Expert Reviewer**, Austrian Science Fund Executive Board
- 2021 – **Editorial Board Member** of the KeAi-Elsevier (Open Publishing Program) Int. Journal of Intelligent Networks
- 2018 – 2022 **Associate Editor**, IEEE Transactions on Cloud Computing
- 2015 – 2018 **Associate Editor**, Springer open access BioMed Big Data Analytics journal
- 2014 – 2015 **General Chair** of the IEEE Special Technical Community on Sustainable Computing
- 2013 – 2014 **Secretary/Treasurer** of the IEEE Special Technical Community on Sustainable Computing
- 2011 – 2013 **Information Officer** of the IEEE Special Technical Community on Sustainable Computing
- 2017 – 2019 **Member** of AEIT (Associazione Italiana di Elettrotecnica, Elettronica, Automazione, Informatica e Telecomunicazioni) and AICT society
- 2011 – 2015 **Member** of the IT Systems Architect working group within AICA (Associazione Italiana per l'Informatica ed il Calcolo Automatico)
- 2022 **Member** for the evaluation **committee** of **RTD-A** candidates at the University of Trento
- 2018 **External referee** for the assessment of **University of Calgary** applications for **Promotion to Professor**

#### TECHNOLOGY TRANSFER (SELECTION OF PAST 10-YEARS)

- **Patent:** *D. Ardagna*, E. Conforti, C. Francalanci, M. Gatti, S. Lucchini, S. Morsello, M. Trubian. Method, system and computer program for configuring server farms at minimum cost. Politecnico di Milano - IBM. *Patent number US7886036*, USA Patent Office
- **Open Source Tools, Products and Services:**<sup>1</sup>
  - 2022-2023 Luxottica Consultancy services: Partitioning and managing AI models at runtime in computing continua
  - 2020-2021 ANDREAS: Artificial intelligence traiNing scheDuler foR accElerAted resource clusterS. Advanced scheduler for GPU based clusters to support deep learning models training. Funded by TETRAMAX technology transfer project, achieved TRL 8, commercialization already started with E4 Company
  - 2021– SPACE4AI-D: System PerformAnce and Cost Evaluation on Cloud for AI applications Design. O-source tool to support design space exploration, component placement and resource selection of AI applications running on cloud-edge systems. One of the main assets of the on-going H2020 AI-SPRINT project. Validated in industry use case
  - 2017 – aMLLib: a Machine Learning Library. Open-source library to train performance models for estimating the performance of complex software systems. Applied to estimate performance of Spark systems and deep neural networks model training on GPUs. Allowed to improve the performance models of Spark inventors. Currently used within the H2020 AI-SPRINT and LIGATE research projects
  - 2016 – 2018 D-SPACE4Cloud: Data intensive System PerformAnce and Cost Evaluation on Cloud. DICE open-source tool for the design-time optimisation of big data applications based on Hadoop and Spark. One of the main H2020 DICE project assets led to the funding of the H2020 AI-SPRINT project and currently evolving into SPACE4AI-D
  - 2016-2017 OPT\_IC & OPT\_JR. A set of open-source run-time optimization-based resource management tools for Spark applications. One of the main H2020 EUBRA-BIGSEA project assets
  - 2013-2015 SPACE4Cloud: System PerformAnce and Cost Evaluation on Cloud. An open-source design-time tool to support design space exploration of enterprise applications running on cloud. One of the main FP7 MODAClouds project assets. Led to the funding of the H2020 DICE project and evolved into D-SPACE4Cloud. Validated in industry use case

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<sup>1</sup> Open source tools links available at: [https://ardagna.faculty.polimi.it/?page\\_id=465](https://ardagna.faculty.polimi.it/?page_id=465)

## CURRICULUM VITAE ET STUDIORUM

### Danilo Ardagna



Politecnico di Milano,  
Dipartimento di Elettronica, Informazione e Bioingegneria  
Via Golgi 42, 201333 Milano, Italy  
Telephone: +39-02 2399 3514  
e-mail: [danilo.ardagna@polimi.it](mailto:danilo.ardagna@polimi.it)  
Born: June 8, 1973 - Monza (MB), Italy  
Nationality: Italian

### Highlights

**135 peer-reviewed publications**, including **52 journal papers** (31 in Scimago Q1 ranking), **16 IEEE/ACM Transactions** and **2 top-level A++/A+ conferences**

Co-author of **83 scientific publications on peer-reviewed conferences/workshops**

Co-author of **6 chapters in scientific books**

Co-author of **two textbooks** in Italian

Co-editor of **one scientific book**

Co-inventor of **one international patent**

**16 Invited Talks/Seminars/Panels** (2007-2023)

**3 tutorials**

**Included in the World's Top 2% Scientist ranking** (according to "Updated science-wide author databases of standardized citation indicators," November 2022)

**2 best paper awards**

**Best project award** among the 3rd call for **Value Chain Technology Transfer H2020 TETRAMAX - ANDREAS** (2022)

Co-applicant for several **European and national funded projects**, totaling **2.95mln euros** of funding to date

**Google Cloud for Education** May 2022

**IBM 2016 SUR grant**, big data P8 cluster donation. Joint work with Prof. Cristina Silvano and Prof. Letizia Tanca

**IBM 2010 faculty award** for research on virtualized systems

**Top CompSci University Azure** Adoption research July 2018, July 2017, October 2016

**Amazon AWS in Education** research grant May 2014, March 2012, and December 2010.

Joint work with Prof. Elisabetta Di Nitto and Prof. Gianpaolo Cugola

**Windows Azure Research Pass** October 2013. Joint work with Prof. Elisabetta Di Nitto

Politecnico di Milano Fondi **5 per mille 2013 Poli-RISPOSTA project co-applicant**

Politecnico di Milano Fondi **5 per mille 2009 GAME-IT Principal Investigator**

**Visiting researcher and intern at IBM T.J. Watson Research, BCAM (Basque Center for Applied Mathematics), and Federal University of Minas Gerais, Brazil**

Based on **Google Scholar** (27/9/2023), my **h-index** is **37** and total number of **citations** is **6627 (2132 since 2018)**, with first published paper in 2002. My **top ranked paper** was published in 2007 collecting up to **1234 citations (Scopus h-index 28, citations 3870)**

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**Education**

2001-2004	Politecnico di Milano, Ph.D. in Computer Science and Engineering with the thesis “A cost-oriented methodology for the design of information technology architectures,” advisor Prof. C. Francalanci
1992-2000	Politecnico di Milano, Master in Computer Science and Engineering (100/100 magna cum laude), with the thesis “ISIDE: A software tool for the cost-oriented design of Information Systems,” advisor Prof. G. Bracchi

**Academic positions**

	<b>POLITECNICO DI MILANO, MILAN, ITALY</b>
Dec 2014 -	Associate Professor at the Department of Electronics, Information, and Bioengineering
2006-2014	Assistant Professor (tenure-track) at the Department of Electronics, Information, and Bioengineering
2004-2006	Post Doctorate at the Department of Electronics, Information, and Bioengineering. Grant by MIUR to support post-doctoral studies
2001-2004	Ph.D. Student. Grant by MIUR to support Ph.D. studies

**FULL PROFESSOR QUALIFICATION**

July 2023	Italian national scientific qualification in 01/B1 INF/01 scientific sector (date of achievement 21/7/2023)
July 2018	Italian national scientific qualification in 09/H1 ING-INF/05 scientific sector (date of achievement 26/7/2018)

**Research interests****AREAS OF SPECIALIZATION**

Design, prototype, and evaluation of resource management algorithms for Cloud/Edge/Fog, HPC systems supporting Artificial Intelligence, Big Data and Service based applications. Optimization and game theory methods applied to capacity planning and management of very large-scale data centres. Bayesian optimization and Reinforcement Learning methods for optimal configuration of HPC and computing continuum systems. Performance modelling of Artificial Intelligence and Big Data applications. Machine learning models for Data Intensive and Deep Learning applications performance prediction. Model Driven Design and management of multi-Cloud applications. Energy efficiency solutions for virtualized infrastructures. Cost-oriented design and capacity planning of distributed IT architectures.

**BIG DATA AND ARTIFICIAL INTELLIGENCE APPLICATIONS, EDGE COMPUTING, AND HPC**

- ☐ Bayesian optimization methods for the auto-tuning of large scale and HPC systems
- ☐ Advanced scheduling policies for Deep Learning applications training in GPU based clusters. Energy-aware training
- ☐ Performance modelling of GPGPU systems through machine learning
- ☐ Optimal partitioning of Artificial Intelligence models in cloud and edge/fog systems and runtime management across computing continua
- ☐ Network architecture search of Deep Learning models with accuracy and performance trade-off
- ☐ Runtime management of Big Data and computing intensive applications: optimization models for the development of efficient runtime management policies

- Big Data applications performance modelling: machine learning and hybrid machine learning techniques for gray-box performance modelling, simulation models based on Stochastic Well Formed Petri Nets for MapReduce and Spark
- Model-driven-development of Data-Intensive Applications: methodology and tools for data-aware quality-driven development and optimization of Big Data applications

#### GREEN AND CLOUD COMPUTING

- Model-driven-development of Cloud Applications: MDE approach for design and runtime management of applications targeting multiple Clouds with Quality of Service guarantees
- Service Provisioning: Definition of capacity allocation and load redirect policies with response time and availability constraints in Infrastructure as a Service Systems through optimization and game theory
- Energy Aware Resource Allocation: Development of autonomic resource allocation techniques for the resource management of very large-scale virtualized Data Centres

#### SERVICE ORIENTED ARCHITECTURES

- Model-driven-development of SOAs: Model driven development of component-based systems in SOA and pervasive environments
- Web Service Composition: Definition and analysis of service selection policies in composed Flexible Processes with Quality of Service global constraints

#### AUTONOMIC COMPUTING

- Self-Management Techniques: Design of network controllers for Autonomic Computing Infrastructures. Implementation of resource allocation policies for the optimization of Service Provider profits associated with multiple class of Service Level Agreement acting at multiple time scales

#### DESIGN OF IT ARCHITECTURES

- Cost comparison of IT architectures: Empirical analysis of the technical and management costs of different IT architectures. Implementation of a design tool to support minimum-cost IT architectural design (including joint hardware and network communication costs)

#### Participation in research projects

#### EUROPEAN RESEARCH PROJECTS

2021-	<b>Coordinator</b> of the AI-SPRINT H2020 project for the development of a design and runtime framework to support the design and operation of AI applications in computing continua with performance, security and privacy guarantees ( <b>5mln euros</b> over 3 years, <b>1.1mln euros</b> allocated to my research unit).
2021-	Participation to the LIGATE EURO-HPC research project at Politecnico di Milano. Develop performance models and Bayesian optimization methods for drug discovery application optimization in HPC clusters.
2020-2021	<b>Coordinator for Politecnico di Milano research unit</b> for the TETRAMAX ANDREAS project involved in the design of GPU scheduling policies for deep learning applications ( <b>75k euros</b> over 10 months, <b>25k euros</b> allocated to my research unit)
2017-2019	<b>Coordinator for Politecnico di Milano research unit</b> for the ATMOSPHERE H2020 project involved in the performance modelling and prediction of container based and GPU based applications ( <b>1.5mln euros</b> over 2 years, <b>180k euros</b> allocated to my research unit)

2016-2018	Participated to DOSSIER-Cloud Twinning project, providing expertise on Cloud services, resource and energy management for large scale data centres and big data systems. <b>Proposal co-editor (520k euros over 3 years, 140k euros allocated to my research unit)</b>
2016-2017	<b>Coordinator for Politecnico di Milano research unit</b> for the EUBRA-BIGSEA H2020 project involved in the performance analysis and definition of run time management policies of Big Data and computing intensive applications ( <b>1.5mln euros over 2 years, 240k euros allocated to my research unit</b> )
2015-2018	<b>Coordinator for Politecnico di Milano research unit</b> for the DICE H2020 project on model driven design, quality assessment, and optimization of Data-Intensive applications. Standardization leader and Ethics issue manager for data privacy ( <b>4mln euros over 3 years, 530k euros allocated to my research unit</b> )
2016-2017	<b>Coordinator for Politecnico di Milano research unit</b> for the UrbanMob LISA Cineca project on development of urban mobility applications with data and performance quality
2012-2015	Participated to MODAClouds IP research project at Politecnico di Milano on design and run-time management of applications targeting multiple Clouds. Developing design-time exploration with performance and availability guarantees. <b>WP Leader, proposal co-editor (9mln euros over 3 years, 780k euros allocated to my research unit)</b>
2008-2013	Participation in SMScom IDEAS-ERC research project at Politecnico di Milano on design of situational applications with run-time performance guarantees
2008-2012	Participation in s-Cube, the European Network of Excellence in Software Services and Systems developing optimization algorithms for composed Web services
2008-2011	Participation in Q-ImPrESS FET/STREP research project at Politecnico di Milano on the model-driven-development of SOA systems with QoS guarantees
2005-2008	Participation in WS-Diamond FET/STREP research project at Politecnico di Milano on the design of repair actions in self-healing web services systems

#### ITALIAN NATIONAL RESEARCH PROJECTS

2005-2008	Participation in DISCORSO FAR research project at Politecnico di Milano on the design of optimization and Web services composition algorithms to support Small and Medium Enterprises and industrial districts
2003-2005	Participation in MAIS FIRB research project at Politecnico di Milano on analysis of multi-channel adaptive Information Systems

#### Awards

##### TOP 2% SCIENTIST RANKING

- ☐ Included in the World's Top 2% Scientist ranking (according to "Updated science-wide author databases of standardized citation indicators", November 2022)

##### BEST PAPERS

- ☐ *D. Ardagna*, S. Bernardi, E. Gianniti, S. Karimian Aliabadi, D. Perez-Palacin, J. I. Requeno. Modeling Performance of Hadoop Applications: A Journey from Queueing Networks to Stochastic Well Formed Nets. ICA3PP 2016 Proceedings. Granada, Spain
- ☐ Evangelinou, M. Ciavotta, G. Kousiouris, *D. Ardagna*. A Joint Benchmark-Analytic Approach For Design-Time Assessment of Multi-Cloud Applications. In CF2015 Proceedings. Pisa, Italy

##### EUROPEAN PROJECTS

- ☐ *D. Ardagna*, F. Filippini, F. Magugliani, M. Cicala, K. K. Materka, M. Riedl, P. Skrzypek. Best project award. The ANDREAS project has been selected by the TETRAMAX Consortium in the context of the 3rd call for Value Chain Technology Transfer Projects within the H2020 TETRAMAX cascade funding, for its exceptional contribution and

innovation in power and cost management of deep learning training workloads. January 2022

### GOOGLE CLOUD SERVICES

- Google Cloud for Education. May 2022 (5k\$)

### MICROSOFT CLOUD SERVICES

- Top Compsci University Azure Adoption. October 2016 (20k\$), July 2017 (20k\$), July 2018 (15k\$)
- Windows Azure Research Pass October 2013. Joint work with Prof. Elisabetta Di Nitto, DEEP-SE Cloud initiative (40k\$)

### AMAZON WEB SERVICES

- AWS in Education research grant March 2014. Joint work with Prof. Elisabetta Di Nitto, DEEP-SE Cloud initiative (5k\$)
- AWS in Education research grant March 2012. Joint work with Prof. Elisabetta Di Nitto and Prof. Gianpaolo Cugola, DEEP-SE Cloud initiative (10k\$)
- AWS in Education research grant December 2010. Joint work with Prof. Elisabetta Di Nitto, DEEP-SE Cloud initiative (10k\$)

### IBM

- IBM SUR Grant October 2016. Joint work with Prof. Cristina Silvano and Prof. Letizia Tanca. P8 based cluster for Big Data research (80k€)
- IBM Faculty Award 2010. The PARVIS project has been funded by IBM to develop self-managing techniques for virtualized systems (20k\$)

### POLITECNICO DI MILANO

- Fondi 5 per mille 2013. Poli-RISPOSTA **project co-applicant** (Principal Investigator Prof. F. Ballio). Poli-RISPOSTA is one of the 8 projects selected out of 50 proposals by Politecnico di Milano to foster research on society. The project will develop an emergency management system for hydro-geological disasters (65k€)
- Fondi 5 per mille 2009. GAME-IT project **Principal Investigator**. GAME-IT is one of the 8 projects selected out of 77 proposals by Politecnico di Milano to support junior researchers. The project aims at the development of green policies for virtualized data centers (60k€)

### International scientific collaborations

2016

#### VISITING RESEARCHER

One week visit at IBM T.J. Watson Research Centre. Participating to research projects on performance analysis and management of Spark applications with Machine Learning and Hybrid Machine Learning techniques, within the Infrastructures Performance Analysis and System Optimization Group

2013

Two weeks visit at IBM T.J. Watson Research Centre. Participating to research projects on management of Map-reduce Cloud data centers and analysis of clock drifts and

- synchronization algorithms for multi-Cloud systems, within the Infrastructures Performance Analysis and System Optimization Group
- 2011 One month visit at BCAM (Basque Center for Applied Mathematics) working within the Analysis, Design and Performance Evaluation of Telecommunication Networks and Computer Systems group on the study of Generalized Nash Equilibria for Platform-as-a-Service Cloud Systems
- 2007 Two weeks visit at IBM T.J. Watson Research Centre. Participating in a research project on the self-optimization of Autonomic Computing within the Infrastructures Performance Analysis and System Optimization Group
- 2005 One week visit at Computer Science Department at the Federal University of Minas Gerais, Brazil. Participating in a research project on the management of services and Service Level Agreements in the Service Oriented Architecture, within the Performance Analysis and Modelling group led by Prof. Virgilio Almeida

### **INTERNSHIP AT IBM T.J. WATSON RESEARCH CENTER**

- 2003 Six months internship at IBM T. J. Watson Research Center, Performance Analysis and System Optimization Group. Participated in a research project on maximization of Service Level Agreement revenues in Web Systems. Grant by IBM Research to support studies

### **KEYNOTE SPEECHES**

- Cloud and Multi-Cloud Computing: Current Challenges and Future Applications. A Quality of Service Perspective, 23/5/2015. PESOS Workshop at ICSE 2015

### **INVITED SEMINARS**

1. AI-SPRINT: Open Source Tools for AI@EDGE. European Commission. EU-SW Forum. Bruxelles, 2/12/2022
2. AI-SPRINT: Future challenges of the Cognitive Cloud. European Commission. Digital Autonomy in the Computing Continuum. HORIZON-CL4-2022-DATA-01-03 call presentation. Online, 11/11/2021
3. Performance Prediction of GPU-based Deep Learning Applications. Spanish Supercomputing Network 13<sup>th</sup> Users Conference 2019, Zaragoza, Spain, 19/9/2019
4. Model Driven Development and QoS Assessment of Cloud Applications, Polytechnic University of Catalonia, Barcelona, Spain, 7/5/2014
5. Model Driven Development and QoS Assessment of Cloud Applications, IBM T.J. Watson Research Center, Yorktown Heights, NY, USA, 15/10/2013
6. QoS Modeling and Evaluation in Cloud Environments, University of Austria at Timisoara, Timisoara, Romania, 24/9/2013
7. QoS Modeling and Evaluation in Cloud Environments, 7th Advanced Summer School in Service Oriented Computing, Crete, Greece, 4/7/2013
8. Generalized Nash Equilibria for the Service Provisioning Problem in Cloud Systems, IRISA, Rennes, France, 8/11/2012
9. Energy-Aware Autonomic Resource Allocation in Multitier Virtualized Environment (in very Large Service Centers), Imperial College, London, UK, 1/6/2012
10. A Game Theoretic Formulation of the Service Provisioning Problem in Cloud Systems, IBM T.J. Watson Research Center, Hawthorne, NY, USA, 1/7/2011
11. A Game Theoretic Formulation of the Service Provisioning Problem in Cloud Systems, BCAM, Bilbao, Spain, 27/5/2011
12. Identification of Linear Parameter Varying State Space Models for the Performance Management of Autonomic Systems, IBM T.J. Watson Research Center, Hawthorne, NY, USA, 23/7/2009

13. Green Active Management of Energy in IT systems, Karlsruhe University, Karlsruhe, Germany, 29/4/2009
14. Active Management of Energy in IT systems, Italy, Università di Modena e Reggio Emilia, Modena, Italy, 24/10/2008
15. Adaptive Service Composition in Flexible Processes, IBM T.J. Watson Research Center, Hawthorne, NY, USA, 4/5/2007
16. Capacity Management and Planning for Modern Virtualized IT Infrastructures, IBM T.J. Watson Research Center, Hawthorne, NY, USA, 30/4/2007

## **TUTORIALS**

1. Model-Driven Management of Multi-Cloud Applications, UCC 2014. London, UK, 11/12/2014. Joint tutorial with Giuliano Casale and Nicolas Ferry
2. Model Driven Design of Cloud Applications with a-priori Quality of Service Guarantees. SYNASC MICAS 2014. Timisoara, Romania, 22-23/9/2014. Joint tutorial with Marcos Almeida, Nicolas Ferry, and Juan F. Perez
3. Model Driven Design of Cloud Applications with a-priori Quality of Service Guarantees. ASE 2014. Västerås, Sweden, 16/9/2014. Joint tutorial with Marcos Almeida, Giuliano Casale, and Nicolas Ferry

## **Teaching experience**

### **UNDERGRADUATE TEACHING**

- 2006-2017, Principles of Computer Systems (Informatica B), Politecnico di Milano
- 2008-11, Computer Science Project (Progetto Ingegneria Informatica), Politecnico di Milano
- 2003-04, Web based Information Systems (Sistemi Informativi Web), Politecnico di Milano
- 2003-2008: Information Systems Platforms (Sistemi Informativi), Politecnico di Milano

### **GRADUATE TEACHING**

- 2016- : Algorithms and Parallel Computing, Politecnico di Milano
- 2021- : Computing Infrastructures, Politecnico di Milano
- 2023: Enabling AI at The Edge: Design, Security, Performance and Runtime Management, PhD course Politecnico di Milano
- 2019-2020: Computing Infrastructures, Politecnico di Milano
- 2018-2019: Complex Networks, PhD course Politecnico di Milano (with Prof. Ana Paulo Couto Silva)
- 2015-2016: Computer Systems, Politecnico di Milano
- 2012-2014, 2015-2019: Multi-disciplinary Project, Politecnico di Milano, Master and PhD program Politecnico di Milano
- 2011-12; 2013-14: Cloud Computing from a Software Engineering perspective, Master and PhD program Politecnico di Milano (with Prof. Elisabetta Di Nitto)
- 2007-2008: Autonomic Services, PhD course Politecnico di Milano (with Prof. Barbara Pernici)
- 2015-2016: Graduate seminars on Computing Infrastructures, Politecnico di Milano
- 2013-2014: Graduate seminars on Software Engineering, Politecnico di Milano
- 2001-2006: Graduate seminars on Information System platforms and security, Politecnico di Milano
- 2005-: Instructor in many professional master programs in the context of the Politecnico educational offer through Cefriel and MIP (main topics: Information Systems, Performance Evaluation, Virtualization and Cloud Computing, Big Data, Hadoop, Spark, Spark Machine Learning and Deep Learning, Computing continuum)

## **Institutional responsibilities**

- ☐ Since June 2023 member of the PhD Board for the Computer Science and Engineering Program at Politecnico di Milano
- ☐ Since September 2022 member of the European Open Ecosystem for Research and Innovation (EGI) Working Group on Artificial Intelligence for the Department of Electronics, Information and Bioengineering of Politecnico di Milano
- ☐ Since July 2022 Executive Board member of the Italian Computing and Data Infrastructure (ICDI) Working Group for the Department of Electronics, Information and Bioengineering of Politecnico di Milano
- ☐ Since July 2022 member of the CINI Working Group on System and Service Quality
- ☐ Since July 2022 member of the National Research Center in High-Performance Computing, Big Data and Quantum Computing (Spoke Future HPC) for the Department of Electronics, Information and Bioengineering of Politecnico di Milano
- ☐ June 2022 – Apr 2023, member of the PhD Applications Evaluation Committee for the Computer Science and Engineering Research Area at Politecnico di Milano
- ☐ June 2021, November 2022, member of the evaluation committee for the assessment of RTD-B candidates to Associate Professor role Promotion at Politecnico di Milano
- ☐ Since 2020 member of the Research Support Group of the Computer Science Research Area of the Department of Electronics, Information and Bioengineering at Politecnico di Milano
- ☐ 2015-2018 member of IBM/POLIMI Collaborative Innovation Center on Big Data Analytics

## **Research supervision**

### **MASTER, DOCTORAL STUDENTS, AND POSTDOCTORAL RESEARCHERS**

- ☐ 2020- : Postdoctoral research advisor for Dr. Hamta Sedghani
- ☐ 2017-2020: Postdoctoral research advisor for Dr. Marco Lattuada (R&D STMicroelectronics)
- ☐ 2018-2019: Postdoctoral research advisor for Dr. Eugenio Gianniti (Free2move eSolutions)
- ☐ 2017-2018: Postdoctoral research advisor for Dr. Enrico Barbierato (RTD-A, Università Cattolica)
- ☐ 2016-2017: Postdoctoral research advisor for Dr. Athanasia Evangelinou (European Commission Officer, HPC research unit)
- ☐ 2012- 2016: Postdoctoral research advisor for Dr. Michele Ciavotta (Associate Professor, Università Milano Bicocca)
- ☐ 2009-2010: Postdoctoral research advisor for Dr. Barbara Stefania Panicucci
  
- ☐ 2023- : Supervisor for PhD Student Roberto Sala
- ☐ 2023- : Supervisor for PhD Student Laura De Giorgi (funded by Tinvention)
- ☐ 2023- : Supervisor for PhD Student Riccardo Cavadini (co-funded by E4 Company)
- ☐ 2022- : Supervisor for PhD Student Abednego Wamuhindo Kambale (co-funded by Luxottica)
- ☐ 2021- : Supervisor for PhD Student Bruno Guindani
- ☐ 2020- : Supervisor for PhD Student Federica Filippini
- ☐ 2015- 2018: Supervisor for PhD Student Eugenio Gianniti
- ☐ 2013- 2016: Supervisor for PhD Student Giovanni Paolo Gibilisco (R&D Akams)
- ☐ 2010-2012: Co-Supervisor for PhD. Student Niccolò Maria Calcavecchia

- 2015-2016: Supervisor of the Minor research for PhD. Student Alessandro Maria Rizzi
- 2015: Supervisor of the Minor research for PhD. Student Lorela Cano
- 2013: Supervisor of the Minor research for PhD. Student Santo Lombardo
- 2012: Supervisor of the Minor research for PhD. Student Silvia Lovergine
- 2010: Supervisor of the Minor research for PhD. Student Chiara Sandionigi
- 2001- : Advisor/Co-advisor of 110+ Master Students in Computer Science Engineering, Politecnico di Milano, Italy

#### **HOSTED VISITING STUDENTS**

- 2023-2024: Lunchen Xie, Tongji University, China
- 2023: Yicheng Gao, Imperial College London, UK
- 2020: Hamta Sedghani, University of Tabriz, Iran
- 2019: Arezoo Jahani, University of Tabriz, Iran
- 2016: Ehsan Ataie, Sharif University of Technology, Iran
- 2016: Soroush Karimian-Aliabadi, Sharif University of Technology, Iran
- 2014: Marzieh Malekimajd, Sharif University of Technology, Iran

#### **PHD EXAMINER**

- Yali Zhao, PhD Evaluator, The University of Melbourne, 2020
- SPEC 2019 Award program committee
- Marcelo Amaral, PhD Evaluation commission, Polytechnic University of Catalonia, 2019
- Gustavo Cipriano Motta Sousa, PhD Evaluation commission, University of Lille, 2018
- Yasaman Amannejad, PhD Evaluation commission, University of Calgary, 2017
- Marco Abundo, PhD Thesis reviewer, Università Tor Vergata, 2016
- Nicolas Poggi, PhD Evaluation commission, Polytechnic University of Catalonia, 2014
- Ajay Kattapur, PhD Evaluation commission, INRIA-IRISA, 2012

#### **Organization of scientific meetings**

#### **CONFERENCE ORGANIZATION COMMITTEES**

- ACM SIGMETRICS 2023 Tutorials Co-chair, Orlando, Florida, USA<sup>1</sup>
- IFIP WG 7.3 Performance 2021 General chair, Milan, Italy (virtual event)<sup>2</sup>
- IFIP WG 7.3 Performance 2020 General chair, Milan, Italy (virtual event)
- ICGreen 2015 General chair, Milan, Italy
- BPM 2008 Local organization chair, Milan, Italy

#### **INTERNATIONAL WORKSHOPS CO-ORGANIZER AND CO-CHAIR**

- First International Workshop on FastContinuum 2023, at ICPE 2023
- Fourth International Workshop on Scalable Deep Learning over Parallel And Distributed Infrastructures (SCADL) 2022, at IPDPS 2022
- Third International Workshop on Scalable Deep Learning over Parallel And Distributed Infrastructures (SCADL) 2021, at IPDPS 2021

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<sup>1</sup> SIGMETRICS is the flagship conference of the SIGMETRICS community.

<sup>2</sup> Performance is the flagship conference of IFIP WG 7.3 and occurs jointly with SIGMETRICS once every three years.

- ☐ Second International Workshop on Scalable Deep Learning over Parallel And Distributed Infrastructures (SCADL) 2020, at IPDPS 2020
- ☐ Second International Workshop On Quality-Aware Devops (QUDOS) 2016, at ISSTA 2016
- ☐ First International Workshop On Quality-Aware Devops (QUDOS) 2015, at ESEC/FSE 2015
- ☐ First International Workshop on Multi-Cloud applications and federated clouds (Multi-Cloud) 2013, at ICPE 2013
- ☐ First International Workshop on Run-time mOdelS for Self-managing Systems and Applications (ROSSA) 2009, at Valuetools 2009
- ☐ First International workshop on Quality of Self-healing Web Services (QSWs) 2008, at BPM 2008

#### **STEERING COMMITTEES**

- ☐ Steering Committee of the Fifth International Workshop on Scalable Deep Learning over Parallel And Distributed Infrastructures (SCADL) 2023, at IPDPS 2023
- ☐ 2017- : Steering Committee of the International Workshop On Quality-Aware Devops (QUDOS)

#### **INTERNATIONAL CONFERENCE TECHNICAL PROGRAM COMMITTEE MEMBER (main)**

- ☐ IEEE CLOUD 2021-2009
- ☐ IEEE Big Data 2016-2014, 2019-2017 Senior PC member
- ☐ IEEE/ACM CCGrid 2023-2022
- ☐ IEEE ICWS 2012- 2009
- ☐ IEEE/ACM UCC 2018- 2020
- ☐ IEEE ICDCS 2023-2022, 2017, 2012
- ☐ IEEE ICPADS 2012
- ☐ IEEE DSS 2018-2017
- ☐ CIoT 2016
- ☐ IEEE BigDataSE 2016
- ☐ IEEE IC2E 2015
- ☐ OBD 2015
- ☐ IEEE ICAC 2015-2014
- ☐ IFIP DAIS 2014
- ☐ IEEE ICA3PP 2022, 2018, 2016-2015
- ☐ Closer 2019-2017, 2015- 2013
- ☐ IEEE BDDS 2013
- ☐ IEEE MASCOTS 2014-2013
- ☐ IEEE CGC 2013
- ☐ IEEE HPCC 2013
- ☐ IEEE SmartData 2017
- ☐ LOD 2019
- ☐ QoSA 2011-2009
- ☐ FiCloud 2014
- ☐ CSC 2012
- ☐ MobiWIS 2011
- ☐ CGC 2011
- ☐ SEASS 2011
- ☐ Intensive 2009

- ☐ IEEE/INFORMS SOLI 2009
- ☐ IESA 2007-2006

## **Commissions of trust**

### **EVALUATION OF EUROPEAN AND NATIONAL RESEARCH PROJECTS**

- ☐ External Reviewer for the European Commission, EuroHPC project OPTIMA (Optimizing Industrial Applications for Heterogeneous HPC systems), 2022
- ☐ External Reviewer for the European Commission, H2020 Center of Excellence project POP2 (Performance Optimisation and Productivity 2), 2022
- ☐ Barcelona Supercomputing Center Stars program evaluator and chair of the evaluators group, 2019
- ☐ ERC Consolidator grants expert evaluator for the European Commission, 2017
- ☐ Member of the Netherlands Research Council for the Engineering and Applied Sciences Executive Board, 2015, 2016
- ☐ Member of the Netherlands Organisation for Scientific Research Executive Board, 2013
- ☐ Member of the Austrian Science Fund Executive Board, 2012, 2013

### **EXTERNAL REFEREE ACADEMIC PROMOTION**

- ☐ Committee member for the evaluation of junior Research Assistant candidates at the University of Trento, 2022
- ☐ External referee for the assessment of University of Calgary applications for Promotion to Professor, 2018

### **ROLES WITHIN IEEE COMPUTER SOCIETY**

- ☐ 2014-2015, General Chair of the IEEE Special Technical Community on Sustainable Computing
- ☐ 2013-2014, Secretary/Treasurer of the IEEE Special Technical Community on Sustainable Computing
- ☐ 2011-2013, Information Officer of the IEEE Special Technical Community on Sustainable Computing

### **ROLES WITHIN COMPUTER SCIENCE ITALIAN ASSOCIATIONS**

- ☐ 2017-2020 member of AEIT (Associazione Italiana di Elettrotecnica, Elettronica, Automazione, Informatica e Telecomunicazioni) and AICT society. Organization of yearly seminars at my Department
- ☐ Since 2011 member of the IT Systems Architect working group within AICA (Associazione Italiana per l'Informatica ed il Calcolo Automatico)

### **EDITORIAL BOARDS**

- ☐ Since October 2021, Editorial Board Member of the KeAi-Elsevier (Open Publishing Program) International Journal of Intelligent Networks
- ☐ 2018- 2022 Associate Editor of the IEEE Transactions on Cloud Computing

- 2017-2020 Associate Editor of the Springer open access BioMed Big Data Analytics journal
- 2015 Guest co-Editor, Springer Computing, Sustainable Computing Systems and Applications special issue
- 2014 Guest co-Editor, ACM SIGMETRICS Performance Evaluation Review, Performance and Resource Management in Big Data Applications special issue
- 2013 Guest co-Editor, Springer Computing, Cloud Computing special issue
- 2012-2019 Editorial Board Member of the International Journal of Cloud-Computing and Super-Computing

#### **INTERNATIONAL JOURNALS REVIEWING SERVICES (main)**

- IEEE Transactions on Software Engineering
- IEEE Transactions on Services Computing
- IEEE Transactions on Computers
- IEEE Transactions on Cloud Computing
- IEEE Transactions on Storage
- IEEE Transactions on Network and Service Management
- IEEE Systems Journal
- ACM Transactions on the Web
- ACM Transactions on Modeling and Performance Evaluation of Computing Systems
- ACM Transactions on Software Engineering and Methodology
- ACM Transactions on Autonomous and Adaptive Systems
- IEEE Internet Computing
- IEEE Transactions on System Men and Cybernetics, Part C
- Journal of Systems and Software, Elsevier
- Journal of Parallel and Distributed Computing, Elsevier
- European Journal of Operational Research, Elsevier
- Journal on Selected Areas in Communications
- Computers in Industry, Elsevier
- Information and Software Technology, Elsevier
- Journal of Cooperative Information Systems
- Journal of Information Technology, Kluwer

#### **Technology transfer**

##### **PATENTS**

*D. Ardagna*, E. Conforti, C. Francalanci , M. Gatti, S. Lucchini, S. Morsello, M. Trubian. Method, system and computer program for configuring server farms at minimum cost. Politecnico di Milano - IBM. *Patent number US7886036*, USA Patent Office.

#### **OPEN SOURCE TOOLS, PRODUCTS AND SERVICES**

- |           |  |
|-----------|--|
| 2022-2023 | Consultancy services: Partitioning and managing AI models at runtime in computing continua for Luxottica   |
| 2020-2021 | <p>ANDREAS: Artificial intelligence traiNing scheDuler foR accElerAted resource clusterS. Advanced scheduler for GPU based clusters to support deep learning models training. Funded by TETRAMAX technology transfer project, achieved TRL 8, commercialization already started (<a href="https://www.e4company.com/en/andreas-artificial-intelligence-training-scheduler-for-accelerated-resource-clusters/">https://www.e4company.com/en/andreas-artificial-intelligence-training-scheduler-for-accelerated-resource-clusters/</a>).</p> |

2021-	<p>SPACE4AI-D: System PerformAnce and Cost Evaluation on Cloud for AI applications Design. A novel open-source tool to support design space exploration, component placement and resource selection of AI applications running on cloud-edge systems.</p> <p>One of the main assets of the on-going H2020 AI-SPRINT project (<a href="https://gitlab.polimi.it/ai-sprint/space4ai-d">https://gitlab.polimi.it/ai-sprint/space4ai-d</a>). Validated in industry use case.</p>
2017-	<p>aMLLib: a Machine Learning Library. An open-source library to train performance models for estimating the performance of complex software systems.</p> <p>Applied to estimate performance of Spark systems and deep neural networks model training on GPUs. Allowed to improve the performance models of Spark inventors. Currently used within the H2020 AI-SPRINT and LIGATE research projects (<a href="https://github.com/a-MLLibrary/a-MLLibrary">https://github.com/a-MLLibrary/a-MLLibrary</a>).</p>
2016-2018	<p>D-SPACE4Cloud: Data intensive System PerformAnce and Cost Evaluation on Cloud. DICE open-source tool for the design-time optimisation of big data applications based on Hadoop and Spark.</p> <p>One of the main H2020 DICE project assets led to the funding of the H2020 AI-SPRINT project and currently evolving into SPACE4AI-D (<a href="https://github.com/deib-polimi/diceH2020-space4cloudsWS">https://github.com/deib-polimi/diceH2020-space4cloudsWS</a>).</p>
2016-2017	<p>OPT_IC &amp; OPT_JR. A set of open-source run-time optimization-based resource management tools for Spark applications.</p> <p>One of the main H2020 EUBRA-BIGSEA project assets. Global optimum solution gap reduced by 30% with respect to an alternative method by Spark inventors (<a href="https://github.com/eubr-bigsea/OPT_IC">https://github.com/eubr-bigsea/OPT_IC</a>, <a href="https://github.com/eubr-bigsea/opt_jr">https://github.com/eubr-bigsea/opt_jr</a>).</p>
2013-2015	<p>SPACE4Cloud: System PerformAnce and Cost Evaluation on Cloud. An open-source design-time tool to support design space exploration of enterprise applications running on cloud.</p> <p>One of the main FP7 MODAClouds project assets. Led to the funding of the H2020 DICE project and evolved into D-SPACE4Cloud. provides between 21% and 85% costs savings in comparison with alternative methods (<a href="https://github.com/deib-polimi/modacLOUDs-space4cloud">https://github.com/deib-polimi/modacLOUDs-space4cloud</a>). Validated in industry use case.</p>
2006-2007	<p>WASFO: Workload Analysis for Server Farm Optimization. A software tool for the capacity planning of autonomic virtualized server farms.</p> <p>One of the main outputs of my PhD studies, let to a patent already granted in USA and one pending patent in Europe.</p>
2015-2016	<p>Consultancy services: feasibility analysis for the migration of a virtual travel agency software to cloud for a leading operator in Italy.</p>
2004-2005	<p>Consultancy services: performance analysis of a virtualized Internet Banking software system within a sever consolidation project for a large bank in Italy.</p>

General information on my open-source tools can be found at [https://ardagna.faculty.polimi.it/?page\\_id=465](https://ardagna.faculty.polimi.it/?page_id=465)

## Full List of Publications

### International Journals

1. A. Falanti, E. Lomurno, *D. Ardagna*, M. Matteucci. POPNASv3: a Pareto-Optimal Neural Architecture Search Solution for Image and Time Series Classification. *Applied Soft Computing*. To Appear. <https://doi.org/10.1016/j.asoc.2023.110555>. (Scimago Q1).
2. F. Filippini, M. Lattuada, M. Ciavotta, A. Jahani, *D. Ardagna*, E. Amaldi. A Path Relinking Method for the Joint Online Scheduling and Capacity Allocation of DL Training Workloads in GPU as a Service Systems. *IEEE Transactions on Services Computing*. 16(3). 1630-1646. 2023. (Scimago Q1).
3. S. Karimian-Aliabadi, M. M. Aseman-Manzar, R. Entezari-Maleki, *D. Ardagna*, B. Egger, A. Movaghar. Fixed-point Iteration Approach to Spark Scalable Performance Modeling and Evaluation. *IEEE Transactions on Cloud Computing*. 11(1). 897-910. 2023. (Scimago Q1).
4. E. Ataie, A. Evangelinou, E. Gianniti, *D. Ardagna*. A Hybrid Machine Learning Approach for Performance Modeling of Cloud-based Big Data Applications. *The Computer Journal, Oxford Academic*. 65(12): 3123-3140. 2022. (Scimago Q2).
5. M. Lattuada, E. Barbierato, E. Gianniti, *D. Ardagna*. Optimal Resource Allocation of Cloud-Based Spark Applications. *IEEE Transactions on Cloud Computing*. 10(2), 1301-1316. 2022. (Scimago Q1).
6. M. Ciavotta, G. P. Gibilisco, *D. Ardagna*, E. Di Nitto, M. Lattuada, M. A. Almeida da Silva. Architectural Design of Cloud Applications: a Performance-aware Cost Minimization Approach. *IEEE Transactions on Cloud Computing*. 10(3), 1571-1591. 2022. (Scimago Q1).
7. H. Sedghani, M. Z. Lighvan, H. S. Aghdasi, M. Passacantando, G. Verticale, *D. Ardagna*. A Stackelberg Game approach for Managing AI Sensing Tasks in Mobile Crowdsensing. *IEEE Access*. 10, 91524-91544, 2022. (Scimago Q1).
8. M. Lattuada, E. Gianniti, *D. Ardagna*, L. Zhang. Performance Prediction of Deep Learning Applications Training in GPU as a Service Systems. *Cluster Computing*. 25, 1279-1302. 2022. (Scimago Q3).
9. H. Sedghani, *D. Ardagna*, M. Passacantando, M. Zolfy Lighvana, H. S. Aghdasi. An incentive mechanism based on a Stackelberg game for mobile crowdsensing systems with budget constraint. *Ad Hoc Networks, Elsevier*. 123, 1-15. 2021. (Scimago Q1).
10. *D. Ardagna*, E. Barbierato, E. Gianniti, M. Gribaudo, T.B.M. Pinto, A.P.C da Silva, J. M. Almeida. Predicting the Performance of Big Data Applications on the Cloud. *Journal of Super Computing*. 77(2), 1321-1353. 2021. (Scimago Q2).
11. E. Gianniti, M. Ciavotta, *D. Ardagna*. Optimizing Quality-Aware Big Data Applications in the Cloud. *IEEE Transactions on Cloud Computing*. 9(2), 737-752. 2021. (Scimago Q1).
12. *D. Ardagna*, M. Ciavotta, R. Lancellotti, M. Guerriero. A Hierarchical Receding Horizon Algorithm for QoS-driven control of Multi-IaaS Applications. *IEEE Transactions on Cloud Computing*. 9(2), 418 - 434. 2021. (Scimago Q1).
13. E. Ataie, R. Entezari-Maleki, L. Rashidi, K. S. Trivedi, *D. Ardagna*, A. Movaghar. Hierarchical Stochastic Models for Performance, Availability, and Power Consumption Analysis of IaaS Clouds. *IEEE Transactions on Cloud Computing*. 7(4), 1039-1056. 2019. (Scimago Q1).
14. S. Karimian-Aliabadi, *D. Ardagna*, R. Entezari-Maleki, E. Gianniti, A. Movaghar. Analytical Composite Performance Models for Big Data Applications. *Journal of Network and Computer Applications. Elsevier*. 142(15), 63-75. 2019. (Scimago Q1).
15. A. S. Alic, J. Almeida, G. Aloisio, N. Andrade, N. Antunes, *D. Ardagna*, R. M. Badia, T. Basso, I. Blanquer, T. Braz, A. Brito, D. Elia, S. Fiore, D. Guedes, M. Lattuada, D. Lezzi, M. Maciel, W. Meira Jr., D. Mestre, R. Moraes, F. Moraes, C. E. Pires, N. Puchalski Kozievitch, Walter dos Santos, P. Silva, M. Vieira. BIGSEA: A

- Big Data analytics platform for public transportation information. *Future Generation Computer Systems*. Elsevier. 96, 243-269. 2019. (Scimago Q1).
16. D. Ardagna, C. Cappiello, W. Samà, M. Vitali. Context-aware Data Quality Assessment for Big Data. *Future Generation Computer Systems*. Elsevier. 89, 548-562. 2018. (Scimago Q1).
  17. L. Cano, G. Carello, D. Ardagna. A Framework for Joint Resource Allocation of MapReduce and Web Service Applications in a Shared Cloud Cluster. *Journal of Parallel and Distributed Computing*, Elsevier. 120, 127-147. 2018. (Scimago Q2).
  18. M. Malekimajd, D. Ardagna, M. Ciavotta, E. Gianniti, M. Passacantando, A. M. Rizzi. Capacity Allocation and Admission Control of MapReduce Jobs. *The Journal of Supercomputing*. 74(10), 5314-5348. 2018. (Scimago Q2).
  19. E. Ataie, R. Entezari-Maleki, S. E. Etesami, B. Egger, D. Ardagna, A. Movaghar. Power-aware Performance Analysis of Self-Adaptive Resource Management in IaaS Clouds. *Future Generation Computer Systems*. Elsevier. 86, 134-144. 2018. (Scimago Q1).
  20. J. Anselmi, D. Ardagna, J. C.S. Lui, A. Wierman, Y. Xu, Z. Yang. The Economics of the Cloud. *ACM Transactions on Modeling and Performance Evaluation of Computing Systems*. 2(4), 1-23. 2017.
  21. M. Scavuzzo, E. Di Nitto, D. Ardagna. Experiences and Challenges in Building a Data Intensive System for Data Migration. *Empirical Software Engineering*. 23(1), 52-86. 2018. (Scimago Q2).
  22. A. Evangelinou, M. Ciavotta, D. Ardagna, A. Kopaneli, G. Kousiouris, T. Varvarigou. Enterprise Applications Cloud Rightsizing through a Joint Benchmarking and Optimization Approach. *Future Generation Computer Systems*. Elsevier. 78(1), 102-114. 2018. (Scimago Q1).
  23. F. Ballio, D. Molinari, G. Minucci, M. Mazuran, C. Arias, S. Menoni, F. Atun, D. Ardagna, N. Berni, C. Pandolfo. The RISPOSTA procedure for the collection, storage and analysis of high quality, consistent and reliable damage data in the aftermath of floods. *Journal of Flood Risk Management*. Wiley on line. 604-615. 2018. (Scimago Q1).
  24. E. Gianniti, A. M. Rizzi, E. Barbierato, M. Gribaudo, D. Ardagna. Fluid Petri Nets for the Performance Evaluation of MapReduce and Spark Applications. *ACM SIGMETRICS Performance Evaluation Review*. 44(4), 23-36. 2017.
  25. D. Ardagna, M. Ciavotta, M. Passacantando. Generalized Nash Equilibria for the Service Provisioning Problem in Multi-Cloud Systems. *IEEE Transactions on Services Computing*. 10(3), 381-395. 2017. (Scimago Q1).
  26. M. Ciavotta, G. P. Gibilisco, D. Ardagna. A Mixed Integer Linear Programming Optimization Approach for Multi-Cloud Capacity Allocation. *Journal of Systems and Software*. Elsevier. 123(1), 64-78. 2017. (Scimago Q1).
  27. M. Passacantando, D. Ardagna, A. Savi. Service Provisioning Problem in Cloud and multi-Cloud Systems. *INFORMS Journal on Computing*. 28(2), 265-277. 2016. (Scimago Q1).
  28. M. Malekimajd, D. Ardagna, M. Ciavotta, A. M. Rizzi, M. Passacantando. Optimal Map Reduce Job Capacity Allocation in Cloud Systems. *ACM SIGMETRICS Performance Evaluation Review*, 42 (4), 50-60. 2015.
  29. D. Ardagna, G. Casale, M. Ciavotta, J. F. Perez, W. Wang. Quality-of-Service in Cloud Computing: Modeling Techniques and Their Applications. *Journal of Internet Services and Applications*. 5(1), 1-17, 2014. (Scimago Q2).
  30. B. Addis, D. Ardagna, A. Capone, G. Carello. Energy-aware Joint Management of Networks and Cloud Infrastructures. *Computer Networks*. Elsevier. 70, 75-95, 2014. (Scimago Q1).
  31. J. Anselmi, D. Ardagna, M. Passacantando. Generalized Nash Equilibria for SaaS/PaaS Clouds. *European Journal of Operational Research*. 236(1), 326-339, 2014. (Scimago Q1).
  32. J. Anselmi, D. Ardagna, J. C. S. Lui, Adam Wierman, Y. Xu, Z. Yang. The economics of the cloud: price competition and congestion. *ACM SIGMETRICS Performance Evaluation Review*. 41(4), 47-49, 2014.
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## International Conferences

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## Editorial Work

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2. *D. Ardagna*. Performance 2021 Foreword from the General Chair. ACM Performance Evaluation Review. 49(3), 2. December 2021.
3. *D. Ardagna*. Performance 2020 Foreword from the General Chair. ACM Performance Evaluation Review. 48(3), 2. December 2020.
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## International Workshops

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2. E. Galimberti, B. Guindani, F. Filippini, H. Sedghani, *D. Ardagna*, S. Risco, G. Moltó, M. Caballer. OSCAR-P and aMLLibrary: Performance Profiling and Prediction of Computing Continuous Applications. AIPerf 2023@ICPE Workshop. (1<sup>st</sup> International Workshop for Performance Modeling, Prediction, and Control). ACM ICPE Companion Proceedings. 139-146. 2023.
3. M. Precuzzi, F. Filippini, *D. Ardagna*. Scheduling Deep Learning Jobs Training in the Cloud: Comparing Multiple Approaches. SPARK@ICAPS 2022 Workshop. (15<sup>th</sup> International Workshop on Scheduling and Planning Applications workshop). 1-9. 2022.
4. F. Filippini, *D. Ardagna*, M. Lattuada, E. Amaldi, M. Ciavotta, M. Riedl, K. Materka, P. Skrzypek, F. Magugliani, M. Cicala. ANDREAS: Artificial intelligence training scheduler for accelerated resource clusterS. EMSICC@FiCloud 2021 Workshop Proceedings. (7<sup>th</sup> International Workshop on Energy Management for Sustainable Internet-of-Things and Cloud Computing). 388-393. 2021.
5. H. Sedghani, *D. Ardagna*, M. Matteucci, G. A. Fontana, G. Verticale, F. Amarilli, R. Badia, D. Lezzi, I. Blanquer, A. Martin, K. Wawruch. Advancing Design and Runtime Management of AI Applications with AI-SPRINT, Position Paper. AIM@COMPSAC 2021 Workshop Proceedings (Advances in Artificial Intelligence & Machine Learning: Applications, Challenges & Concerns). 1455-1462. 2021.
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8. E. Gianniti, *D. Ardagna*, M. Ciavotta, M. Passacantando. A Game-Theoretic Approach for Runtime Capacity Allocation in MapReduce. WACC@CCGRID 2017 Proceedings (International Workshop on Assured Cloud Computing and QoS aware Big Data). 1080-1089. Madrid, Spain.
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24. S. Benefico, E. Gjeci, R. Gonzalez Gomasasca, E. Lever, S. Lombardo, *D. Ardagna*, E. Di Nitto. The evaluation of CAP Properties on Amazon SimpleDB and Windows Azure Table Storage. *MICAS-SYNASC 2012 Workshops Proceedings (1st Workshop on Management of resources and services in Cloud and Sky computing)*. 430-435. Timisoara, Romania.
25. F. L. Ferraris, D. Franceschelli, M. P. Gioiosa, D. Lucia, *D. Ardagna*, E. Di Nitto, T. Sharif. Evaluating the Auto Scaling Performance of Flexiscale and Amazon EC2 Clouds. *MICAS-SYNASC 2012 Workshop Proceedings (1st Workshop on Management of resources and services in Cloud and Sky computing)*. 423-429. Timisoara, Romania.
26. S. Lombardo, E. Di Nitto, *D. Ardagna*. Issues in handling complex data structures with NoSQL databases. *MICAS-SYNASC 2012 Workshop Proceedings (1st Workshop on Management of resources and services in Cloud and Sky computing)*. 443-448. Timisoara, Romania.
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28. *D. Ardagna*, R. Mirandola, M. Trubian, L. Zhang. Run-time Resource Management in SOA Virtualized Environments. *QUASOSS 2009 Proceedings (1st International Workshop on the Quality of Service-Oriented Software System)*. 39-46, Amsterdam, The Netherlands.
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33. *D. Ardagna*, B. Pernici. Global and Local QoS Guarantee in Web Service Selection. BPS 2005 Proceedings (Workshop on Business Processes and Services). 32-46. Nancy (France), September 2005.

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1. *D. Ardagna*, M. Ciavotta, G. P. Gibilisco, R. B. Desantis, G. Casale, J. F. Perez, F. D'Andria, R. Sosa Gonzalez. QoS Assessment and SLA Management. Springer, 2016.
2. N. Calcavecchia, *D. Ardagna*, E. Di Nitto. The Emergence of Load Balancing in Distributed Systems: the SelfLet Approach. Run-time Models for Self-managing Systems and Applications, Springer Autonomic Systems Series, 2010.
3. *D. Ardagna*. Process Optimization. Encyclopedia of Database Systems, Springer, 2008.
4. *D. Ardagna*, A. Avenali, L. Baresi, D. Berardi, D. Bianchini, C. Cappiello, M. Comuzzi, V. De Antonellis, F. De Rosa, D. Desideri, C. Francalanci, C. Leporelli, G. Matteucci, A. Maurino, M. Mecella, M. Melchiori, S. Modafferi, E. Mussi, B. Pernici, P. Plebani, D. Presenza. E-Services - Mobile Information Systems - Infrastructure and Design for flexibility and adaptivity, Springer, 2006.
5. *D. Ardagna*, L. Baresi, C. Batini, M. Briosci, C. Cappiello, M. Comerio, M. Comuzzi, F. De Paoli, C. Francalanci, S. Grega, A. Maurino, S. Modafferi, N. Simeoni. Development of Services for Mobile Information Systems - Mobile Information Systems - Infrastructure and Design for flexibility and adaptivity, Springer, 2006.
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2. *D. Ardagna*, M.G. Fugini, B. Pernici, P. Plebani. Sistemi Informativi Basati su Web. Franco Angeli 2006.
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### Other Publications

1. B. Guindani, *D. Ardagna*, A. Guglielmi. MALIBOO: Capacity Planning through Bayesian Optimization and Machine Learning. 1st Conference on System and Service Quality (QualITA 2022). November 2022, Milan, Italy. Extended Abstract.
2. B. Guindani, *D. Ardagna*, A. Guglielmi. Bayesian Optimization with Machine Learning for Big Data Applications in the Cloud. SIS 2022. 51st Scientific Meeting of the Italian Statistical Society. Caserta, Italy. 1-6. June 2022. Pearson. To Appear.

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4. M. Scavuzzo, E. Di Nitto, *D. Ardagna*. Experiences and challenges in building a data intensive system for data migration. ICSE 2018, 93. May 2018.
5. M. Ciavotta, *D. Ardagna*, A. Koziolk. Palladio Optimization Suite: QoS optimization for component-based Cloud applications. Valuetools 2015. Extended Abstract. Berlin, Germany.
6. M. Ciavotta, E. Gianniti, *D. Ardagna*, M. Passacantando. Game-Theoretic Approach to Joint Admission Control and Capacity Allocation for MapReduce. AIRO 2015. Pisa, Settembre 2015. Extended Abstract.
7. B. Addis, *D. Ardagna*, G. Carello, A. Capone. Energy-aware joint management of networks and Cloud infrastructures. AIRO 2015. Pisa, September 2015. Extended Abstract.
8. M. Almeida, *D. Ardagna*, N. Ferry, J.F. Pérez. Model-Driven Design of Cloud Applications with Quality-of-Service Guarantees: the MODAClouds Approach. Timisoara, September 2014. Extended Abstract.
9. M. Ciavotta, *D. Ardagna*, M. Passacantando. Generalized Nash Equilibria for the Service Provisioning Problem in Multi-Cloud Systems. AIRO 2014. Como, Settembre 2014. Extended Abstract.
10. D. Molinari, M. Mazuran, C. Arias, G. Minucci, F. Atun, *D. Ardagna*. PoliRisposta: Overcoming present limits of flood damage data. European Geosciences Union General Assembly 2014. Vienna, April 2014. Extended Abstract.
11. J. Anselmi, *D. Ardagna*, J. C. S. Lui, A. Wierman, Y. Xu, Z. Yang. The economics of the cloud: price competition and congestion. NetEcon 2013. Pittsburgh, June 2013. Extended Abstract.
12. *D. Ardagna*, M. Caldirola. Tecnologie di virtualizzazione: evoluzione in atto. AEIT, 16-21, Luglio-Agosto 2010. Invited Paper.
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14. *D. Ardagna*, M. Giorgetta, M. Trubian. Optimum Servers Partitioning in Autonomic Computing Infrastructure. AIRO 2006. Cesena, Settembre 2006. Extended Abstract.
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16. *D. Ardagna*, B. Pernici. Global and Local QoS Constraints Guarantee in Web Service Selection. ICWS 2005 Poster Track Proceedings (3rd IEEE International Conference on Web Services), 462-463. Orlando, July 2005.
17. L. Zhang, *D. Ardagna*. SLA Based Profit Optimization in Web Systems. WWW 2004 Poster Track (13th International World Wide Web Conference), 462-463. New York, May 2004.
18. *D. Ardagna*, C. Francalanci, E. Zavarise. Internet sostituirà le attuali infrastrutture telefonica e televisiva? SMAU Ricerche. March 2002. Invited Paper.
19. *D. Ardagna*, L. Bazzardi, P. Facchi, C. Francalanci. Internet, standardizzazione tecnologica e riduzione dei costi per le imprese: il primo passo verso ritorni positivi. SMAU Ricerche. March 2002. Invited Paper.
20. *D. Ardagna*, C. Francalanci, M. Trubian. Cost oriented optimization of information technology (IT) infrastructures. AIRO 2002. L'Aquila, Settembre 2002. Extended Abstract.

## Impact of Selected Publications

1. F. Filippini, M. Lattuada, M. Ciavotta, A. Jahani, *D. Ardagna*, E. Amaldi. A Path Relinking Method for the Joint Online Scheduling and Capacity Allocation of DL Training Workloads in GPU as a Service Systems. *IEEE Transactions on Services Computing*. 16(3): 1630-1646 (2023). (Scimago Q1).  
*Contribution: main publication of my PhD student's work. Led the problem definition and research agenda. Participated to the optimization problem formulation and validation.*  
*Impact: Reference paper of the TETRAMAX ANDREAS technology transfer project and TETRAMAX award, proposes a joint scheduler and resource allocator for deep learning jobs. Provides 95% costs savings in comparison to an IBM Research prototype.*
2. M. Ciavotta, G. P. Gibilisco, *D. Ardagna*, E. Di Nitto, M. Lattuada, M. A. Almeida da Silva. Architectural Design of Cloud Applications: a Performance-aware Cost Minimization Approach. *IEEE Transactions on Cloud Computing*. 10(3), 1571-1591. 2022. (Scimago Q1).  
*Contribution: main publication of my PhD student's work. Led the research agenda, the optimization problem formulation and validation.*  
*Impact: Applied to an industry use case, provides between 21% and 85% costs savings in comparison to a SOTA alternative method.*
3. M. Lattuada, E. Barbierato, E. Gianniti, *D. Ardagna*. Optimal Resource Allocation of Cloud-Based Spark Applications. *IEEE Transactions on Cloud Computing*. 10(2), 1301-1316. 2022. (Scimago Q1).  
*Contribution: led the research agenda, the optimization problem formulation, the design of the heuristic method and validation.*  
*Impact: global optimum solution gap reduced by 30% with respect to a SOTA method by Spark inventors.*
4. E. Gianniti, M. Ciavotta, *D. Ardagna*. Optimizing Quality-Aware Big Data Applications in the Cloud. *IEEE Transactions on Cloud Computing*. 9(2), 737-752. 2021. (Scimago Q1).  
*Contribution: main publication of my PhD student's work. Led the research agenda. Worked on the performance models and participated to the optimization problem formulation.*  
*Impact: global optimum solution gap reduced by 10-30% with respect to a SOTA method by Spark inventors*
5. *D. Ardagna*, M. Ciavotta, R. Lancellotti, M. Guerriero. A Hierarchical Receding Horizon Algorithm for QoS-driven control of Multi-IaaS Applications. *IEEE Transactions on Cloud Computing*. 9(2), 418-434. 2021. (Scimago Q1).  
*Contribution: led the research agenda and the validation activities (cloud experiments and simulation). Participated to the optimization problems receding-horizon formulation.*  
*Impact: one of the few literature works providing a multi-time scale solution for resource management. With respect to heuristic provided by previous research works cost-savings range in 50-100% (21 GoogleScholar citations).*
6. *D. Ardagna*, M. Ciavotta, M. Passacantando. Generalized Nash Equilibria for the Service Provisioning Problem in Multi-Cloud Systems. *IEEE Transactions on Services Computing*. 10(3), 381-395. 2017. (Scimago Q1).  
*Contribution: led the research agenda and participated to the game formulation. Led validation activities setup.*  
*Impact: Extension of my work in [selected publication 10] to multi-cloud scenarios (89 GoogleScholar citations).*

7. B. Addis, D. Ardagna, B. Panicucci, M. Squillante, L. Zhang. A Hierarchical Approach for the Resource Management of Very Large Cloud Platforms. IEEE Transactions on Dependable and Secure Computing. 10(5), 253-272, 2013. (Scimago Q1).  
*Contribution: summary of my ten years of work on Green IT. Led the research agenda and the definition of the hierarchical multi-time scale optimization problem. Led validation activities setup.*  
*Impact: one of the very few literature works (111 GoogleScholar citations) implementing resource management solutions which provides both performance and availability guarantees.*
  
8. D. Ardagna, B. Panicucci, M. Passacantando. Generalized Nash Equilibria for the Service Provisioning Problem in Cloud Systems. IEEE Transactions on Services Computing. 6(4), 429-442, 2013. (Scimago Q1).  
*Contribution: led research agenda. Participated to game model formulation. Developed the toolchain used for the validation.*  
*Impact: reformulation of my work in [selected publication 11] as a potential game, providing a fully distributed implementation. Compared to other SOTA solutions Price of Anarchy improved by 50-70% (145 GoogleScholar citations).*
  
9. D. Ardagna, B. Panicucci, M. Trubian, L. Zhang. Energy-Aware Autonomic Resource Allocation in Multi-tier Virtualized Environments. IEEE Transactions on Services Computing. 5(1), 2-19, 2012. (Scimago Q1).  
*Contribution: led research agenda. Participated to the optimization model formulation. Coordination of the development of the main tool used for the validation. Performed validation activities.*  
*Impact: one of the very first works (266 GoogleScholar citations) on energy-aware resource management of cloud data centers. Improvement on average by 45% of the solution provided by the IBM Tivoli middleware.*
  
10. D. Ardagna, B. Panicucci, M. Passacantando A Game Theoretic Formulation of the Service Provisioning Problem in Cloud Systems. WWW 2011 Proceedings (20<sup>th</sup> International World Wide Web Conference). 177-186. Hyderabad, India. Acceptance rate 12.3%. (GGS A++).  
*Contribution: led research agenda, developed the main tool used for the validation. Participated to the game model formulation.*  
*Impact: one of the very first works (189 GoogleScholar citations) which applied Game Theory to the management of cloud services identifying Generalized Nash Equilibria.*
  
11. D. Ardagna, B. Pernici. Adaptive Service Composition in Flexible Processes. IEEE Transactions on Software Engineering. 33(6), 369-384, 2007 (top ranked paper, 1234 citations). (Scimago Q1).  
*Contribution: main output of my post-doc research. Worked on the optimization problem formulation and negotiation framework setting. Toolchain development and execution of the experimental campaign.*  
*Impact: one of the most cited literature works (1205 GoogleScholar citations) for solving Web Services composition problem with global quality of service constraints.*
  
12. J. Almeida, V. Almeida, D. Ardagna, C. Francalanci, M. Trubian. Resource Management in the Autonomic Service-Oriented Architecture. ICAC 2006 Proceedings (3<sup>rd</sup> International Conference on Autonomic Computing), 84-92, Dublin June 2006. **Acceptance rate 21%**. (GGS A++).  
  
*Contribution: responsible for the optimization model formulation, code development and validation of the solution.*  
*Impact: This is my very first work done in collaboration with Brazilian colleagues that started a long-term and fruitful collaboration that after some years (thanks to the available EU Commission – Brazilian government*

*joint fundings) led to the ATMOSPHERE and EU-BRA-BIGSEA research projects (133 GoogleScholar citations).*