Emiliano Casalicchio
Curriculum Vitae

Roma, 1/08/2023

Content

Part I – Education

Type	Year	Institution	Notes (Degree, Experience,…)
Specialty / Post-Ph.D. training	2017	Blekinge Tekniska Högskola, Sweden	Higher Education Pedagogy, Introductory course (7.5 CFU) Higher Education Pedagogy, Project Course (7.5 CFU)
Specialty / Post-Ph.D. training	2016	Blekinge Tekniska Högskola, Sweden	Doctoral Student Supervision course (5 CFU) – *In Sweden, a prerequisite to serve as main Advisor of Ph.D students.*
PhD	2002	Università di Roma Tor Vergata, Italy	PhD in "Informatica e Ingegneria dell'Automazione" (Computer Science and Automation Engineering) defending the thesis "Cluster-based Web systems: paradigms and dispatching algorithms", advisor prof. S. Tucci co-advisor prof. M. Colajanni.
University graduation	1998	Università di Roma Tor Vergata, Italy	Laurea in Ingegneria Informatica

Part II – National and International Habilitations

- Abilitazione Scientifica Nazionale I Fascia 01/B1 - INF/01, 1st quarter 2021 valid from 31/01/2022 to 31/01/2033
- Abilitazione Scientifica Nazionale I Fascia 09/H1 - ING-INF/05, 5th quarter 2018 valid from 13/11/2020 to 13/11/2031
- 2016 - Docent I Datavetenskap (Docent in Computer Science). Similar to the Italian *Abilitazione Scientifica Nazionale,* in Sweden, *the docentship is a prerequisite to apply for a position as Full Professor (no expiration date)*

Part III – Appointments

III.A – Academic Appointments

Years	Institution	Position
Since 11/2020	Sapienza Università di Roma	Presidente del *Consiglio di Area Didattica in Informatica (L-31, LM-18)*
Since 2022	Sapienza Università di Roma	Member of the *Consiglio del Corso di Studi in Science Matematiche per l'Intelligenze Artificiale (L-35)*
Since 2019	Sapienza Università di Roma	Member of the *Consiglio del Corso di Studi in Data Science (LM-Data)*
Since 09/2018	Sapienza Università di Roma	Member of the *Comitato Infosapienza (Designated by the rector)*
Since 2018	Sapienza Università di Roma	Member of the *Collegio dei Docenti del Dottorato in Computer Science*
Since 29/12/2017	Sapienza Università di Roma	Associate professor – 01/B1-INF/01
2015 - 2017	Blekinge Tekniska Högskola, Department of Computer Science	Associate Professor in computer science
2012 - 2017	Università di RomaTor Vergata, Doctorate School in Computer Science and Control	Member (external member) of the Council of the Doctorate School in Computer Science and Control
2015	Università di Roma Tor Vergata, Facoltà di Lettere e Filosofia	Member of the scientific board of the Master in Data Science, organized by "BAICR Cultura della Relazione" and "Università di Roma Tor Vergata"
2002 - 2015	Università di Roma Tor Vergata, Facoltà di Ingengeria, Dipartimento di Ingegneria Civile e Ingegneria Informatica (Dipartimento di Informatica Sistemi e Produzione from 2002 to 2010)	Researcher and Adjunct professor
2013	Royal Holloway University of London	External evaluator in the PhD Degree Program for the PhD thesis "Context-based Anomaly Detection in Critical Infrastructures: A Study in Distributed Systems" Examiner Professor Keith Mayes; Advisor Dr. Stephen D. Wolthusen; PhD Candidate Richard McEvoy

III.B – Visiting researcher

Year	Institution	Position
2017	Mississippi State University, Faculty of Engineering, Computer Science Department	Visiting Researcher, hosted by prof. Stefano Ianucci, working on the project "Autonomic Security for Next generation health care systems" - Global Discovery Seed Grant
2012	George Mason University, The Volgenau School of Engineering	Visiting Researcher, hosted by prof. D. A. Menascé, working on Autonomic Cloud Computing
2007	George Mason University, The Volgenau School of Engineering	Visiting Researcher, hosted by prof. D. A. Menascé, working on Optimal Service Selection in SoA
2003	George Mason University, Computer Science Department	Visiting Researcher, hosted by prof. D. A. Menascé, working on QoS aware scheduling in Grid Computing

III.C – Appointments at national and international institutions

Year	Institution	Position
2023	Istituto per la Vigilanza sulle Assicurazioni (IVASS)	Membro Commissione di Concorso Pubblico per l'assunzione di funzionari specializzati in sicurezza, blockchain e intelligenza artificale
2022	Comando Generale della Guardia di Finanza	Membro Commissioen di Concorso Pubblico per l'assunzione di Tenenti nel ruolo tecnico informatico
2013 - 2016	European Commission – DG-CNECT/E/02 - Software and services, Cloud	Reviewer for the projects: - SWITCH: Software Workbench for Interactive, Time Critical and Highly self-adaptive Cloud Applications (H2020) - CloudScale: Scalability Management for Cloud Computing (FP7) - CACTOS: Context-Aware Cloud Topology Optimisation and Simulation (FP7) - ORBIT: Business Continuity as a Service (FP7)
2012 - 2015	Grep srl a start-up company co-financed by FILAS (Financing, innovation and research in Lazio, Italy)	Co-founder and Chief of Research and Development – The company was a Desktop-as-a-Service provider.
2014	Natural Sciences and Engineering Research Council of Canada	Research project evaluator for "NSERC Discovery Grant proposals"
2011	STW Technology Foundation, Neatherland	Research project evaluator in the area ICT
2010	WWTF - Vienna Science and Technology Fund, Austria	Research project evaluator in the area ICT
2008	Italian Custom Agency (Agenzia delle Dogane)	Consultant - Under a Twinning project Italy-Jordan, funded by the European Community, I oversaw the designing of a distributed system for Jordan's custom intelligence and coordinating a team of engineers and technical staff of the Jordan Custom Agency and an ASYCUDA engineer.

Part V – Teaching experiences

V.A – Courses

Academic Years	Institution	Course
2021/22 – 2022/23	Sapienza Università di Roma	Sicurezza, *CdS in Informatica L-31 e Informtica erogato prevalentemente a distanze (Unitelma) L-31*
2018/19 – 2022/23	Sapienza Università di Roma	Cloud Computing, *CdS in Data Science LM-91/DATA, Computer Science LM-18, Cybersecurity LM-66*
2018/19 – 2022/23	Sapienza Università di Roma	Sistemi Operativi II, Canale 2, *CdS in Informatica L-31*
2016/17	Blekinge Tekniska Högskola	Performance Optimization, *MSc in Computer Science*
2016/17 – 2017/18	Blekinge Tekniska Högskola	Introduction to Cloud Computing, *MSc in Computer Science*
2016/17	Blekinge Tekniska Högskola	Computer Security, *MSc in Computer Science*
2015	Università di Roma Tor Vergata and BAICR	Sicurezza e Privacy, *Master II livello in Data Science*
2015	Università di Roma Tor Vergata and BAICR	Business Intelligence, *Master II livello in Data Science*
2011/12 – 2014/15	Università di Roma Tor Vergata	Fondamenti di Informatica, *CdS in Ingegneria dell'Edilizia L-23*
2012/13 – 2014/15	Università di Roma Tor Vergata	Calcolatori Elettronici (online course) *CdS in Ingegneria Informatica L-8*
2010/11 – 2011/12	Università di Roma La Sapienza (Sede di Rieti)	Progettazione di Reti e Sistemi Informatici, CdS in Ingegneria dei Sistemi Informatici / Ingegneria Informatica L-8

V.B – Invited Lectures

Year	Institution	Lecture
2018	Norwegian University of Science and Technology, Gjövik Campus PhD program in Computer Science / Forensic Computing Group	Autonomic computing: from self-optimization to self-protection … and what about forensic?
2017	Mississippi State University, Faculty of Engineering, Computer Science Department	Security and privacy in Cloud Data Services *for the students of the course CSE 4243/6243 - information and computer security (MSc level)*

V.C – PhD Students

Graduation Year	Role	Student and Thesis title/topic	Phd Program/ Institution
t.b.d	Advisor	*Danilo Magliarisi,* Decentralized Task scheduling for microservice applications	38th Cycle Computer Science, Sapienza Univestity of Rome
t.b.d	Advisor	*Javid Misirli,* Task offloading in Fog Computing	35th Cycle - Computer Science, Sapienza Univestity of Rome
t.b.d.	Extarnal co-Advisor	*Ahmed A. Al-Saedi,* Energy-efficient Federated learning	Computer Science, Blekinge Institute of Technology
2023	External Advisor	*Vida Ahmadi Mehri,* Towards Automated Context-aware Vulnerability Risk Management	Computer Science, Blekinge Institute of Technology
2020	External Co-Advisor	*Eva García Martín,* Energy Efficiency in Machine Learning: Approaches to Sustainable Data Stream Mining	Computer Science, Blekinge Institute of Technology
2014	Co-Advisor	*Luca Silvestri,* Service Level Provisioning in Cloud Systems: Models, Algorithms and Architectures	Computer Science, Università di Roma Tor Vergata
2010	Co-Advisor	*Emanuele Galli,* Modeling and Simulation of	Computer Science, Università

		Interdependent and Critical Complex Systems	di Roma Tor Vergata
2007	Co-Advisor	*Federico Morabito,* Content-based publish/subscribe systems: architectures and algorithms	Computer Science, Università di Roma Tor Vergata

V.D – Advisor of Master and Bachelor final thesis

Year	**Institution**	**Description**
Since 2018	Sapienza Università di Roma	Advisor for - 23 final theses in the MSc in Computer Science - 5 final theses in the MSc in Data Science - 2 final theses in the MSc in Cybersecurity - 1 final thesis in the MSc in Engineering in Computer Science - 24 final theses in BSc in Informatica Main topics: Cloud Computing, Cybersecurity, distributed systems
2016 - 2017	Blekinge Tekniska Högskola	Advisor for: - 3 MSc final thesis in Computer Security - 11 MSc final thesis in Computer Science - 4 MSc final thesis in Telecommunication - 1 BSc final theses in Software Engineering. Main topics: Security of containers and virtual machines, Cloud Computing and Big Data Architecture, Autonomic computing
2016	Blekinge Tekniska Högskola	External co-advisor of a master thesis in Ingegneria Informatica at the University of Rome Tor Vergata (*thesis results published in "Measuring Docker Performance: what a Mess", ACM ICPE '17 Companion - International Workshop on Autonomous Control for Performance and Reliability Trade-offs in Internet of Services)*
2002-2015	Università di Roma Tor Vergata	I served as advisor of about fifty final theses of the Bachelor's degree and Master degree program in Ingegneria Informatica

Part VI – Funding Information and research projects

- In the last five years (since 2018) I have been PI of 6 research project, and since 2010 I have been PI of 13 research project for a total founding amount of about € 2M
- Since 2002 I participate in 18 projects (excluded the 12 mentioned above) as researcher or WP leader.

VI.A –As Principal Investigator

Years	Title	Program (and Partners)	Role	Grant Value (Total co-financed)
1/10/23 - 2025	Panacea: A Model-Based Framework for Self-Protecting Systems	PRIN 2022, MUR *Partners:* Univerità Roma Tre (project leader), Univerità di Modena e Reggio Emilia, Università La Sapienza	Principal Investigator[1] for Sapienza Research Unit	€ 240K
2023-2025	Next Generation Cloud per l'Amministrazione Pubblica (NGCloud4PA)"	P.R.S. Planning Ricerche e Studi s.r.l. - Finanziamento di n. 1 borsa di studio frequenza al 38° ciclo del dottorato di ricerca in Computer Science – Informatica (ex D.M. n. 352/22 del 9 Aprile 2022)	Principal Investigator	€ 45K
2021	Distributed and Adaptive Edge-based AI Models for Sensor Networks	FIA Sony	Co-PI with prof. Veselka Boeva (BTH)	$ 100K
2020-2023	SmartDefense: Models, algorithms, and mechanisms for Reducing Cyber Risks in Smart Industry,	*Ricerca Ateneo 2019*	Principal Investigator	€ 51K
2020 - 2023	Earth In The Cloud,	POR FESR Lazio 2014 – 2020 (Azione 1.2.1)	Principal Investigator for Sapienza Research Unit	€ 148K
2019 - 2021	Architetture distribuite, interoperabili ed affidabili per la realizzazione della piattaforma Obserbot nell'ambito della LEC	PTR 2019-2021 Progetto 1.7 ENEA	Principal Investigator	€ 25K
2017	Federated Certified Service Broker - Realization of a research and development project on "Cloud for Europe" - Prototype Development	"Cloud for Europe" - Tender number: 5843932 - CUP: C58I13000210006, Lot 1, 2 and 3. Phase II "Prototype Development"	Principal Investigator	€ 486K
2015 - 2016	Federated Certified Service Broker - Realization of a research and development project on "Cloud for Europe" - Design	Cloud for Europe - Tender number: 5843932 - CUP: C58I13000210006, Lot 1, 2 and 3. Phase I "Design"	Principal Investigator,	€ 104.5K
2014 - 2016	SYPCIT: SYstem for prevention and Combat Identity Theft	HOME/2013/ISEC/FINEC/400 0005234	Principal Investigator – Tor Vergata research unit	€ 441K
2013	Good practice guide for secure deployment of Governmental Clouds (Gov-Cloud)	P/29/12/TCD LOT 2	Principal Investigator	€ 35K

[1] In the project proposal prof. Caludio di Ciccio was appointed as PI. I take over as PI from the beginning of the project, because prof. Di Ciccio will leave Sapienza in November 2023.

2012	Design, implementation and exploitation of a Mobile Desktop-as-a-Service service	Sostegno agli Spin-Off Da Ricerca FILAS (Financing, innovation and research in Lazio, Italy	Principal Investigator	€ 98K
2010 - 2012	MENSA - Measureing the Security, Stability and Resiliency level of the DNS	The Global Cyber Security Center (GCSEC) – Poste Italiane	Principal Investigator	€ 220K
2010	Automated Service Level Provisioning for Cloud-based Applications	Amazon Web Services research grant	Principal Investigator	€ 7K

VI.B –As WP leader, Task leader or Research team member

Years	**Title**	**Program (and Partners)**	**Role**
2023 – 2026	SERICS - SuReCare - Secure Remote Healthcare for a Better Future (PE00000014)	MUR National Recovery and Resilience Plan funded by the European Union - NextGenerationEU.	Research team member
2023 – 2026	SERICS - SmartDeFi - Smart Decentralized Finance (PE00000014)	MUR National Recovery and Resilience Plan funded by the European Union - NextGenerationEU.	Research team member
2021 - 2024	Le sfide all'istruzione concepita come bildung ai tempi della platform society: il caso della scuola secondaria di secondo grado a Roma,	*Ricerca Ateneo 2020*	Research team member
2018 – 2021	UNAVOX	PNRM a2016.099bis	Research team member
2019-2021	PRISMA: PRIvacy-preserving, Security, and MAchine-learning techniques for healthcare applications,	*Ricerca d'Ateneo 2018*	Research team member
2019 - 2021	MIRAI - Machine Intelligence for smart and sustainable planning and operation of IoT and Edge	*ITEA3 (19034) 2020*	Research team member
2015 - 2021	Scalable resource-efficient systems for big data analytics	Knowledge Foundation, Sweden (G.n.20140032)	Leader of the WP *Foundation and Enabling Technologies* (until 2017) Member of the research team (2018 – 2021)
2014 - 2016	CI2C - Critical Infrastructures and Cloud Computing: understanding cross-sectorial criticalities and security practices.	HOME/2013/CIPS/AG/4000005013	Leader of the WP *Recommendations, dissemination and results exploitation*
2015	Big Data Security Challenges and Opportunities	ENISA D-COD-15-T21	Research team member
2014	Security requirements for governmental cloud procurement	ENISA D-COD-14-T14	Research team member
2011	Mission Planning and Strategies in a Network Centric System for a warfare cyber defence system	Elettronica S.p.a. (conto terzi)	Research team member
2010 - 2012	MOTIA: MOdeling Tools for Interdependencies Assessment in ICT systems	JLS/2009/CIPS/AG/C18016	WP leader (under CASPUR research contract)

2008 - 2010	MIA: Definition of a methodology for the assessment of mutual interdependencies between ICT and electricity generation / transmission infrastructures	EC DG-HOME	WP leader (under Booz&Co research contract)
2009	Scheduler and resource allocator (SARA) for a warfare cyber defence system	Elettronica S.p.a (Conto terzi)	Research team member
2007-2009	D-ASAP: Dependable Adaptable Software Architecture for Pervasive computing	PRIN 2007 - MIUR	Research team member
2006 - 2008	CRESCO: Computation Center for Research in Complex Systems	MIUR – PON 2005	Research team member
2006 - 2008	SMS - Simple Mobile Service	FP6-IST-034620	Task leader (under CNIT contract)
2003 - 2006	Dynamically evolving, large scale information systems (DELIS)	FP6-IST-001907	Research team member (under. Telecom Italia contract)
2002 - 2006	Internet Networks: efficiency, integration and security	funded by Italian National Research Council (CNR)	Research team member
2002 - 2003	High quality Web systems	COFIN program MIUR	Research team member

Part VII – Research

In what follow are summarized the research contributions provided in my career. Citations in the text refer to "*Part XII – Complete list of publications*"

Keywords	Brief Description
Cybersecurity	Research results in the area of Cybersecurity are summarized in what follows: 1) *Industry 4.0* – In the projects SmartDefense (cf. Section VI.A) and PRISMA (Cf Section VI.B) we proposed a self-protecting architecture for cyber–physical systems realizing a verifiable control application [9, 39, 40]. The solution, ASiMOV, is inspired by modular redundancy and leverages virtualization technologies to respond to and prevent cyber-attacks to the control logic. Using simulation experiments, we evaluated the effects of an attack on an industrial control application enhanced by ASiMOV, the delay introduced by ASiMOV within a control loop, and the cyber-attack detection delay. A solution for self-protection is also proposed in [11, 33]. In the SmartDefense project, we also analyzed the vulnerabilities and cyber threats introduced by the use of cutting-edge technologies and the policies adopted in managing the small-satellite ecosystem supply chain [37]. Vulnerability risk management (VRM) is the most crucial cyber defense to eliminate attack surfaces in IT environments. VRM is a cyclical practice of identifying, classifying, evaluating, and remediating vulnerabilities. In [5, 32, 35] we proposed a framework for automating the entire VRM cycle in the context of a given organization. The prioritization phase is automated introducing a selection and sorting algorithm which consider as input the organization's context and risk appetite. The patch management phase is also automated to reduce the number of patching failures and security experts' intervention. Moreover, a feedback is provided to improve the patch prioritization phase. Experimental results validated the approach. 2) *Digital Therapy (DTx)* – Digital Therapies is a new approach to personalized medicines. Although there are guidelines for protecting digital devices from cyber threats, there is no specific guideline for DTx. In this research, we defined a meta-architecture for DTx, and we analyzed cybersecurity threats and possible countermeasures [106]. 3) *Mobile applications* - In the SYPCIT project (cf. Section VI.A), we proposed a novel framework for phishing detection in Android mobile devices, which, on the one hand, exploits well-known techniques already implemented by popular web browsers plug-ins, such as public blacklist search, and, on the other hand, implement a machine learning-based engine to ensure zero-hour protection from new phishing campaigns [53]. We adopted a supervised classification approach and a related machine-learning model. 4) *Big Data* – In the project "Big Data Security Challenges and Opportunities" (cf Section VI.B), we studied the security challenges faced by companies and institutions implementing Big Data solutions, from infrastructures to analytics applications, and how risks are mitigated. The analysis focused on private organizations in given sectors (e.g. Finance, Energy, Telecom). and on research institutions, public organizations, and government agencies. The output of the study was the report "Big Data Security Good Practices and Recommendations on the Security of Big Data Systems" [115] 5) *Cloud computing* – in the project "Security requirements for governmental cloud procurement" (cf. Section VI.B), we contributed to the definition of the CCSM - the Cloud Certification Schemes Metaframework [116]. **CCSM** extended the CCSL. It is a meta-framework of cloud certification schemes. The meta-framework aims to provide a neutral high-level mapping from the customer's Network and Information Security requirements to security objectives in existing cloud certification schemes, which facilitates the use of existing certification schemes during procurement. 6) *Cloud computing* – in the project "Good Practice Guide for securely deploying Governmental Clouds" (cf. Section VI.B) we identified the Member States with operational government Cloud infrastructures and underlines the diversity of Cloud adoption in the public sector in Europe. The project produced the report "Good Practice Guide for securely deploying Governmental Cloud" [117] aiming to assist Member States in elaborating a national Cloud strategy implementation, to understand current barriers and suggest solutions to overcome those barriers, and to share the best practices paving the way for a common set of requirements for all Member States (MS). 7) *DNS* - The Domain Name System is one of the most critical components of the Internet. An attack to the DNS can compromise the functioning of internet/network applications at large scale. In the framework of the MENSA project (cf. Section VI.A) we proposed a methodology to measure the level of security of the DNS [15]. we also analyzed the impact of DNS failures on the remote control of the power grid [17,60].

Federated learning, Energy efficient machine learning	In the projects "Scalable resource-efficient systems for big data analytic" (cf. Section VI.B) we studied energy efficient machine learning algorithms and specifically we analyzed the energy consumption profile of streaming algorithms, such as the Very Fast Decision Tree (VFDT), designed to run in embedded mobile devices, and we proposed the nmin adaptation method [8], which reduces the energy consumption of the VFDT algorithm with only minor effects on accuracy. We have conducted extensive experiments on 29 public datasets, showing that the VFDT with nmin adaptation consumes up to 31% less energy than the original VFDT, and up to 96% less energy than the CVFDT (VFDT adapted for concept drift scenarios), trading off up to 1.7 percent of accuracy. In the MIRAI project we proposed solution to make Federated Learning energy efficient by reducing model parameters' transfer preserving model accuracy [4, 31, 34].
Cloud computing, Big Data platforms, Autonomic computing	Research results in the area of Cloud computing and Big Data platform runtime adaptation are summarized in what follows: 1) The problem of *QoS-aware run-time adaptation of containers* has been widely studied in [9, 10, 11, 12, 42, 44, 45, 46, 47] analyzing performance metrics suitable for run-time adaptation, and proposing new orchestration mechanisms, autoscaling and scheduling algorithms. Cybersecurity challenges has been also investigated [8]. 2) *Optimal runtime adaptation in cloud-based systems* (Infrastructure as a Service). We proposed algorithms and architectures for the optimal allocation (at runtime) of virtual resources on physical resources, and we also considered constraints imposed both by the service provider (cost) and by the service consumer (service level objectives), minimizing QoS metrics [16, 54, 56, 57, 59, 62, 64]. With D.A. Menascê we proposed a model to guarantee availability constraints and to maximize the provider revenue [55]. In [57], We studied the problem of maintaining security objectives in cooperative inter-cloud systems. 3) *QoS and Legislation-aware cloud service brokerage*. In the project "Federated Certified Service Broker - Realization of a research and development project on Cloud for Europe – Design" (cf. section VI.A), the challenge was the design of a cloud service broker capable of guaranteeing, during the service life cycle, the compliance with QoS and Legislation requirements. The proposed solution has been published in [13]. A model for optimal run-time adaptation of cloud services with QoS and legislation/regulation requirements has been proposed in [51, 52]. 4) *Energy aware optimal placement of virtual nodes in Big Data platforms*. In the project "Scalable resource-efficient systems for big data analytics" (Cf. Section VI.B), we addressed the problem of orchestrating vertical scaling, horizontal scaling, and energy-aware optimal placement of virtual nodes in Cassandra big data platform used in production by Ericsson, a research partner of the project. Results have been published in [10, 14, 45, 48, 49, 50]. The performance of the proposed optimal adaptation algorithm has been compared to four other run-time adaptation policies.
Service oriented architectures, Autonomic computing	Service Oriented Architectures give the possibility to realize a specific complex functionality (e.g., a workflow) composing atomic services. That makes it possible to select the appropriate set of atomic services that, together, maximize the provider utility and fulfill the customers' requirements (e.g., quality of service). With my former research group at the University of Rome Tor Vergata we addressed the challenge of optimal service composition and self-adaptation [18, 58, 59, 63, 71, 72, 78, 79] by proposing different optimization models and service selection and composition algorithms. With prof. D.A Menascé, we address the problem of self-adaptation of Service-Oriented systems by proposing optimal and sub-optimal adaptation strategies [20, 75, 73].

Critical information infrastructures protection, Distributed simulation, Interdependency analysis	Critical Information Infrastructure Protection is a broad research area. Specifically, the research problem addressed was modeling Critical Information Infrastructures and their inter-dependencies to assess the impact and propagation of failures, cyber/physical attacks, and natural disasters and to design disaster prevention and remediation solutions. In the CRESCO and MIA projects (cf. Section VI.B), we proposed an agent-based federated simulation methodology of complex critical systems validated through the implementation of a federated simulator applied to real use cases [19, 67, 68, 69, 70, 74, 76, 77, 83, 85]. Moreover, we studied a methodology for interdependency analysis [61, 65, 66] that integrates with the federated simulation model.
Workload characterization	The project "Design, implementation and exploitation of a Mobile Desktop-as-a-Service service" (cf. Section VI.A) was an industrial research project with the final goal of deploying a cloud-based Desktop-as-a-Service. When the system was in production, we collected a wide range of system load metrics for a long-time period. We used that dataset to perform a workload characterization study [54] to optimize resource management tasks.
Content delivery networks, Admission control, Quality of service	In this research, we investigated the problem of how to integrate mobile internet access and content delivery network services. Specifically, we proposed a mobility and QoS-aware context transfer protocol to manage the context transfer during the mobile cell handoff phase [22, 91, 93, 95, 114]. We also proposed heuristic admission control policies used to enforce the level of QoS during context transfer in CDN access [22, 91, 95].
Publish-subscribe systems	In the DELIS project (cf Section VI.B), we investigated how to manage subscriptions in content-based publish-subscribe systems. We proposed a set of clustering algorithms that were adaptive and capable of dealing with limited knowledge [23, 82, 86, 87].
Grid computing, Quality of service, Scheduling	In 2003, with Prof. D. A. Menascé, we studied the problem of Quality of Service aware scheduling in Grid systems for enterprise applications. We formulated a complex resource scheduling problem with performance and cost constraints [24, 90, 92]. Because the scheduling problem formulation is NP-hard, and the optimization problem is not linear, we defined a heuristic algorithm validated through distributed event simulation.
High-performance web servers, Load balancing	During my Ph.D. (1999 - 2002), i studied design and performance evaluation of cluster-based web server systems (e.g. [21, 25 - 29] and [96 - 105]). The emphasis was on: algorithms and mechanisms for QoS-aware load balancing, replacement algorithms to manage web caches (selecting the most appropriate page to cache/remove; and admission control of web requests.

Part VIII – Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
Papers [international]	100	Scopus	2000	2023
Papers [international]	73	Web of Science (WOS)	2000	2023
Papers [international]	135	Google Scholar	2000	2023

	Databases		
	Scopus	**Web of Science**	**Google Scholar**
Total Impact factor	110,83	110,83	110,83
Average Impact Factor	4,43	4,43	4,43
Total Citations	2316	1150	4644
Average Citations per Product	23.16	15,75	34,4
Hirsch (H) index	27	17	34
Normalized H index *(H index divided by the academic seniority)*	1.17	0,73	1,48

Part IX - Organization of Conferences, Keynotes, TPC, peer review, paper presentation

Keywords	Brief Description
Conference Organization	1. Poster CHAIR of the 20th International Conference on Applied Cryptography and Network Security (ACNS 2022) https://acns22.di.uniroma1.it/organization 2. co-CHAIR of the 3rd International Workshop on Self-protecting systems SPS2021 (https://sites.google.com/view/sps21). The workshop is held in conjunction with IEEE ACSOS and proceedings are published by IEEE. 3. co-CHAIR of the 2nd International Workshop on Self-protecting systems SPS2020 (https://sites.google.com/view/sps20). The workshop is held in conjunction with IEEE ACSOS and proceedings are published by IEEE. 4. co-CHAIR of the 18th International Conference on Applied Cryptography and Network Security (https://sites.google.com/di.uniroma1.it/acns2020). 5. co-CHAIR (and co-founder) of the International Workshop on Self-protecting Systems part of the Part of the FAS* Workshops series held in conjunction with 16th IEEE International Conference on Autonomic Computing and 13th IEEE International Conference on Self-Adaptive and Self-Organizing Systems https://sites.google.com/view/sps19/home a. The idea of the workshop originates from the research collaboration with S .Iannucci (Mississippi State University, MS, USA) and B.J. Williams (University of Florida, FL, USA) 6. co-CHAIR of the Workshop on Container-based systems for Big data, Distributed and Parallel computing (CBDP'2018) co-located with Euro-Par 2018 http://europar2018.org, August 27-28 2018, Torino, Italy a. This workshop is essentially the second edition of the "Autonomic Management of Large-scale Container-based Systems" workshop co-located with IEEE ICCAC 2107 (c.f. previous title) 7. co-CHAIR (and founder) of the workshop "Autonomic Management of Large-scale Container-based Systems", co-located with the 2017 IEEE international conference on Cloud and Autonomic Computing https://www.bth.se/amlcs/ a. The idea of the workshop originates from my research in the field and the research collaboration with ERICSSON A.B. Karlskrona Sweden and CityCloud A.B. Sweden 8. co-CHAIR of the workshop InfQ 2016 - New Frontiers in Quantitative Methods in Informatics, In conjunction with Valuetools 2016, October 24-25 Taormina – Italy http://archive.valuetools.org/2016/show/InfQ 9. Poster CHAIR of the 13th IEEE/ACM International Symposium on Distributed Simulation and Real Time Applications (DS-RT'09). http://www.cs.unibo.it/ds-rt2009/ 10. Poster and Demo co-CHAIR of the IEEE International Symposium on Distributed Simulation and Real-Time applications (DS-RT'08). http://www.cs.unibo.it/ds-rt2008/
Keynotes	1. *Cybersecurity for Small-Satellite Ecosystems: state-of-the-art and challenges* - 71st International Astronautical Congress / Symposium on Space Security Oct. 14, 2020 (Virtual). 2. *Characterization of CPU and Disk Load for Cloud desktop providers* - INFQ'14/Performance'14, Oct. 7, 2014, Torino, IT 3. *What About Modelling and Security in Cloud Critical Systems?* - ECCS/COINETS'14 conference, Sept. 25, 2014, Lucca, IT. 4. *The Mensa project: Measuring DNS Health and Security* - DNSSEC session at ICANN-42, October 26, 2011, Dakar, Senegal.12 - 5. *DeDALO: a framework for distributes systems dependency discovery and analysis* - NetONets, Central European University, June 07, 2011, Budapest. 6. *Cyber Dependencies: Characterization, Discovery, and Analysis* - IEEE Compeng 2010, Feb. 23, 2010, Roma.
Journal Review	With High Frequency • ACM Transaction on Autonomous and Adaptive Systems, • IEEE Transaction on Cloud Computing, • IEEE Transaction on Software Engineering • Elsevier Journal of Future Generation Computer Systems. • Springer Journal of Cloud Computing • Elsevier Journal of Systems and Software, With Moderate/Low Frequency • IEEE Transactions on Network and Service Management;

	• IEEE Transaction on Parallel and Distributed Systems; • IEEE Access • IEEE Internet Computing • Elsevier Journal of Supercomputing, • Elsevier Journal on Parallel and Distributed Computing, • Springer Computing Journal, • Elsevier Simulation Modeling, Practice and Theory, • Elsevier Performance Evaluation, • Elsevier Computer and Electrical Engineering • Elsevier Computer Communications
Member of Technical Program Committee (TPC)	**Computer Systems and Networks** • IEEE Symposium of Computer and Communications, • IEEE International Conference on Information and Communication Systems – (IEEE Jordan charter) • DCNET - International Conference on Data Communication Networking (INSTICC), **Cloud Computing** • IEEE CloudTech • IEEE International Workshop on Management of Cloud Systems (MoCS) • IEEE/ACM Workshop Cloud for Business, Industry and Enterprises, co-located with the 13th IEEE/ACM Int. Symp. on Clouster, Cloud and Grid computing • IEEE International Workshop on Cloud Convergence: challenges for future infrastructures and services, co-located with IEEE International Conference on Communications **Autonomic computing** • IEEE International Conference on Cloud and Autonomic Computing • International Workshop on Feedback Computing, *co-located with the IEEE International Conference on Autonomic Computing.* • International Workshop on Autonomic Systems for Big Data Analytics, *co-located with the IEEE International conference on Cloud and Autonomic Computing.* **Modeling, Analysis and Performance Evaluation** • InfQ - New Frontiers in Quantitative Methods in Informatics • IEEE Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (MASCOT) • International Workshop on Autonomous Control for Performance and Reliability Trade-offs in Internet of Services, *in conjunction with the 8th ACM/SPEC International Conference on Performance Engineering* • Workshop on Performance evaluation of communications in distributed systems and Web based service architectures *co-located with IEEE ISCC'09* **Simulation** • SIMULTECH - International Conference on Simulation and Modeling Methodologies, Technologies and Applications (INSTICC) • IEEE/ACM International Symposium on Distributed Simulation and Real Time Applications • 2006 EUROPEAN Conference on Modelling and Simulation • EUROSIM2004. European Simulation Multiconference – ESM2004. **Critical Infrastructure Protection** • CRITIS - International Conference on Critical Information Infrastructures Security (LNCS proc.) • IFIP WG11.10 Conference on Critical Infrastructure Protection.
Papers presentation	Since 1999 I have presented my research results at more than 50 international conferences, including: • IEEE International Conference on Cloud and Autonomic Computing; • IEEE International Conference on Autonomic Computing; • IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems; • IEEE Utility and Cloud Computing conference;

	• IEEE International Conference on Web Services; • ACM Int. Conference on Performance Engineering; • EAI International Conference on Performance Evaluation Methodologies and Tools; • International Symposium on Computer and Information Sciences; • IEEE International Symposium on Network Cloud Computing and Applications; • International Workshop on Critical Information Infrastructure Security; • IEEE Complexity in Engineering conference; • IEEE International Symposium on Distributed Simulation and Real Time Applications; • ICST Int. Workshop on Advanced Architectures and Algorithms for Internet Delivery and Applications; • ACM/IEEE/SCS Workshop on Principles of Advanced and Distributed Simulation; • IST Mobile & Wireless Communications Summit; European Conference on Complex Systems; • ACM/IEEE International Symposium on Modeling, Analysis and Simulation of Wireless and Mobile Systems; • EUROSIM Congress on Modelling and Simulation; • IEEE Euromicro Workshop on Parallel and Distributed Processing; • IEEE Int'l Conference on Cluster Computing • - International Corporation for Assigned Names and Numbers (ICANN) community forum

Part X - Society memberships, Awards and Honors

Year	Type	Title
Since 2023	*Membership*	Member of the *Comitato Tecnico Scientifico dell' Intergruppo parlamentare "Sanità Digitale e Terapie Digitali"*
Since 2022	M*embership*	Member of the *WG CINI on System and Service Quality*
Since 2010	*Membership*	Member of the *Italian group on Quantitative Methods in Informatics (INFQ)*
2017	*Award*	*ISI medel 2017* (ISI funds 2017) – Is a personal award given by the University to the author(s) of an ISI-journal publication. The author(s) receives a price of 30.000 SEK, about 3000 EUR. I received the grant for two papers • E. Casalicchio et al. (2017) Research Challenges in legal-rule and QoS-aware Cloud Services Brokerage, Future Generation Computer Systems, Elsevier • E. Casalicchio et al. (2017) Energy-aware Auto-scaling Algorithms for Cassandra Virtual Data Centers, To appear in the June issue of J. of Cluster Computing, Elsevier
2006-2012	Membership	Member of the Council of the "Associazione Italiana Esperti in Infrastructture Critiche (AIIC)"

Part XI– Selected Publications

#	Authors, Title, and bibliographic data	IF	No. Cit.
1	Al-Saedi, A.A., Boeva, V., **Casalicchio, E**. *FedCO: Communication-Efficient Federated Learning via Clustering Optimization* (2022) Future Internet, 14 (12), art. no. 377, DOI: 10.3390/fi14120377	3.4	2
2	Ahmadi Mehri, V., Arlos, P., **Casalicchio, E.** *Automated Context-Aware Vulnerability Risk Management for Patch Prioritization* (2022) Electronics (Switzerland), 11 (21), art. no. 3580 DOI: 10.3390/electronics11213580	2.9	0
3	Al-Saedi, A.A., Boeva, V., **Casalicchio, E**., Exner, P. *Context-Aware Edge-Based AI Models for Wireless Sensor Networks—An Overview* *(2022*) Sensors, 22 (15), art. no. 5544 DOI: 10.3390/s22155544	3.9	1
4	Cardellini, V., **Casalicchio, E**., Iannucci, S., Lucantonio, M., Mittal, S., Panigrahi, D., Silvi, A. *irs-partition: An Intrusion Response System utilizing Deep Q-Networks and system partitions* (2022) SoftwareX, 19, art. no. 101120, DOI: 10.1016/j.softx.2022.101120	3.4	0
5	García-Martín, E., Lavesson, N., Grahn, H., **Casalicchio, E.**, Boeva, V. *Energy-aware very fast decision tree* (2021) International Journal of Data Science and Analytics, 11 (2), pp. 105-126. DOI: 10.1007/s41060-021-00246-4	2.4	7
6	**Casalicchio, E.**, Gualandi, G. *ASiMOV: A self-protecting control application for the smart factory* (2021) Future Generation Computer Systems, 115, pp. 213-235. DOI: 10.1016/j.future.2020.09.003	7.5	5
7	Shirinbab, S., Lundberg, L., **Casalicchio, E**. *Performance evaluation of containers and virtual machines when running Cassandra workload concurrently* (2020) Concurrency and Computation: Practice and Experience, 32 (17), art. no. e5693 DOI: 10.1002/cpe.5693	2	14
8	**Casalicchio, E.**, Iannucci, S. *The state-of-the-art in container technologies: Application, orchestration and security* (2020) Concurrency and Computation: Practice and Experience, 32 (17), art. no. e5668 DOI: 10.1002/cpe.5668	2	40
9	**Casalicchio, E.** *A study on performance measures for auto-scaling CPU-intensive containerized applications* (2019) Cluster Computing, 22 (3), pp. 995-1006. DOI: 10.1007/s10586-018-02890-1	4.4	38
10	***Casalicchio, E.*** *Container Orchestration: A Survey* (2019) EAI/Springer Innovations in Communication and Computing, pp. 221-235. DOI: 10.1007/978-3-319-92378-9_14	-	37
11	Nardelli, M., Cardellini, V., **Casalicchio, E.** *Multi-Level Elastic Deployment of Containerized Applications in Geo-Distributed Environments* (2018) Proceedings - 2018 IEEE 6th International Conference on Future Internet of Things and Cloud, FiCloud 2018, art. no. 8457986, pp. 1-8 DOI: 10.1109/FiCloud.2018.00009	-	19
12	**Casalicchio, E.,** Cardellini, V., Interino, G., Palmirani, M. *Research challenges in legal-rule and QoS-aware cloud service brokerage* (2018) Future Generation Computer Systems, 78, pp. 211-223. DOI: 10.1016/j.future.2016.11.025	7.5	21
13	**Casalicchio, E.**, Lundberg, L., Shirinbab, S. *Energy-aware auto-scaling algorithms for Cassandra virtual data centers* *(2017) Cluster Computing, 20 (3), pp. 2065-2082. Cited 9 times.* *DOI: 10.1007/s10586-017-0912-6*	4.4	9

14	**Casalicchio, E.,** Iannucci, S., Silvestri, L. *Cloud desktop workload: A characterization study* (2015) Proceedings - 2015 IEEE International Conference on Cloud Engineering, IC2E 2015, art. no. 7092901, pp. 66-75. DOI: 10.1109/IC2E.2015.25	-	5
15	Bottazzi, G., **Casalicchio, E.**, Cingolani, D., Marturana, F., Piu, M. *MP-shield: A framework for phishing detection in mobile devices* (2015) Proceedings - 15th IEEE International Conference on Computer and Information Technology, CIT 2015, 14th IEEE International Conference on Ubiquitous Computing and Communications, IUCC 2015, 13th IEEE International Conference on Dependable, Autonomic and Secure Computing, DASC 2015 and 13th IEEE International Conference on Pervasive Intelligence and Computing, PICom 2015, art. no. 7363339, pp. 1977-1983. DOI: 10.1109/CIT/IUCC/DASC/PICOM.2015.293	-	30

Part XII– Complete list of international publications

Guest Editor

1. Mauro Conti, Jianying Zhou, Emiliano Casalicchio, Angelo Spognardi, Applied Cryptography and Network Security, 18th International Conference, ACNS 2020, Rome, Italy, October 19–22, 2020, Proceedings, Part I, Lecture Notes in Computer Science DOI: 10.1007/978-3-030-57808-4
2. Iannucci, S., Casalicchio, E., Williams, B. Editorial for FGCS special issue: Advances in self-protecting systems (2021) Future Generation Computer Systems, 123, pp. 178-180. DOI: 10.1016/j.future.2021.05.005
3. E. Casalicchio, S. Distefano (2017) Special Issue in New frontiers in Quantitative Methods in Informatics, ACM Performance Evaluation Review (PER), March 2017.

Journals

4. Al-Saedi, A.A., Boeva, V., Casalicchio, E. FedCO: Communication-Efficient Federated Learning via Clustering Optimization (2022) Future Internet, 14 (12), art. no. 377, . Cited 2 times. DOI: 10.3390/fi14120377
5. Ahmadi Mehri, V., Arlos, P., Casalicchio, E. Automated Context-Aware Vulnerability Risk Management for Patch Prioritization (2022) Electronics (Switzerland), 11 (21), art. no. 3580, DOI: 10.3390/electronics11213580
6. Al-Saedi, A.A., Boeva, V., Casalicchio, E., Exner, P. Context-Aware Edge-Based AI Models for Wireless Sensor Networks—An Overview (2022) Sensors, 22 (15), art. no. 5544, . Cited 1 time. DOI: 10.3390/s22155544
7. Cardellini, V., Casalicchio, E., Iannucci, S., Lucantonio, M., Mittal, S., Panigrahi, D., Silvi, A. irs-partition: An Intrusion Response System utilizing Deep Q-Networks and system partitions (2022) SoftwareX, 19, art. no. 101120, DOI: 10.1016/j.softx.2022.101120
8. García-Martín, E., Lavesson, N., Grahn, H., Casalicchio, E., Boeva, V. Energy-aware very fast decision tree (2021) International Journal of Data Science and Analytics, 11 (2), pp. 105-126. Cited 7 times. DOI: 10.1007/s41060-021-00246-4
9. Casalicchio, E., Gualandi, G. ASiMOV: A self-protecting control application for the smart factory (2021) Future Generation Computer Systems, 115, pp. 213-235. Cited 5 times.
10. Shirinbab, S., Lundberg, L., Casalicchio, E. Performance evaluation of containers and virtual machines when running Cassandra workload concurrently (2020) Concurrency and Computation: Practice and Experience, 32 (17), art. no. e5693, . Cited 14 times. DOI: 10.1002/cpe.5693
11. Casalicchio, E., Iannucci, S. The state-of-the-art in container technologies: Application, orchestration and security (2020) Concurrency and Computation: Practice and Experience, 32 (17), art. no. e5668, . Cited 40 times. DOI: 10.1002/cpe.5668
12. Casalicchio, E. A study on performance measures for auto-scaling CPU-intensive containerized applications (2019) Cluster Computing, 22 (3), pp. 995-1006. Cited 38 times. DOI: 10.1007/s10586-018-02890-1
13. Casalicchio, E., Cardellini, V., Interino, G., Palmirani, M. Research challenges in legal-rule and QoS-aware cloud service brokerage (2018) Future Generation Computer Systems, 78, pp. 211-223. Cited 21 times. DOI: 10.1016/j.future.2016.11.025
14. Casalicchio, E., Lundberg, L., Shirinbab, S. Energy-aware auto-scaling algorithms for Cassandra virtual data centers (2017) Cluster Computing, 20 (3), pp. 2065-2082. Cited 9 times. DOI: 10.1007/s10586-017-0912-6
15. E. Casalicchio, M. Caselli, A. Coletta, Measuring the global domain name system, Network, IEEE 27 (1), 25-31 2013
16. E. Casalicchio, Silvestri L . Mechanisms for SLA provisioning in Cloud-based service providers. COMPUTER NETWORKS, Volume 57, Issue 3, 26 February 2013, Pages 795–810, ISSN: 1389-1286
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30. Abghari, S., Boeva, V., Casalicchio, E., Exner, P. An Inductive System Monitoring Approach for GNSS Activation (2022) IFIP Advances in Information and Communication Technology, 647 IFIP, pp. 437-449. Cited 1 time. DOI: 10.1007/978-3-031-08337-2_36
31. Al-Saedi, A.A., Casalicchio, E., Boeva, V. An Energy-Aware Multi-Criteria Federated Learning Model for Edge Computing (2021) Proceedings - 2021 International Conference on Future Internet of Things and Cloud, FiCloud 2021, pp. 134-143. DOI: 10.1109/FiCloud49777.2021.00027
32. Ahmadi, V., Arlos, P., Casalicchio, E. Normalization Framework for Vulnerability Risk Management in Cloud (2021) Proceedings - 2021 International Conference on Future Internet of Things and Cloud, FiCloud 2021, pp. 99-106. Cited 2 times.
DOI: 10.1109/FiCloud49777.2021.00022
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61. E.Casalicchio, A.Paoletti, S.Tucci, “DeDALO: a framework for distributed systems dependencies discovery and analysis”, ISCIS 2011, Springer Lecture Notes notes on Electrical Engineering
62. E.Casalicchio, L.Silvestri “Architectures for Autonomic Service Management in Cloud-based Systems” MOCS2011, The 6th IEEE symposium on Computers and Communications, June 2011, Corfu, Greece.
63. V.Cardellini, E.Casalicchio, V.Grassi, F.Lo Presti "Adaptive Management of Composite Services under Percentile-based Service Level Agreements" 8th Int. Conf on Service Oriented Computing (15% Acceptance Rate), Dec. 2010, San Francisco, CA.
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1/08/2023 **Emiliano Casalicchio**