

Giuseppe Bisicchia

Postdoctoral Research Fellow

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Short Biography

Giuseppe Bisicchia is a postdoctoral research fellow at the Department of Computer Science of the University of Pisa, where he conducts research in software engineering, distributed systems, and quantum computing. He received his PhD in Computer Science with honours from the University of Pisa with a dissertation on the distributed execution of quantum programs, in which he developed methodologies, software tools, and experimental approaches for executing, distributing, and evaluating quantum computations on NISQ devices. He previously received his master's degree in Computer Science with honours from the University of Pisa and, through the double-degree programme between the University of Pisa and the Universidad de Málaga, the *Máster Universitario en Ingeniería Informática* with *Matrícula de Honor*. During his studies at the Universidad de Málaga, he ranked first in his cohort and received the *Premio Extraordinario "José María Troya"*, awarded to the student with the highest average grade in the master's programme.

His research has evolved from the study of declarative approaches for managing smart environments and Cloud-IoT infrastructures to the design of techniques and tools for accessing, executing, and managing quantum computations through cloud infrastructures and distributed systems. Before and during his PhD, he collaborated with Consortium GARR through two research fellowships on the orchestration, monitoring, and benchmarking of multi-cloud and multi-region infrastructures. In this context, he led the design and development of a TRL 7 software system that is currently deployed in production on a nationwide federated cloud and supports the monitoring, performance evaluation, and operational management of distributed infrastructures.

He maintains active collaborations with several international research groups and has undertaken research stays at international institutions, including the Universidad de Extremadura and Simula Research Laboratory, working with groups active in software engineering, complex systems, and quantum software testing. His scientific output includes articles published in international journals and conference proceedings in software engineering, the cloud-edge continuum, and quantum computing, together with publicly available software, datasets, and research artefacts.

Alongside his academic research, he works as a scientific consultant on applied AI and quantum technologies, contributing to the development of Ireli.ai and advising on quantum-related technical and educational initiatives. He serves as Scientific Director for *EMPIRIA HALL - Advanced Quantum Virtual Lab*, contributing to the scientific and educational direction of a high-realism virtual laboratory platform for quantum physics and technologies. His work also includes university and pre-university teaching, with particular emphasis on computer science education, coding, educational robotics, digital technologies, and quantum technologies. He participates in the organisation and delivery of numerous workshops, training programmes, and science-communication events for students, researchers, and the general public, covering topics ranging from basic computer science to robotics, programming, and quantum computing. He is a co-founder of the Quantum Festival, participates in national initiatives dedicated to quantum technologies, and is a Qiskit Advocate with IBM Quantum..

1 Education and Experience

1.1 Education

- 11/2022– **PhD in Computer Science**, *University of Pisa*, Pisa, Italy
11/2025 **Thesis:** *Distributed Execution of Quantum Programs*
Supervisors: Prof. Antonio Brogi (University of Pisa, Italy), Prof. Jose García-Alonso (Universidad de Extremadura, Spain)
Thesis Advisory Board: Prof. Frank Leymann (Stuttgart University, Germany), Prof. Manuel Wimmer (JKU Linz, Austria)
External Reviewers: Prof. Wolfgang Maurer (OTH Regensburg, Germany), Prof. Manuel A. Serrano (Universidad de Castilla - La Mancha, Spain)
Examination Committee: Prof. Gian-Luigi Ferrari (University of Pisa, Italy), Prof. Claudia Faggian (Université Paris Cité, France), Prof. Wolfgang Maurer (OTH Regensburg, Germany) [Link]
Awarded on: 09/02/2026 **Final grade:** Excellent with Honours
- 09/2020– **Master's Degree in Computer Science (LM-18)**, *University of Pisa*, Pisa, Italy
07/2022 **Curriculum:** *ICT Solutions Architect* [Link]
Thesis: *Continuous Reasoning for Application Management over the Cloud-IoT Continuum*
Supervisors: Prof. Antonio Brogi (University of Pisa, Italy), Dr. Stefano Forti (University of Pisa, Italy), Prof. Ernesto Pimentel (Universidad de Málaga, Spain)
Double Degree: Academic programme completed under the *Double Degree Programme* between the University of Pisa and the Universidad de Málaga. He completed the first year of the Master's programme at the University of Pisa and the second year at the Universidad de Málaga. The thesis was jointly supervised by faculty members from both universities, and the final defence was held before two examination committees, one Italian and one Spanish. Upon completion of the programme, he received two Master's degrees: the "*Laurea Magistrale in Informatica*" from the University of Pisa and the "*Máster Universitario en Ingeniería Informática*" from the Universidad de Málaga. The Universidad de Málaga examination committee also awarded the thesis the **Matrícula de Honor**. He ranked first in his cohort at the Universidad de Málaga, achieving the highest final grade and receiving the **Premio Extraordinario "José María Troya"** [Link].
Awarded on: 22/07/2022 **Final grade:** 110/110 with Honours
- 09/2020– **Master's Degree in Computer Engineering**, *Universidad de Málaga*, Málaga, Spain
07/2022 **Curriculum:** *Cybersecurity* [Link]
Thesis: *Razonamiento Incremental para la Gestión de Aplicaciones en el Ecosistema Cloud-IoT* (Continuous Reasoning for Application Management over the Cloud-IoT Continuum)
Supervisors: Prof. Antonio Brogi (University of Pisa, Italy), Dr. Stefano Forti (University of Pisa, Italy), Prof. Ernesto Pimentel (Universidad de Málaga, Spain)
Double Degree: Academic programme completed under the *Double Degree Programme* between the University of Pisa and the Universidad de Málaga. He completed the first year of the Master's programme at the University of Pisa and the second year at the Universidad de Málaga. The thesis was jointly supervised by faculty members from both universities, and the final defence was held before two examination committees, one Italian and one Spanish. Upon completion of the programme, he received two Master's degrees: the "*Laurea Magistrale in Informatica*" from the University of Pisa and the "*Máster Universitario en Ingeniería Informática*" from the Universidad de Málaga. The Universidad de Málaga examination committee also awarded the thesis the **Matrícula de Honor**. He ranked first in his cohort at the Universidad de Málaga, achieving the highest final grade and receiving the **Premio Extraordinario "José María Troya"** [Link].
Awarded on: 22/07/2022 **Final grade:** 9.88/10 & *Matrícula de Honor*

- 09/2017– **Bachelor's Degree in Computer Science (L-31)**, *University of Pisa*, Pisa, Italy
 07/2020 **Thesis:** *Goal-driven Management of IoT Indoor Environments*
Supervisors: Prof. Antonio Brogi (University of Pisa, Italy), Dr. Stefano Forti (University of Pisa, Italy)
Awarded on: 24/07/2020 **Final grade:** 110/110 with Honours
- 09/2012– **Scientific High School Diploma – Applied Sciences Option**, *Liceo Statale "E. Boggio Lera"*, Catania, Italy
 07/2017 **Awarded on:** 07/07/2017 **Final grade:** 98/100

1.2 Positions Held

- 02/2026– **Scientific Consultant · Scientific Director**, *ACSoftware*, Bologna, Italy
 present Scientific consultant on Quantum Technologies, contributing to the assessment, design and development of quantum-related technical and educational initiatives. Scientific Director for *EMPIRIA HALL - Advanced Quantum Virtual Lab*, contributing to the scientific and educational direction of a high-realism virtual laboratory platform for quantum physics and technologies. The platform prepares learners for laboratory experience through research-validated learning pathways while overcoming barriers to accessing advanced laboratory spaces and instrumentation.
- 11/2025– **Postdoctoral Research Fellow**, *University of Pisa*, Pisa, Italy
 present Recipient of a 12-month research fellowship entitled "*Techniques and Tools for the Distributed Execution of Quantum Programs*".
- 05/2024– **Visiting Scholar**, *Simula Research Laboratory*, Oslo, Norway
 06/2024 Visiting researcher at the *Department of Engineering Complex Software Systems* of *Simula Research Laboratory*, hosted by Prof. Shaukat Ali.
- 02/2024– **Scientific Committee Member & Local Organiser**, *Italian Quantum Weeks*, Pisa, Italy
 present Member of the Scientific Committee and local organiser in Pisa for the *Italian Quantum Weeks*. [Link].
- 03/2023– **Scientific Consultant**, *Irelia.ai*, Italy
 present Scientific consultant for the design and development of *Irelia.ai* since its early design stages, contributing to AI-based solutions for automated customer interaction, lead profiling and qualification, and appointment scheduling. [Link].
- 05/2023– **Visiting Scholar**, *Universidad de Extremadura & Fundación COMPUTAEX*, Cáceres, Spain
 06/2023 Visiting researcher with the *Quercus Software Engineering Group* of the *Departamento de Ingeniería de Sistemas Informáticos y Telemáticos de la Universidad de Extremadura*, hosted by Prof. Juan Manuel Murillo and Prof. Jose García-Alonso.
- 05/2023– **Technical & Scientific Committee Member**, *BeQuantum*, Italy
 11/2025 Member of the Technical-Scientific Committee of *BeQuantum*, the first Italian community dedicated to quantum science and technologies. He also served on the association's editorial team, contributing to science communication [Link].
- 11/2022– **PhD Scholarship Recipient**, *University of Pisa*, Pisa, Italy
 11/2025 Scholarship supporting the PhD programme in Computer Science at the Department of Computer Science of the University of Pisa [Link].
- 03/2022– **Research Fellow**, *Consortium GARR*, Rome, Italy
 10/2022 Awarded a one-year extension of the "Orio Carlini" research fellowship funded by Consortium GARR. Some results obtained during the project, entitled "*Continuous, Autonomic and QoS-compliant Management of Applications on the GARR Network*", are reported in [C7] [Link].

- 03/2021– **Research Fellow**, *Consortium GARR*, Rome, Italy
- 03/2022 Selected, from more than 40 applicants, as one of 10 recipients of the “Orio Carlini” research fellowships funded by Consortium GARR for research on technologies enabling innovative digital infrastructures and services in multidisciplinary settings. Some results obtained during the project, entitled “*Continuous Reasoning for the QoS-compliant Management of Services on Cloud-IoT Infrastructures*”, are reported in [J1] [Link].

1.3 Other Experience and Volunteering

- 04/2026– **Education Specialist**, *MakerDojo*, Italy
 present He delivers digital-education activities for MakerDojo, designing and running *summer camps*, workshops, and STEAM learning programmes for students from primary through secondary school, aimed at developing digital skills, creativity, hands-on learning, and problem-solving abilities. He is also responsible for organising and delivering the free weekly meetings of the MakerDojo Club in Pisa.
- 09/2025– **Qiskit Advocate**, *IBM Quantum*
 present A Qiskit Advocate is an individual selected by IBM Quantum who has in-depth knowledge of the Quantum Computing and Quantum Software landscape and has contributed to the growth of the Qiskit Global Community. Qiskit, developed by IBM and released as open-source software, is one of the most widely used frameworks for programming, simulating, and executing quantum algorithms.
- 12/2024– **STEM Enrichment Programme Specialist**, *I.C.S. “L. Fibonacci”*, Pisa, Italy
 04/2025 Instructor for curricular courses in “*Coding*” and “*Educational Robotics*” for primary-school students within the PNRR project *LI-STEM (to the world)*.
- 05/2024– **External Instructor**, *Fondazione ISI*, Pisa, Italy
 present External instructor responsible for designing and delivering activities to strengthen soft and technical skills for secondary-school students through team-based block or Python programming of five six-degree-of-freedom robotic arms.
- 01/2023– **Teaching Assistant**, *University of Pisa*, Pisa, Italy
 present Instructor for the laboratory classes of “*Cloud Computing*” in the Bachelor’s Degree programme in Computer Science.
- 12/2022– **External Instructor**, *I.C.S. “L. Fibonacci”*, Pisa, Italy
 present Instructor for afternoon workshops in “*Computational Thinking*”, “*Coding*”, and “*Robotics*” for primary- and secondary-school students.
- 01/2024– **Activities & Logistics Coordinator**, *Pisa CoderDojo*, Pisa, Italy
 04/2026 He served as a mentor at Pisa CoderDojo from 2018 to April 2026 and, from 2024 to April 2026, coordinated and supervised its activities, logistics, and public relations.
- 09/2018– **Mentor**, *Pisa CoderDojo*, Pisa, Italy
 04/2026 He served as a mentor at Pisa CoderDojo, which organises monthly meetings within the international CoderDojo movement: approximately 1,500 clubs in 60 countries where young people aged 7 to 17 can learn computer programming free of charge. Pisa CoderDojo organised more than 60 meetings and, during the first COVID-19 lockdown, produced a series of *video tutorials* recognised as part of the Italian Ministry for Technological Innovation and Digitalisation’s *Digital Solidarity* initiative (<https://pisa.coderdojo.it/iorestoacasa>). The initiative was supported by the Museum of Computing Instruments, the University Museum System of the University of Pisa, and the Department of Computer Science of the University of Pisa
- 01/2023– **Communications Team Member**, *Department of Computer Science, University of Pisa*, Pisa, Italy
 11/2025 He served on the communications team of the Department of Computer Science of the University of Pisa, contributing to the management of a regular newsletter and to the organisation of departmental events.

- 12/10/2023– **Tutor & Speaker**, *Salone dello Studente*, Catania, Italy
 13/10/2023 He carried out university-orientation activities at the “Salone dello Studente” in Catania as a tutor and speaker within the University of Pisa’s “UNIPi Orienta” project [Link].
- 02/2022– **Mentor**, *5GBOT*, Pisa, Italy
 05/2022 He supervised and guided a group of secondary-school students in developing a prototype of a highly connected artificial-intelligence and robotics application for the 5GBOT competition, promoted by Fondazione Mondo Digitale in collaboration with the Lars Magnus Ericsson Foundation [Link].
- 09/2018– **Mentee**, *LeadTheFuture*, Italy
 08/2019 He was among the small number of Italian students selected to participate in the *LeadTheFuture* programme, a non-profit organisation providing mentoring to STEM students, with an acceptance rate below 20%.
- 09/2017– **Science Communicator, Editor & Developer**, *thedifferentgroup.com*, Italy
 02/2019 He authored several popular-science articles on technology and computer science for *thedifferentgroup.com*, a science-communication network. He subsequently joined both the editorial team and the development team [Link].
- 2018 **Jury Member**, *Premio Nazionale di Divulgazione Scientifica*, Italy
 As a jury member, he evaluated science-communication works including books, articles, and videos [Link].
- 09/2014– **Group & Team Leader**, *Gruppo di Robotica del Liceo Statale “E. Boggio Lera”*, Catania, Italy
 07/2017 He served as *Group Leader* of his high school’s robotics group, coordinating its teams, developing strategic plans, and contributing to decisions on projects and competitions. From 2012, he also led his own team and coordinated its members.
- 09/2015– **Journalism Intern**, *NewSicilia.it*, Catania, Italy
 06/2016 After winning the “*Diventa Giornalista*” competition organised by the online newspaper *NewSicilia.it*, he joined its editorial staff and authored numerous articles across different subject areas [Link].

1.4 Additional Training

- 01/11/2022– **PhD Programme in Computer Science**, *Pisa*, Italy
 31/10/2025 During his PhD, he attended and successfully passed the examinations for the following courses, each lasting at least 16 hours: *Principles of Abstract Interpretation* (Prof. Roberto Bruni, Prof. Roberta Gori, University of Pisa; Dr. Francesco Logozzo, Meta), *Computational Modeling for Systems Biology* (Prof. Paolo Milazzo, University of Pisa), *Pathways to Green ICT* (Prof. Antonio Brogi, Dr. Stefano Forti, University of Pisa), and *Programming Tools and Techniques in the Pervasive Parallelism Era* (Prof. Marco Danelutto, Prof. Patrizio Dazzi, University of Pisa).
- 01/11/2022– **PhD School in Information Technologies**, *Cáceres*, Spain
 31/10/2025 During his PhD, he attended the 8-hour seminar *Métodos de Investigación en Tecnologías Informáticas: Revisión Rigurosa y Sistemática de la Literatura. Herramientas de Gestión Bibliográfica*.
- 07/07/2025– **Qiskit Global Summer School 2025**, *Online*
 22/07/2025 The *Qiskit Global Summer School* is an intensive two-week summer programme designed to equip the next generation of quantum researchers and developers with the *know-how* needed to explore quantum computing. This sixth edition focused on the “*past, present, and future of quantum computing*”.
- 15/07/2024– **Qiskit Global Summer School 2024**, *Online*
 26/07/2024 The *Qiskit Global Summer School* is an intensive two-week summer programme designed to equip the next generation of quantum researchers and developers with the *know-how* needed to explore quantum computing. This fifth edition prepared participants for the emerging era of *quantum utility*.

- 02/02/2023– **English for Research Publication and Presentation Purposes**, *Pisa*, Italy
 06/04/2023 The programme comprised ten three-hour sessions (30 hours in total) and was designed to develop the language skills required to write and publish scientific papers in English and to participate interactively in international academic settings. The course also addressed *soft skills*. Upon completion, subject to attendance requirements and a final examination, a certificate was issued confirming a *C1* level of English.
- 13/03/2023– **28th Bertinoro International Spring School (BISS'23)**, *Bertinoro*, Italy
 17/03/2023 **PhD School**: The programme consisted of three 14-hour courses (42 hours in total) on *AI for Health* (Prof. Gianluigi Greco, Prof. Francesco Calimeri, Prof. Pierangela Bruno, University of Calabria, Italy), *Shape Your Own Programming Language* (Prof. Walter Cazzola, Prof. Luca Favalli, University of Milan, Italy), and *Hybrid Quantum Computing* (Prof. Juan Manuel Murillo, Prof. Jose García-Alonso, Universidad de Extremadura, Spain) [Link].
- 02/2023– **Mauriana Pesaresi Seminar Series**, *Pisa*, Italy
 05/2023 He organised, attended, and participated as a speaker in the annual “*Mauriana Pesaresi*” seminar series of the PhD Programme in Computer Science at the University of Pisa. The 14-session programme required a first-year PhD student to present an open research problem in their field at each meeting. Each presentation was followed by a round-table discussion moderated by him and a second co-organiser [Link].

1.5 Languages

Italian *Native speaker*
 English *C1* **Certificate:** *English for Research Publication and Presentation Purposes (2023)*
 Spanish *B1*

1.6 Certifications

- 2025 **Quantum Excellence**, Qiskit Global Summer School 2025 (IBM Quantum)
 2024 **Quantum Excellence**, Qiskit Global Summer School 2024 (IBM Quantum)
 2024 **Fundamentals of Quantum Computing (LFQ101)**, Linux Foundation
 2023 **English for Research Publication and Presentation Purposes**, *Grade: C1*, University Language Centre – University of Pisa

2 Scientific Research Activity

2.1 Brief Description of Research Activity

Giuseppe Bisicchia's research activity lies at the intersection of software engineering, distributed systems, cloud-edge computing, and quantum computing. The common thread throughout his scientific work is the design of methods, models, and software tools for the management, execution, and evaluation of complex computational systems, with particular attention to emerging scenarios in which the underlying infrastructure is heterogeneous, distributed, dynamic, and subject to quality, reliability, and scalability constraints.

In the first phase of his research activity, he studied declarative approaches for managing smart environments and Cloud-IoT infrastructures. In this context, he designed goal-oriented frameworks for the automation of intelligent environments, capable of mediating among potentially conflicting requirements, user preferences, actuator configurations, and sustainability criteria [C1, C2, J2, T1]. He subsequently extended these research lines to the continuous management of multi-service applications in the Cloud-Edge continuum, proposing declarative reasoning techniques to dynamically adapt applications to infrastructure changes and variations in Quality of Service requirements [J1, J3, T2].

He further developed this line of work through two research fellowships undertaken in collaboration with Consortium GARR, during which he led the design and implementation of tools for monitoring, benchmarking, and managing multi-cloud and multi-region infrastructures. In particular, this work led to the development of a modular, declarative, and customisable software system currently deployed in production on a nationwide federated cloud. The system supports operational monitoring and infrastructure performance evaluation, demonstrating the transferability of research results to a real-world, distributed, and highly complex setting [C5, C7].

During his PhD, his research focused on Quantum Software Engineering, with the goal of making the execution of quantum programs on NISQ devices accessed through cloud platforms more effective and practical. Currently available quantum computers are characterised by limitations in scalability, noise, and resource availability; consequently, executing quantum programs requires software techniques capable of accounting for device characteristics, distributing computational workloads, assessing result quality, and supporting decision-making in the selection of quantum resources.

Within this context, he has proposed methodologies for distributing quantum computations across multiple devices, techniques for partitioning and recomposing quantum circuits [C9, J6, J7], shot-wise approaches for distributing execution [C3, C4, C8, J4], benchmarking tools for quantum simulators and devices [C10, C11], and software packages accompanied by reproducible experimental datasets [A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11]. His research combines theoretical and methodological aspects, software design, empirical experimentation, and the development of open-source tools, contributing to the definition of practices, methodologies, and infrastructures for engineering quantum software [C6, T3].

The overall evolution of his scientific activity demonstrates thematic continuity across traditional distributed systems, cloud-edge infrastructures, and quantum computational systems. In all these areas, the central contribution concerns the construction of abstractions, tools, and methodologies for governing complex, heterogeneous, and distributed systems. His future research aims to contribute to the consolidation of Quantum Software Engineering as an area of applied and experimental computer science, integrating software engineering, benchmarking, testing, orchestration, and resource-management techniques to support the development of reliable, reproducible, and usable distributed and quantum applications in scientific and industrial settings [J5, J8].

From this perspective, he also participates in international initiatives aimed at defining the priorities and strategic outlook of *Quantum Software Engineering* and is among the authors of a contribution to the *Public Consultation on the Quantum Computing and Simulation Roadmap Update 2026* [P1].

Papers in International Journals

- J9. **G. Bisicchia**, A. Bocci, E. Pimentel, and A. Brogi. "How Many Shots Are Enough for a Quantum Circuit?" In: *ACM Transactions on Quantum Computing* (2026). DOI: 10.1145/3841468.
- J8. J. García-Alonso, E. Moguel, J. Alvarado-Valiente, J. Romero-Álvarez, A. Aparicio-Morales, J. Murillo, F. Cavero, A. Romero-Flores, A. Márquez-Chamorro, J. Parejo, A. Ruiz-Cortés, **G. Bisicchia**, A. Bocci, and A. Brogi. "Rethinking Services in the Quantum Age: The SOQ Paradigm". In: *ACM Transactions on Software Engineering and Methodology* (2026). DOI: 10.1145/3805807.
- J7. **G. Bisicchia**, J. Alvarado-Valiente, J. Romero-Álvarez, J. García-Alonso, J. Murillo, and A. Brogi. "Maximizing quantum hardware utilization via multiprogramming circuits and shot-wise distribution". In: *Information and Software Technology* 191 (2026), p. 108005. DOI: 10.1016/j.infsof.2025.108005.
- J6. **G. Bisicchia**, A. Bocci, J. García-Alonso, J. Murillo, and A. Brogi. "Cut&shoot: Distributed Execution of Quantum Circuit Fragments". In: *IEEE Transactions on Quantum Engineering* 7 (2026), pp. 1–14. DOI: 10.1109/TQE.2026.3675340.
- J5. **G. Bisicchia**, J. García-Alonso, J. Murillo, and A. Brogi. "Quantum Software Engineering: Past, Present & Future". In: *Amplify* 38.5 (2025), pp. 8–15. URL: <https://www.cutter.com/article/quantum-software-engineering-past-present-future>.
- J4. **G. Bisicchia**, G. Clemente, J. García-Alonso, J. Murillo, M. D'Elia, and A. Brogi. "Distributing Quantum Computations, Shot-Wise". In: *Future Internet* 17.11 (2025), p. 507. DOI: 10.3390/fi17110507.
- J3. **G. Bisicchia**, S. Forti, E. Pimentel, and A. Brogi. "Continuous QoS-compliant orchestration in the Cloud-Edge continuum". In: *Software: Practice and Experience* 54.11 (2024), pp. 2191–2213. DOI: 10.1002/spe.3334.
- J2. **G. Bisicchia**, S. Forti, and A. Brogi. "Sustainable goal-oriented smart environments: a declarative programming approach". In: *Journal of Logic and Computation* 33.4 (2023), pp. 864–899. DOI: 10.1093/logcom/exad015.
- J1. S. Forti, **G. Bisicchia**, and A. Brogi. "Declarative continuous reasoning in the cloud-IoT continuum". In: *Journal of Logic and Computation* 32.2 (2022), pp. 206–232. DOI: 10.1093/logcom/exab083.

Papers in International and National Conference Proceedings

- C13. **G. Bisicchia**, A. Bocci, E. Pimentel, and A. Brogi. "StableShots: Adaptive Shot Control for Quantum Circuits". In: *IEEE International Conference on Quantum Computing and Engineering (QCE 2026)*. In Press. 2026.
- C12. J. Massa, **G. Bisicchia**, P. Dazzi, and A. Brogi. "A Neurosymbolic Prolog Skill for LLM-Driven Service Placement". In: *IEEE International Conference on Cloud Computing (CLOUD 2026)*. 2026, pp. 29–31. DOI: 10.1109/CLOUD72782.2026.00014.
- C11. A. Bocci, **G. Bisicchia**, J. García-Alonso, and A. Brogi. "A Circuit Mirroring Approach to Selecting the Best Quantum Computer". In: *International Conference on Service-Oriented Computing (ICSOC 2025)*. In Press. 2025.
- C10. **G. Bisicchia**, A. Bocci, J. García-Alonso, J. Murillo, and A. Brogi. "QSimBench: An Execution-Level Benchmark Suite for Quantum Software Engineering". In: *IEEE International Conference on Quantum Computing and Engineering (QCE 2025)*. 2025, pp. 175–180. DOI: 10.1109/QCE65121.2025.10315.

- C9. **G. Bisicchia**, A. Bocci, J. García-Alonso, J. Murillo, and A. Brogi. “Cut&Shoot: Cutting & Distributing Quantum Circuits Across Multiple NISQ Computers”. In: *IEEE International Conference on Quantum Computing and Engineering (QCE 2024)*. 2024, pp. 187–192. DOI: 10.1109/QCE60285.2024.10276.
- C8. **G. Bisicchia**, G. Clemente, J. García-Alonso, J. Murillo, M. D’Elia, and A. Brogi. “Distributing Quantum Computation Across Multiple NISQ Computers”. In: *IEEE International Conference on Quantum Computing and Engineering (QCE 2024)*. 2024, pp. 442–443. DOI: 10.1109/QCE60285.2024.10346.
- C7. **G. Bisicchia**, S. Forti, A. Colla, C. Pisa, A. Barchiesi, and A. Brogi. “A Distributed Tool for Monitoring and Benchmarking a National Federated Cloud”. In: *International Conference on Cloud Computing and Services Science (CLOSER 2023)*. 2024, pp. 92–112. DOI: 10.1007/978-3-031-68165-3_5.
- C6. **G. Bisicchia**, J. García-Alonso, J. Murillo, and A. Brogi. “From Quantum Software Handcrafting to Quantum Software Engineering”. In: *IEEE International Conference on Software Analysis, Evolution and Reengineering Companion (SANER Companion 2024)*. 2024, pp. 149–150. DOI: 10.1109/SANER-C62648.2024.00026.
- C5. **G. Bisicchia**, S. Forti, A. Colla, and A. Brogi. “Customisable Fault and Performance Monitoring Across Multiple Clouds”. In: *International Conference on Cloud Computing and Services Science (CLOSER 2023)*. 2023, pp. 212–219. DOI: 10.5220/0011849500003488.
- C4. **G. Bisicchia**, J. García-Alonso, J. Murillo, and A. Brogi. “Distributing Quantum Computations, by Shots”. In: *International Conference on Service-Oriented Computing (ICSOC 2023)*. 2023, pp. 363–377. DOI: 10.1007/978-3-031-48421-6_25.
- C3. **G. Bisicchia**, J. García-Alonso, J. Murillo, and A. Brogi. “Dispatching Shots Among Multiple Quantum Computers: An Architectural Proposal”. In: *IEEE International Conference on Quantum Computing and Engineering (QCE 2023)*. 2023, pp. 195–198. DOI: 10.1109/QCE57702.2023.10210.
- C2. **G. Bisicchia**, S. Forti, and A. Brogi. “A Declarative Goal-oriented Framework for Smart Environments with LPaaS”. In: *Italian Conference on Computational Logic (CILC 2021)*. 2021, pp. 143–157.
- C1. **G. Bisicchia**, S. Forti, and A. Brogi. “Declarative Goal Mediation in Smart Environments”. In: *IEEE International Conference on Smart Computing (SMARTCOMP 2021)*. 2021, pp. 389–391. DOI: 10.1109/SMARTCOMP52413.2021.00079.

PhD, Master’s and Bachelor’s Theses

- T3. **G. Bisicchia**. “Distributed Execution of Quantum Programs”. PhD thesis. University of Pisa, Department of Computer Science, 2026. URL: <https://hdl.handle.net/20.500.14242/358105>.
- T2. **G. Bisicchia**. “Continuous Reasoning for Application Management over the Cloud-IoT Continuum”. Master’s thesis. University of Pisa, Department of Computer Science, 2022. URL: <https://etd.adm.unipi.it/t/etd-06292022-170952>.
- T1. **G. Bisicchia**. “Goal-driven Management of IoT Indoor Environments”. Bachelor’s thesis. University of Pisa, Department of Computer Science, 2020.

Open Data & Software

- A11. **G. Bisicchia**. *GBisi/quantum-executor*. Software. 2026. DOI: 10.5281/zenodo.20343470.
- A10. **G. Bisicchia**. *Cut&Shoot Software Package*. Software. 2026. DOI: 10.5281/zenodo.18139912.

- A9. **G. Bisicchia**. *GBisi/quantum-incremental-execution*. Software. 2026. DOI: 10.5281/zenodo.18139874.
- A8. **G. Bisicchia**. *QCRAFT Software Package*. Software. 2026. DOI: 10.5281/zenodo.18139861.
- A7. **G. Bisicchia**. *Quantum Broker Software Package*. Software. 2026. DOI: 10.5281/zenodo.18139801.
- A6. **G. Bisicchia**. *GBisi/shot-wise*. Software. 2026. DOI: 10.5281/zenodo.18139742.
- A5. **G. Bisicchia**, J. Alvarado-Valiente, J. Romero-Álvarez, J. García-Alonso, J. Murillo, and A. Brogi. *QCRAFT Scheduler-Shotwise - Laboratory Package*. Software. 2026. DOI: 10.5281/zenodo.18326385.
- A4. **G. Bisicchia** and A. Bocci. *GBisi/Experiments-cut-and-shoot*. Software. 2026. DOI: 10.5281/zenodo.18142557.
- A3. P. Bernardi, A. Brogi, G. Ferrari, and **G. Bisicchia**. *Evaluating Security Properties in the Execution of Quantum Circuits: Experimental Tools and Data*. Dataset. 2025. DOI: 10.5281/zenodo.17977895.
- A2. **G. Bisicchia**. *Quantum Incremental Execution Dataset*. Dataset. 2025. DOI: 10.5281/zenodo.15586358.
- A1. **G. Bisicchia**, G. Clemente, J. García-Alonso, J. Murillo, M. D'Elia, and A. Brogi. *Distributing Quantum Computations, Shot-wise - Dataset*. Dataset. 2024. DOI: 10.5281/zenodo.14181181.

Contributions to Policy Documents and Scientific Consultations

- P1. R. Abreu, S. Ali, P. Arcaini, J. Barzen, M. Beisel, **G. Bisicchia**, A. Brogi, M. Buchberger, L. Burgholzer, J. Campos, C. F. Chiasserini, S. Dustdar, S. Feld, A. Fernandez, D. R. Ferreira, J. García-Alonso, P. García-Bringas, T. Grab, M. Haghparast, R. Heikkinen, C. Heunen, N. Hosters, F. Ishikawa, O. Kinanen, S. Klovits, H. Kondylakis, I. Kumara, F. Leymann, K. Magoutis, W. Maurer, N. Meyer, T. Mikkonen, A. Miranskyy, A. Mjeda, E. Moguel, M. Möller, M. R. Mousavi, H. Müller, J. M. Murillo, Y. Naveh, A. Paller, J. A. Parejo Maestre, R. Pérez-Castillo, M. Piattini, E. Pimentel, A. Ruiz-Cortes, S. Scherzinger, U. Stege, V. Stirbu, D. Taibi, V. Uotila, S. Vialle, B. Weder, M. Wimmer, and J. Zhao. *Contribution to the Public Consultation on the Quantum Computing and Simulation Roadmap Update 2026*. Consultation Contribution. 2026. DOI: 10.5281/zenodo.22100459.

2.3 Bibliometric Statistics

(Updated on 04/09/2026)

- **Google Scholar**. Citations: 161; h-index: 7; i10-index: 7; 18 indexed articles. [Link]
- **Elsevier Scopus**. Citations: 77; h-index: 5; i10-index: 2; 16 indexed articles. [Link]

2.4 Editorial Roles for International Scientific Journals

He served as **guest editor** for the following *Special Issues* in international scientific journals:

- **Quantum-Centric Supercomputing and Networking**. Special Issue of the *International Journal of Networked and Distributed Computing* [Link].
- **Quantum-Centric Supercomputing**. Special Issue of the *International Journal of Networked and Distributed Computing* [Link].

2.5 Awards and Honours

2025 **Quantum Excellence** awarded by IBM Quantum during the *Qiskit Global Summer School 2025*.

- 2024 **Quantum Excellence** awarded by IBM Quantum during the *Qiskit Global Summer School 2024*.
- 2023 **Distinguished Paper Award** at the *International Conference on Service-Oriented Computing* (ICSOC'23) for the paper "*Distributing Quantum Computations, by Shots*" [C4].
- 2023 **Premio Extraordinario "José María Troya"**, awarded annually by the Council of the *Escuela Técnica Superior de Ingeniería Informática* of the *Universidad de Málaga* to the student in each Bachelor's or Master's programme who completed the degree with the highest grade average.
- 2022 **Extension of the GARR "Orio Carlini" Research Fellowship**, awarded by *Consortium GARR* to existing GARR fellows for an additional year, on the basis of a project extending the research conducted in the previous year [Link].
- 2021 **GARR "Orio Carlini" Research Fellowship**, awarded annually by *Consortium GARR* to 10 applicants (from more than 40 in 2021) to carry out a research project on technologies for developing innovative digital infrastructures and services in multidisciplinary settings [Link].
- 2015 **"Diventa Giornalista" Award**, for winning the competition of the same name in both categories (*Jury Prize* and *Audience Prize*), thereby receiving the opportunity to complete a one-year internship with the editorial staff of *NewSicilia.it*.

2.6 Event Organisation

He co-led the organisation of the following events:

- *Quantum Festival 2025*. He was *Lead Organiser* of the second edition of the *Quantum Festival*, a science-communication event in Pisa entirely dedicated to quantum computing. The programme included hands-on workshops for more than 150 secondary-school students, a *Research Track* involving more than 70 early-career researchers from across Italy, and a final conference attended by more than 220 participants, with invited guests from universities, research centres, start-ups, and companies. [Link].
- *Pisa Quantum Festival 2024*. He was *Lead Organiser* of the first science-communication event in Pisa entirely dedicated to quantum computing. The festival involved more than 120 participants, including researchers, entrepreneurs, university and secondary-school students, enthusiasts, and members of the public. Over two days, university professors and researchers from both academia and industry presented a range of perspectives on Quantum Computing. The programme also included introductory lectures and concluded with a hackathon with a total prize pool of EUR 450 [Link].
- *Shaped By Technology*. A science-communication event dedicated to artificial intelligence, explainability, network medicine, and robotics, featuring a seminar series that explored how these technologies may affect everyday life and the way people interact with the world [Link].
- *Robotic Challenge: Play & Learn with Robots*. A series of computer-science and robotics outreach activities designed for secondary-school students within the *Festival della Robotica 2024*, delivered through *Fondazione ISI* of the *Pisa Chamber of Commerce*. The activities involved block-based or Python programming of five six-degree-of-freedom robotic arms.
- *What a Wonderful Quantum World*. An educational and science-communication programme on Quantum Computing organised as part of the 2024 edition of the *Italian Quantum Weeks* [Link].
- *Qiskit Fall Fest 2023*. A three-day programme of lectures, workshops, technical hackathons, and talks held with the support of the University of Trieste and IBM Quantum, aimed at disseminating foundational knowledge of quantum computing [Link].

- 2023 edition of the “*Mauriana Pesaresi*” seminar series. An annual seminar series in which first-year PhD students in Computer Science at the University of Pisa presented an open research problem in their field, followed by a round-table discussion [Link].

2.7 Participation in Scientific Committees

Member of the **technical programme committees** of the following international scientific conferences:

- Sixth edition of the *International Workshop on Quantum Software Engineering and Technology* (Q-SET 2026), 13–18 September 2026, Toronto, Canada.
- Twenty-seventh edition of the *International Conference on Web Information Systems Engineering* (WISE 2026), 2–5 November 2026, Venice, Italy.
- Seventh edition of the *IEEE International Conference on Quantum Computing & Engineering (IEEE Quantum Week)* (QCE26 Poster Proposals), 13–18 September 2026, Toronto, Canada.
- Twenty-fifth edition of the *IFIP Conference e-Business, e-Services and e-Society* (I3E 2026), 15–17 September 2026, Tampere, Finland.
- Sixth edition of the *IEEE International Conference on Quantum Computing & Engineering (IEEE Quantum Week)* (QCE25 QSYS Technical Paper Track, QCE25 Poster Proposals), 31 August–5 September 2025, Albuquerque, New Mexico, USA.
- Twenty-fourth edition of the *IFIP Conference e-Business, e-Services and e-Society* (I3E 2025), 9–11 September 2025, Limassol, Cyprus.

2.8 Reviewing Activity

He served as a **reviewer of scientific submissions** for the following *international journals*:

Journal of Software: Practice and Experience, Distributed Ledger Technologies: Research and Practice, Heliyon, Journal of Logic and Computation, Computing, IEEE Systems Journal, Journal of Systems and Software, PLOS ONE, International Journal of Data Science and Analytics, Integration, SoftwareX, SN Computer Science, Machine Learning, Future Generation Computer Systems, Knowledge-Based Systems, Scientific Reports, Transactions on Services Computing, Transactions on Software Engineering and Methodology, Transactions on Quantum Engineering.

He served as a **reviewer of scientific submissions** for the following *international conferences*:

EAI MobiQuitous 2026, QCE26, QSW2026, HPDC2026, CILC2026, ENASE2026, CILC2025, QCE25 Poster Proposals, I3E 2025, QCE 2025, CCGRID 2024, SOSE 2023, CILC 2023, ICSOC 2021.

He has completed more than 100 peer reviews in total.

2.9 Conference Presentations

Presentations at **national and international scientific conferences**:

- *QSimBench: An Execution-Level Benchmark Suite for Quantum Software Engineering*, for the presentation of the paper of the same name at the second edition of the *Munich Quantum Software Forum*, 20 October 2025, Munich, Germany.
- *Cut&Shoot: Cutting & Distributing Quantum Circuits Across Multiple NISQ Computers*, for the presentation of the paper of the same name at the fourth *International Workshop on Quantum Software Engineering and Technology (Q-SET)*, held during the fifth *IEEE Quantum Week — the IEEE International Conference on Quantum Computing and Engineering (QCE)*, 18 September 2024, Montréal, Canada.
- *From Quantum Software Handcrafting to Quantum Software Engineering*, for the presentation of the paper of the same name at the third *International Workshop on Quantum Software Analysis, Evolution*

and Reengineering, held during the thirty-first *IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER)*, 12 March 2024, Rovaniemi, Finland.

- *Distributing Quantum Computations, by Shots*, for the presentation of the paper of the same name at the twenty-first *International Conference on Service-Oriented Computing (ICSOC)*, 1 December 2023, Rome, Italy.
- *Dispatching Shots Among Multiple Quantum Computers: an Architectural Proposal*, for the presentation of the paper of the same name at the third *International Workshop on Quantum Software Engineering and Technology (Q-SET)*, held during the fourth *IEEE Quantum Week — the IEEE International Conference on Quantum Computing and Engineering (QCE)*, 20 September 2023, Seattle (WA), USA.
- *Customisable Fault and Performance Monitoring Across Multiple Clouds*, for the presentation of the paper of the same name at the thirteenth *International Conference on Cloud Computing and Services Science (CLOSER)*, 26 April 2023, Prague, Czech Republic.
- *Continuous, Autonomic and QoS-compliant Management of Applications on the GARR Network*, for the presentation of the project of the same name at the fourteenth *GARR Scholars Day*, the annual meeting of recipients of the GARR “Orio Carlini” Fellowship, *online*, 23 February 2022, Rome, Italy [Link].
- *Declarative Goal Mediation in Smart Environment*, for the presentation of the paper of the same name at the seventh *IEEE International Conference on Smart Computing (SMARTCOMP)*, *online*, 24 August 2021, Irvine (CA), USA.
- *A Declarative Goal-oriented Framework for Smart Environments with LPaaS*, for the presentation of the paper of the same name at the thirty-sixth *Italian Conference on Computational Logic (CILC)*, *online*, 9 September 2021, Parma, Italy.
- *Continuous Reasoning for the QoS-compliant Management of Services on Cloud-IoT Infrastructures*, for the presentation of the project of the same name at the thirteenth *GARR Scholars Day*, the annual meeting of recipients of the GARR “Orio Carlini” Fellowship, *online*, 21 April 2021, Rome, Italy [Link].

2.10 Appointments and Collaborations at National Universities and Research Institutes

Current collaborations with researchers at national universities or institutes:

- **Massimo D’Elia** and **Giuseppe Clemente**, *Department of Physics, University of Pisa*, on the development of statistical-analysis techniques for distributing quantum computations across multiple NISQ quantum computers. Some results from this collaboration are described in [C8, J4].
- **Alberto Colla**, **Claudio Pisa**, and **Alessandro Barchiesi**, *Consortium GARR*, on the development of a highly customisable, declarative, and modular multi-region and multi-cloud monitoring and benchmarking system. The system is currently deployed in production on the GARR Cloud, integrated with GARR’s existing monitoring and accounting system, and is described in [C7, C5].

2.11 Appointments and Collaborations at International Universities and Research Institutes

Research stays as a **visiting researcher** at international universities and research institutes:

30/05/2024– **Simula Research Laboratory**, Oslo, Norway

26/06/2024 The visit, hosted by Prof. Shaukat Ali within the *Department of Engineering Complex Software Systems*, focused on studying and integrating the department’s *Quantum Software Testing* techniques with his research on *Quantum Software Engineering*.

22/05/2023– **Universidad de Extremadura & Fundación COMPUTAEX**, Cáceres, Spain
20/06/2023 The visit, hosted by Prof. Juan Manuel Murillo and Prof. Jose García-Alonso within the *Quercus Software Engineering Group* of the *Departamento de Ingeniería de Sistemas Informáticos y Telemáticos* at the *Universidad de Extremadura* and the *Fundación Computación y Tecnologías Avanzadas de Extremadura (COMPUTAEX)*, initiated his research line on applying Software Engineering methodologies to *Quantum Computing*.

Current collaborations with researchers at foreign universities or institutes:

- **Francisco Durán** and **Rafael García-Luque**, *Universidad de Málaga (Spain)*, on the study and development of methodologies for orchestrating quantum computations using *Machine Learning* techniques.
- **Juan Manuel Murillo** and **Jose García-Alonso**, *Universidad de Extremadura & Fundación COMPUTAEX (Spain)*, on the study and development of Software Engineering methodologies for *Quantum Computing* and the *Quantum-Cloud* ecosystem, with particular attention to hybrid classical-quantum services.
- **Shaukat Ali**, *Simula Research Laboratory*, on the study and development of Software Engineering methodologies for *Quantum Computing*, with particular attention to software-testing aspects.
- **Ernesto Pimentel**, *Universidad de Málaga (Spain)*, on the study and development of *continuous reasoning* methodologies for managing multi-service applications on Cloud-IoT infrastructures. Some results from this collaboration are described in his Master's thesis [T2] and in [J3].
- **International collaboration on Quantum Software Engineering**, with a network of more than 50 researchers from universities and research centres worldwide, within scientific and strategic initiatives related to quantum software engineering. He is among the authors of the international contribution to the *Public Consultation on the Quantum Computing and Simulation Roadmap Update 2026* [P1].

2.12 Research Projects

He participates or has participated in the following **research projects**:

- 11/2022– **OSMWARE: hOlistic Sustainable Management of distributed softWARE systems**
12/2024 (**PRA_2022_64**), *Department of Computer Science*, University of Pisa, Pisa, Italy
Role: *project member*.
The project, coordinated by Prof. Antonio Brogi, studies prototypes and technologies for enabling holistic and sustainable management of next-generation distributed software applications, also considering economic impact.
- 01/2020– **GIÒ: a Fog Computing Testbed for Research & Education**, *Department of Computer Science*, University of Pisa, Pisa, Italy
present
Role: *project member*.
The project, coordinated by Prof. Antonio Brogi, studies and experiments with innovative methodologies and techniques for implementing *ambient intelligence* capabilities on a departmental Fog network. It has produced prototypes for plant monitoring and irrigation, automatic regulation of natural lighting, a graphical-conversational interface with an interactive up-to-date map of the Department, and an automated smart-environment management system capable of resolving conflicts among users. Some results obtained during the project are reported in his Bachelor's thesis [T1].

2.13 Research Groups and Affiliations

Participation in the activities of the following **research groups**, characterised by national and international collaborations:

- 05/2024–present **Pisa Quantum Group**, *University of Pisa*, Pisa, Italy
Founder and member of the University of Pisa interdepartmental research group on quantum technologies [Link].
- 05/2024–present **Department of Engineering Complex Software Systems**, *Simula Research Laboratory*, Oslo, Norway
Department led by Prof. Shaukat Ali [Link].
- 05/2023–present **Quercus Software Engineering Group**, *Departamento de Ingeniería de Sistemas Informáticos y Telemáticos*, Universidad de Extremadura, Cáceres, Spain
Research group led by Prof. Juan Hernández [Link].
- 11/2022–12/2024 **OSMWARE**, *Department of Computer Science*, University of Pisa, Pisa, Italy
Research group led by Prof. Antonio Brogi and composed of researchers involved in the project of the same name.
- 01/2020–present **GIÒ: a Fog Computing Testbed for Research & Education**, *Department of Computer Science*, University of Pisa, Pisa, Italy
Research group led by Prof. Antonio Brogi and composed of researchers from the Department of Computer Science of the University of Pisa participating in the research project of the same name.
- 01/2020–present **Service-Oriented, Cloud and Fog Computing (SOCC) Research Group**, *Department of Computer Science*, University of Pisa, Pisa, Italy
Research group led by Prof. Antonio Brogi [Link].

Membership in the following national and international **organisations**:

- 2024–present **European Quantum Flagship Community**
- 2024 **IEEE Computer Society Quantum Technical Community**
- 2024 **IEEE Computer Society Technical Community on Cloud Computing**
- 2023–2024 **IEEE Computer Society**
- 2023–2024 **IEEE Young Professionals**
- 2023–2024 **IEEE**
- 2023–2025 **INSTICC**
- 2021 **Association for Logic Programming (ALP)**
- 2021 **Gruppo Ricercatori e Utenti Logic Programming (GULP)**
GULP is the Italian Association for Logic Programming, founded in Pisa on 18 June 1985. GULP organises the annual CILC conference and summer schools for students, PhD candidates, and researchers.

2.14 Publicly Available Software Systems

He coordinated or contributed to the design and development of the following publicly available software:

StableShots A prototype online stopping rule for *shots* in the execution of static quantum circuits. Rather than fixing a shot budget in advance, the system executes the same circuit in small batches and stops when the cumulative empirical output distribution becomes sufficiently stable. The method is *black-box*: it uses only batch-level measurement counts, without inspecting the circuit, backend calibration data, or a noise model. Stability is assessed by comparing cumulative empirical distributions using total variation

distance, with the goal of reducing unnecessary shots while preserving the empirical accuracy of the results. The prototype is described and used in [C13] [<https://github.com/GBisi/stableshts>].

QSOL A declarative language and compiler for modelling combinatorial-optimisation problems. QSOL allows a problem to be described in terms of sets, parameters, relations, unknowns, constraints, and objectives, delegating to the compiler the translation of the specification into a representation executable by classical and quantum solvers. The prototype aims to separate the declarative definition of the problem from the solver's operational configuration, avoiding manual management of binary variables, QUBOs, Hamiltonians, or other low-level mathematical intermediates [<https://github.com/GBisi/QSOL>].

Cut&StableShots He contributed to the development of an experimental environment for generating *cuttable* quantum circuits and evaluating execution strategies under noisy quantum simulation. The prototype includes automatic generation and validation of fragmentable circuits, benchmarking on noisy backends, and comparative analysis of results. The experiments compare standard execution of uncut circuits with different *circuit cutting* strategies, including fixed shot-allocation policies and incremental or *stable-shot* strategies designed to avoid consuming the full budget once the empirical distributions of the fragments become stable [https://github.com/alebocci/cut_and_stable_shots].

QCRAFT Scheduler-Shotwise He contributed to the development of a tool for optimising the scheduling of quantum tasks in shared quantum-computing environments by combining quantum circuits and managing execution *shot-wise*. The system receives user-specified quantum circuits, including circuits created through simulators such as Quirk or through Python/Qiskit code, and organises them into scheduling cycles according to qubit availability on the quantum backend. The prototype supports several configurable scheduling policies, aiming to improve QPU utilisation, reduce waiting times, and limit the overall cost of quantum-task execution. The prototype is described and used in [J7] [<https://github.com/Qcraft-UEx/QCRAFT-Scheduler-Shotwise>].

QSimBench An open-data quantum benchmark suite, accompanied by an open-source Python library, designed for systematic performance evaluation of quantum simulators. It provides more than 20 million precomputed shot-level execution traces. The system is designed to enable comparative analyses, variability studies, and reproducible evaluations of different execution configurations. The tool was presented in [C10] [<https://github.com/GBisi/qsimbenc>].

Quantum Executor A tool designed to provide a unified interface for executing quantum programs across heterogeneous platforms. The system enables transparent, parallel execution of quantum circuits on multiple backends (e.g., IBM, IonQ, Amazon Braket, Azure) without changes to the source code. It supports customisable policies for distributing executions and aggregating results, is compatible with multiple quantum programming frameworks and languages (Qiskit, Cirq, PennyLane, etc.), and enables asynchronous, progressive execution with real-time monitoring [<https://github.com/GBisi/quantum-executor>].

IncrementalExecution An adaptive framework for incremental execution of quantum circuits, designed to estimate in real time the optimal number of shots required to obtain a sufficiently accurate empirical distribution. The framework adopts an *information-convergence* approach: shot batches are executed only when they significantly improve the current estimate of the output distribution. It is structured as an adaptive loop governed by three modular and configurable policies that regulate behaviour according to the observed data. The prototype is described and used in [J9] [<https://github.com/GBisi/quantum-incremental-execution>].

Cut&Shoot A prototype tool for executing quantum circuits through *circuit cutting* and *shot-wise distribution*. The system fragments a quantum circuit into smaller subcircuits that can be executed separately on NISQ devices, dynamically distributing shots according to configurable policies. The prototype is described and used in [C9, J6] [<https://github.com/di-unipi-socc/Cut-and-Shoot>].

Quantum Broker A prototype tool for distributing quantum computations across multiple independent quantum computers through a *shot-by-shot* approach, allowing users to encode run-time requirements as workload-distribution policies through a *Domain-Specific Language*. The prototype is described and used in [C4, C3, J4] [<https://github.com/di-unipi-socc/QuantumBroker>].

cloudWatcher A multi-region and multi-cloud monitoring and benchmarking system (currently TRL 7), developed in collaboration with *Consortium GARR*, designed to monitor and evaluate custom metrics and scenarios in multi-cloud OpenStack systems, provide configurable alerts associated with those measurements, and support extension with additional metrics. It adopts a declarative and modular management approach. The system is currently deployed in production on the GARR Cloud and is described and used in [C5, C7] [<https://github.com/di-unipi-socc/cloudWatcher>].

FogArm A prototype next-generation orchestrator for continuous, Quality-of-Service-aware management of multi-service applications over geographically distributed Cloud-Edge networks, integrated with CI/CD pipelines and infrastructure-monitoring tools. The prototype is described and used in [J3] [<https://github.com/di-unipi-socc/FogArm>].

FogBrainX A Prolog prototype of a declarative continuous-reasoning engine capable of incrementally solving the placement problem for multi-service applications on Cloud-IoT infrastructures, focusing on the latest changes in both the infrastructure and the application's requirements and integrated with the CI/CD pipeline. The prototype is described and used in [J1, J3] [<https://github.com/di-unipi-socc/fbx>].

Solomon++ A Prolog prototype of a declarative framework for goal-oriented management of smart environments based on heterogeneous IoT systems. The prototype extends **Solomon** with capabilities for representing hierarchical smart environments, user-defined goals, and energy-aware, customisable mediation policies to reconcile conflicting user and/or global goals and corresponding actuator settings across multiple IoT systems, while also considering user roles and sustainability objectives. The prototype is described and used in [J2] [<https://github.com/di-unipi-socc/Solomon>].

Solomon A prototype framework for goal-oriented management of smart environments based on heterogeneous IoT systems. The prototype is described and used in [C1, C2] [<https://github.com/di-unipi-socc/Solomon>].

GiòEnv A prototype microservice-based architecture for monitoring the state of rooms in a smart environment and, when necessary, acting on their IoT actuators to achieve the desired state. The prototype implements IoT-sensor-based room monitoring and a goal-oriented system for determining the target room state, appropriately reconciling potentially conflicting goals set by different users regarding room temperature and lighting. The system is based on a preliminary version of **Solomon**. The prototype is described and used in [T1] [<https://github.com/GBisi/GioEnv>].

3 Teaching Activity

3.1 University Courses

Teaching support for the following **university courses**:

A.Y. **Cloud Computing, code 793AA (L-31)**, *Department of Computer Science, University of Pisa*, Pisa, Italy
2025/2026

Course coordinator: Prof. Antonio Brogi.

He designed and delivered the course's weekly laboratory classes, introducing a specific cloud service or tool in each session through targeted exercises and projects.

A.Y. **Cloud Computing, code 793AA (L-31)**, *Department of Computer Science, University of Pisa*, Pisa, Italy
2024/2025

Course coordinator: Prof. Antonio Brogi.

He designed and delivered the course's weekly laboratory classes, introducing a specific cloud service or tool in each session through targeted exercises and projects.

A.Y. **Cloud Computing, code 793AA (L-31)**, *Department of Computer Science, University of Pisa*, Pisa, Italy
2023/2024

Course coordinator: Prof. Antonio Brogi.

He designed and delivered the course's weekly laboratory classes, introducing a specific cloud service or tool in each session through targeted exercises and projects.

A.Y. **Cloud Computing, code 793AA (L-31)**, *Department of Computer Science, University of Pisa*, Pisa, Italy
2022/2023

Course coordinator: Prof. Antonio Brogi.

He designed and delivered the course's weekly laboratory classes, introducing a specific cloud service or tool in each session through targeted exercises and projects.

3.2 Other Teaching

Instructor for the following **courses and workshops**:

07/2026 **MakerDojo SummerCamp**, *Monastero di San Domenico*, 2 weeks, Montecreto, Italy
Two-week residential educational programme at the MakerDojo Summer Camp in Montecreto. During the first week, dedicated to the *Robot Universe* track (ages 11–14), he led hands-on workshops in educational robotics and programming using advanced robots and devices. During the second week, dedicated to the *Drone Challenge*, he guided participants aged 11–17 in learning drone piloting and programming through block-based environments and Python, promoting creativity, problem solving, and teamwork.

06/2026 **MakerDojo Summer Club**, *Laboratori Aperti del Piceno*, 20 hours, Ascoli Piceno, Italy
He designed and delivered a one-week free summer camp on robotics, coding, and Artificial Intelligence for 25 participants aged 8–14.

05/2026 **Python Game Design Workshop**, *I.I.S. "Galilei - Pacinotti"*, 8 hours, Pisa, Italy
Curricular workshop on designing and developing video games in Python, delivered in collaboration with MakerDojo. He designed and taught the workshop to a third-year secondary-school class.

05/2026–
06/2026 **Terna Academy**, *I.I.S. "Galilei - Pacinotti"*, 2 sessions of 4 hours, Pisa, Italy
Curricular workshop on Artificial Intelligence and LLMs, delivered in collaboration with MakerDojo and Terna. He designed and taught the workshop to two third-year secondary-school classes.

- 02/2026–
11/2026 **Developing Digital and Soft Skills through Robotics**, *Chamber of Commerce of North-West Tuscany*, 14 hours, Massa Carrara, Italy
Instructor for Module 2 (Basic Digital Skills and Robotics) and the “Robotics Workshop” within a training programme organised by the Chamber of Commerce of North-West Tuscany to improve basic digital skills, develop soft skills and digital soft skills, and promote digital citizenship and media literacy among young people and adults.
- 01/2026–
03/2026 **Robotics Workshop with Lego WeDo**, *I.C.S. “L. Fibonacci”*, 14 hours, Pisa, Italy
Afternoon robotics workshop using *Lego WeDo 2.0* for primary-school students. He co-designed and co-taught the course to 13 students.
- 01/2026–
03/2026 **Coding Workshop**, *I.C.S. “L. Fibonacci”*, 12 hours, Pisa, Italy
Afternoon computational-thinking workshop using *Scratch* for primary- and lower-secondary-school students. He designed and taught the course to 14 students.
- 11/2025–
01/2026 **Robotics Workshop**, *I.C.S. “L. Fibonacci”*, 12 hours, Pisa, Italy
Afternoon robotics workshop using *Lego Mindstorms EV3* for lower-secondary-school students. He designed and taught the course to 17 students.
- 11/2025–
01/2026 **Introduction to Computational Thinking**, *I.C.S. “L. Fibonacci”*, 14 hours, Pisa, Italy
Afternoon computational-thinking workshop for primary-school students. He designed and taught the course to 10 students.
- 01/2025–
04/2025 **Coding with Bee-Bot**, *I.C.S. “L. Fibonacci”: Primary Schools “D. Chiesa” & “N. Pisano”*, 3 courses of 13 hours (39 total), Pisa, Italy
He designed and taught the curricular programme “Coding with Bee-Bot” to three first-year primary-school classes within the PNRR. The programme included weekly sessions designed to foster computational thinking through gamification, experimentation with robots, and unplugged activities.
- 01/2025–
02/2025 **Educational Robotics with WeDo 2.0**, *I.C.S. “L. Fibonacci”: Primary School “N. Pisano”*, 7 hours, Pisa, Italy
He designed and taught the curricular programme “Educational Robotics with WeDo 2.0” to a third-year primary-school class within the PNRR. Weekly sessions fostered computational thinking and introduced programming through gamification and building and experimenting with small robots.
- 02/2025–
03/2025 **Robotics Workshop**, *I.C.S. “L. Fibonacci”*, 12 hours, Pisa, Italy
Afternoon robotics workshop using *Lego Mindstorms EV3* for lower-secondary-school students. He designed and taught the course to 13 students.
- 11/2024–
01/2025 **Coding Workshop**, *I.C.S. “L. Fibonacci”*, 12 hours, Pisa, Italy
Afternoon computational-thinking workshop using *Scratch* for lower-secondary-school students. He designed and taught the course to 15 students.
- 01/2024–
02/2024 **Robotics Workshop**, *I.C.S. “L. Fibonacci”*, 14 hours, Pisa, Italy
Afternoon robotics workshop using *Lego Mindstorms EV3* for lower-secondary-school students. He designed and taught the course to 15 students.
- 01/2024–
02/2024 **Coding Workshop**, *I.C.S. “L. Fibonacci”*, 12 hours, Pisa, Italy
Afternoon computational-thinking workshop using *Scratch* for lower-secondary-school students. He designed and taught the course to 17 students.
- 12/2022–
04/2023 **Coding Workshop**, *I.C.S. “L. Fibonacci”*, 2 courses of 12 hours (24 total), Pisa, Italy
Afternoon computational-thinking workshops using *Scratch* for lower-secondary-school students. He designed and taught both courses, each with 13 students.

3.3 Thesis Supervision

PhD in Computer Science

- Paolo Bernardi: *Design and Development of Hybrid Quantum-Classical Computations*, 2025–present (Co-supervisors: Prof. Antonio Brogi and Prof. Gian-Luigi Ferrari).

Master's Degree in Cybersecurity (LM-66)

- Paolo Bernardi: *Security Properties in the Execution of Quantum Circuits*, 2025 (Co-supervisors: Prof. Antonio Brogi and Prof. Gian-Luigi Ferrari).

Bachelor's Degree in Computer Science (L-31)

- Luca Marinaro: *Execution and Orchestration Techniques for Computations on Adiabatic Quantum Computers*, 2026 (Co-supervisors: Prof. Antonio Brogi and Dr. Alessandro Bocci).
- Elio Torraj: *LLM-Based Agents to Support Quantum Circuit Compilation*, 2026 (Co-supervisors: Prof. Antonio Brogi and Dr. Alessandro Bocci).
- Sergio De Crescenzo: *Deep Reinforcement Learning for Adaptive Shot Allocation in Quantum Circuit Execution*, 2025 (Co-supervisors: Prof. Antonio Brogi and Dr. Alessandro Bocci).
- Francesco Gianassi: *An Automatic Pipeline and Control Panel for QSimBench*, 2025 (Co-supervisors: Prof. Antonio Brogi and Dr. Alessandro Bocci).
- Giovanni Del Bianco: *Experimental Study of Combining Distributed and Incremental Execution Strategies for NISQ Quantum Systems*, 2025 (Co-supervisors: Prof. Antonio Brogi and Dr. Alessandro Bocci).
- Karim Mahmoud: *Optimising Quantum Circuit Cutting and Distribution in Multi-QPU Environments*, 2025 (Co-supervisors: Prof. Antonio Brogi and Dr. Alessandro Bocci).
- Gabriele Turchetti: *Definition and Experimental Evaluation of Policies for Quantum Broker*, 2024 (Co-supervisor: Prof. Antonio Brogi).

3.4 Invited Seminars and Lectures

- 20/05/2026 **Quantum Cloud: Orchestration and Security for Distributed Quantum Infrastructures**, 15 min, GARR Conference 2026, Pisa, Italy
He gave a talk on the orchestration of quantum and hybrid quantum applications, services, and infrastructures at the GARR Conference 2026.
- 15/05/2026 **Quantum Software Engineering**, 2 hours, University of Pisa, Pisa, Italy
He delivered an introductory lecture on Quantum Software Engineering within the “*Introduction to Quantum Computing*” course of the Master's Degree programme in Computer Science at the University of Pisa.
- 12/05/2026 **Quantum Games: QTRis**, 2 hours, 1st PhD School on Quantum Software Engineering, Jarandilla de la Vera, Spain
He delivered an interactive workshop using the innovative quantum-themed board game *QTris* at the first PhD School on *Quantum Software Engineering*.
- 28/03/2026 **The Physics of Quantum Information: Tools to Understand, Use, and Teach It**, 30 min, Rotary Club of Rome, Rome, Italy
He gave an invited talk on quantum-technology education at *Rotary Quantum Day RYLA 2026*, co-organised by the Rotary Club of Rome, the “Caio Duilio” Naval Officers' Club, and the Club Dirigenti Tecnologie dell'Informazione.
- 17/03/2026 **From Requirements to Runtime: QoS-Aware Orchestration in Quantum Software Engineering**, 1 hour, University of Pisa & IMT Lucca, Pisa, Italy
He gave an invited seminar on Quantum Software Engineering within the joint seminar series *Challenges and Perspectives of Formal Methods for Trustworthy Software* and *Research Topics in Software Quality*, co-organised by the University of Pisa and IMT Lucca.

- 16/12/2025 **Quantum Software Engineering: How Does Software Change When Information Becomes Quantum?**, 1 hour, University of Catania, Catania, Italy
He gave an invited seminar on Quantum Software Engineering at Qiskit Fall Fest 2025 in Catania, organised by the University of Catania.
- 04/12/2025 **Quantum Software Workshop**, 2 hours, University of Pisa, Pisa, Italy
He delivered a *hands-on* workshop on developing and executing quantum software within the “Advanced Software Engineering” course of the Master’s Degree programme in Computer Science at the University of Pisa.
- 02/12/2025 **Quantum Software Engineering 101**, 2 hours, University of Pisa, Pisa, Italy
He delivered a lecture on “Quantum Software Engineering” within the “Advanced Software Engineering” course of the Master’s Degree programme in Computer Science at the University of Pisa.
- 18/11/2025 **From Qubits to Systems: Engineering Hybrid Quantum Applications**, 1 hour, Universidad de Extremadura, Online
Invited talk within the “Tech4Efficiency International Days” seminar series organised by the Universidad de Extremadura.
- 13/11/2025 **Quantum & Furious: Test Laps on the Quantum Circuit**, 1 hour, Google Developer Group Pisa, Pisa, Italy
Invited science-communication talk for GDG Pisa on quantum computing.
- 21/03/2025 **The PhD in Computer Science**, 1 hour, University of Pisa, Pisa, Italy
Science-communication and career-orientation talk within the course “Career Guidance and Transferable Skills in ICT”, organised by the Department of Computer Science of the University of Pisa.
- 28/11/2024 **Quantum Software Engineering 101**, 1 hour, University of Pisa, Pisa, Italy
He delivered a lecture on “Quantum Software Engineering” within the “Advanced Software Engineering” course of the Master’s Degree programme in Computer Science at the University of Pisa.
- 21/11/2024 **Introduction to Quantum Programming**, 1 hour, Pisa Quantum Festival, Pisa, Italy
He delivered an introductory lecture on quantum programming at the *Pisa Quantum Festival*.
- 05/06/2024 **Distributing Quantum Computations, Shot-wise**, 1 hour, Simula Research Laboratory, Oslo, Norway
He delivered the seminar during his research stay at Simula Research Laboratory.
- 16/04/2024 **Computer Science after Graduation: Academia and Research**, 1 hour, University of Pisa, Pisa, Italy
Science-communication and orientation talk at the “IncontraInformatica 2024” outreach event organised by the Department of Computer Science of the University of Pisa.
- 16/02/2024 **Quantum Software Engineering?**, 1 hour, Seminar Series on Quantum Computing, National Centre for HPC, Big Data and Quantum Computing - SPOKE 10
He gave an **invited** talk on “Quantum Software Engineering” within the seminar series organised by SPOKE 10 of the National Centre for HPC, Big Data and Quantum Computing.
- 15/12/2023 **Quantum Software Engineering 101**, 1 hour, University of Pisa, Pisa, Italy
He delivered a lecture on “Quantum Software Engineering” within the “Advanced Software Engineering” course of the Master’s Degree programme in Computer Science at the University of Pisa.
- 16/11/2023 **Hands On: First Circuits with Qiskit and Python**, 2 hours, Qiskit Fall Fest 2023, University of Trieste, Trieste, Italy
He delivered a *hands-on* lecture at Qiskit Fall Fest 2023.

- 24/07/2023 **A Comprehensive Exploration of Languages for Parallel Computing**, *1 hour*, Department of Computer Science, University of Pisa, Pisa, Italy
He delivered the seminar within the PhD course “Programming Tools and Techniques in the Pervasive Parallelism Era”.
- 15/06/2023 **Dispatching Shots Among Multiple Quantum Computers: an Architectural Proposal**, *1 hour*, Departamento de Ingeniería de Sistemas Informáticos y Telemáticos, Universidad de Extremadura, Cáceres, Spain
He delivered the seminar during his research stay at the Universidad de Extremadura.
- 31/05/2023 **Quantum Computing and Sustainability**, *1 hour*, Department of Computer Science, University of Pisa, Pisa, Italy
He delivered the seminar within the PhD course “Pathways to Green ICT”.
- 19/05/2023 **Sound Symbolic Execution via Abstract Interpretation and its Application to Security**, *1 hour*, Department of Computer Science, University of Pisa, Pisa, Italy
He delivered the seminar within the PhD course “Principles of Abstract Interpretation”.
- 19/05/2023 **Who Killed Dr. Black? An Introduction to Prolog**, *2 hours*, Department of Computer Science, University of Pisa, Pisa, Italy
He provided teaching support during the afternoon workshop held as part of the “Incontra Informatica” orientation event of the Department of Computer Science at the University of Pisa.
- 30/03/2023 **Orchestrating Applications in the Cloud-Edge Continuum**, *1 hour*, Department of Computer Science, University of Pisa, Pisa, Italy
He delivered the seminar within the PhD course “English for Research Publication and Presentation Purposes”.
- 10/02/2023 **Orchestrating Applications in the Cloud-Edge Continuum**, *1 hour*, Department of Computer Science, University of Pisa, Pisa, Italy
He delivered the seminar within the 2022/2023 “Mauriana Pesaresi” seminar series.

4 Other Activities & Third Mission

4.1 Technology Transfer Activities

- 02/2026– **Scientific Director**, *ACSoftware*, Bologna, Italy
present Scientific and educational direction for *EMPIRIA HALL - Advanced Quantum Virtual Lab*, a platform that recreates advanced quantum laboratory environments, instruments and procedures with high realism and uses research-validated learning pathways to prepare learners for real laboratory experiences.
- 03/2023– **Scientific Consultant**, *Irelia.ai*, Italy
present Scientific consulting for the design and development of *Irelia.ai*, contributing since its early design stages to AI-based solutions for automated customer interaction, lead profiling and qualification, and appointment scheduling.

4.2 Organisational and Governance Roles

- 04/2025– **Member of the Strategic Plan Monitoring Committee**, Department of Computer Science, University of Pisa, Pisa, Italy
present
- 11/2023– **PhD Students' Representative**, *Department Executive Committee and Council*, Department of Computer Science, University of Pisa, Pisa, Italy
10/2025 **Member of the Working Group** for the *Department Strategic Plan 2024/2026*.

4.3 Science Communication Activities

He designed, organised, and/or delivered the following science-communication activities:

- **2025** – *Quantum Leap*. Educational workshop for Internet Festival 2025 (2 sessions) [Link].
- **2025** – *The Invasion of the Little Monsters: Program a World that Evolves*. Educational workshop for Internet Festival 2025 (3 sessions) [Link].
- **2025** – *Interstellar Journey with Robotics*. Educational workshop for Internet Festival 2025 (10 sessions) [Link].
- **2025** – *All You Can Code* Programming outreach activity at *Bright Night 2025*.
- **2025** – *Qubits and Bloch Spheres: Discover Quantum Physics*. Science-communication activity on quantum phenomena and technologies at *Bright Night 2025*.
- **2025** – *Artificial Intelligence with MachineLearningForKids*. Four science-communication activities over two days at the *Festival della Robotica 2025*, designed for primary- and secondary-school students to explore artificial intelligence through gamification.
- **2025** – *Arduino and Robotics: Let's Build and Program Our Robot*. Two science-communication activities over two days at the *Festival della Robotica 2025*, designed for primary- and secondary-school students to understand how robots are built, how they work, and how they are programmed through gamification and interactive mini-challenges.
- **2025** – *Many Shots, Many QPUs: How to Distribute Quantum Computing?*. Science-communication activity within the *DayStributed* event.
- **2025** – *Quantum Software Engineering*. Science-communication activity within the *PhD Spotlight* event.
- **2024** – *Pisa Quantum Festival*. The first public-engagement event in Pisa entirely dedicated to quantum computing. The festival attracted more than 120 participants and featured professionals and researchers from both academia and industry.

- **2024** – *Shaped By Technology*. A seminar series dedicated to artificial intelligence, explainability, network medicine, and robotics.
- **2024** – *Sushi Programming with micro:bit*. Programming outreach activity at *Bright Night 2024*.
- **2024** – *InterAttivaMente: Game Workshops at the Cittadella Galileiana*. An “unplugged” summer workshop in which participants could “program” one another to draw constellations on a map using a small set of simple commands.
- **2024** – *Robotic Challenge: Play & Learn with Robots*. A series of computer-science and robotics outreach activities designed for secondary-school students within the *Festival della Robotica 2024*, delivered through *Fondazione ISI* of the *Pisa Chamber of Commerce*. The activities involved block-based or Python programming of five six-degree-of-freedom robotic arms.
- **2024** – *What a Wonderful Quantum World*. Educational and science-communication programme on Quantum Computing organised as part of the 2024 edition of the *Italian Quantum Weeks* [Link].
- **2023** – *Qiskit Fall Fest 2023*. A three-day programme of lectures, workshops, technical hackathons, and talks held with the support of the University of Trieste and IBM Quantum, aimed at disseminating foundational knowledge of quantum computing [Link].
- **2023** – *From Schrödinger’s Cat to Teleportation*. Educational programme for secondary schools at Internet Festival 2023 [Link].
- **2022** – *Bug Hunters*. Educational workshop for Internet Festival 2022 (2 sessions) [Link].
- **2021** – *Pedometer and Micro:bit*. Educational workshop for Internet Festival 2021 (2 sessions) [Link].
- **2020** – *#iorestoacasa e #programmo*. Programming video tutorials for young people aged 7–17, released online during the first COVID-19 lockdown and recognised as part of the *Digital Solidarity* initiative of the Italian Ministry for Technological Innovation and Digitalisation [Link].
- **2019** – *#MoonDojo*. Educational workshop for Luna50, the festival marking the 50th anniversary of the Moon landing [Link].
- **2019** – *The micro:coin: How Does a Blockchain Work?*. Educational workshop for Internet Festival 2019 (2 sessions) [Link].

He was an **exhibitor** at the following events:

- **2017** – *Water, Humanity’s Treasure*. Science-communication event within the *22nd Week of Scientific Culture*.
- **2016** – *Genesis Soccer*. The project, conceived and coordinated by him, was selected for exhibition at *Maker Faire Rome*; only 35 proposals worldwide were accepted [Link].

4.4 Internships and Extra-Academic Courses

He completed the following internships and study stays:

- **10 months** – *Journalism*. Internship from September 2015 to June 2016 with the editorial staff of NewSicilia.it.
- **1 week** – *Language study*. Study stay in Purley (UK) in March 2017.
- **2 weeks** – *Language study*. Study stay in Reading (UK) in July 2015.

He attended the following extra-academic courses:

- **2016–2017** – *Neuroscience*.

- **2016–2017** – *Cosmology*.
- **2012–2017** – *Robotics*.
- **2014–2016** – *Computer Science*.

4.5 Competitions

He **won** the following competitions:

- **2017** – *Robomensa – Teams*: **1st place**. Computer-science competition organised by the Italian Mensa association.
- **2017** – *Italian Neuroscience Olympiad – School Round*: **1st place**.
- **2016** – *Italian Informatics Olympiad Preparation Competition*: **1st place**.
- **2016** – *Italian Team Informatics Olympiad – Regional Round*: **1st place**.
- **2015** – *Diventa Giornalista*: **Winner of the Jury Prize** and the **Audience Prize**.

He achieved a **podium finish** in the following competitions:

- **2017** – *Robomensa – Individual*: **2nd place**. Computer-science competition organised by the Italian Mensa association.
- **2016** – *Italian Informatics Olympiad – Regional Round*: **2nd place**.
- **2016** – *Italian Informatics Olympiad – School Round*: **2nd place**.
- **2016** – *RoboCup Jr. – Regional Round*: **3rd place**.
- **2015** – *Italian Informatics Olympiad – School Round*: **2nd place**.

He **participated** in the following competitions:

- **2020** – *LP/CP Programming Contest*: **Participant**. A 24-hour competition held during ICLP 2020, the 36th *International Conference on Logic Programming*.
- **2017** – *Italian Neuroscience Olympiad – Regional Round*: **Participant**.
- **2017** – *RoboCup Jr. – National Round*: **22nd place**.
- **2017** – *RoboCup Jr. – Regional Round*: **10th place**.
- **2016** – *Italian Team Informatics Olympiad – National Round*: **26th place**.
- **2016** – *RoboCup Jr. – National Round*: **18th place**.
- **2016** – *Italian Statistics Olympiad – Finals*: **59th place (out of 511)**.
- **2016** – *Italian Statistics Olympiad – Qualifying Round*: **19th place (out of 707)**.
- **2015** – *Italian Informatics Olympiad – Regional Round*: **Participant**.
- **2015** – *Minirobot*: **Participant**.
- **2015** – *Italian Informatics Olympiad – School Round*: **Participant**.
- **2014** – *Minirobot*: **Participant**.
- **2013** – *Minirobot*: **Participant**.