Andrea Bombarda, Ph.D.

bomba-andrea@hotmail.com andrea.bombarda@unibg.it
@bombandrea94 andreabombarda Andrea Bombarda
https://cs.unibg.it/bombarda/ (+39) 3393307157
April 10th, 1994
Via per Curnasco, 51 - 24127, Bergamo (BG), Italy

Employment

2022 – Now
Postdoctoral Researcher in Software Engineering
Prof. Angelo Gargantini
Institution: University of Bergamo, Bergamo (Italy)

2019
Scientific Animator
Institution: University of Bergamo, Bergamo (Italy)

Research Fellow in Software Engineering
Prof. Angelo Gargantini
Institution: University of Bergamo, Bergamo (Italy)

2014 – 2019
Software Developer and Database Administrator
Institution: PLM Impianti Srl, Almè (Italy)

2013
Scientific Animator
Institution: ITIS P. Paleocapa - Bergamo Scienza, Bergamo (Italy)

2012
Internship - Software Developer
Institution: Nuovo Istituto Italiano d'Arti Grafiche, Bergamo (Italy)

Scientific Animator
Institution: ITIS P. Paleocapa - Bergamo Scienza, Bergamo (Italy)

2010 – 2011
Scientific Animator
Institution: ITIS P. Paleocapa - Bergamo Scienza, Bergamo (Italy)

Teaching Experience

2023
Professor
Mobile App Lab
Institution: University of Bergamo, Bergamo (Italy)

2022
Teaching Assistant (12 hours)
Informatics IIIB
Prof. Patrizia Scandurra
Institution: University of Bergamo, Bergamo (Italy)

Teaching Assistant (12 hours)
Artificial Intelligence
Prof. Mario Verdicchio
Institution: University of Bergamo, Bergamo (Italy)

Teaching Assistant (12 hours)
Informatics IIIA
Prof. Angelo Gargantini
Institution: University of Bergamo, Bergamo (Italy)

Teaching Assistant (18 hours)
Software Engineering
Prof. Angelo Gargantini
Institution: University of Bergamo, Bergamo (Italy)

Teaching Assistant (12 hours)
Software Testing and Verification
Prof. Angelo Gargantini
Institution: University of Bergamo, Bergamo (Italy)

Employment (continued)

Teaching Assistant (12 hours)
Informatics II - Object Oriented Programming
Prof. Patrizia Scandurra
Institution: University of Bergamo, Bergamo (Italy)

2021

Teaching Assistant (12 hours)
Informatics IIIB
Prof. Patrizia Scandurra
Institution: University of Bergamo, Bergamo (Italy)

Teaching Assistant (23 hours)
Informatics II - Object Oriented Programming
Prof. Angelo Gargantini
Institution: University of Bergamo, Bergamo (Italy)

High School Professor
Emerging Technologies
Institution: iSchool, Bergamo (Italy)

Teaching Assistant (24 hours)
Informatics II - Operating Systems
Prof. Patrizia Scandurra
Institution: University of Bergamo, Bergamo (Italy)

Teaching Assistant (12 hours)
Software Testing and Verification
Prof. Angelo Gargantini
Institution: University of Bergamo, Bergamo (Italy)

2020

Teaching Assistant (12 hours)
Data Science and Automation
Prof. Mirko Mazzoleni
Institution: University of Bergamo, Bergamo (Italy)

Teaching Assistant (12 hours)
Informatics IIIB
Prof. Patrizia Scandurra
Institution: University of Bergamo, Bergamo (Italy)

Teaching Assistant (23 hours)
Informatics II - Operating Systems
Prof. Patrizia Scandurra
Institution: University of Bergamo, Bergamo (Italy)

Teaching Assistant (9 hours)
Informatics II - Object Oriented Programming
Prof. Angelo Gargantini
Institution: University of Bergamo, Bergamo (Italy)

Teaching Assistant (6 hours)
Software Testing and Verification
Prof. Angelo Gargantini
Institution: University of Bergamo, Bergamo (Italy)

2019-2020

Professor
Internet of Things
Institution: Fondazione "Istituto Tecnico Superiore per le nuove tecnologie e per il made in Italy", San Paolo d'Argon (Italy)

Professor
Software Architecture
Institution: Fondazione "Istituto Tecnico Superiore per le nuove tecnologie e per il made in Italy", San Paolo d'Argon (Italy)

2019

Teaching Assistant (12 hours)
Informatics IIIB
Prof. Patrizia Scandurra
Institution: University of Bergamo, Bergamo (Italy)

Employment (continued)

Teaching Assistant (36 hours)
Informatics IIIA
Prof. Angelo Gargantini
Institution: University of Bergamo, Bergamo (Italy)

Professor
PLC Programming
Institution: Università degli Studi di Napoli Federico II, Napoli (Italy)

2018 **Teaching Assistant (12 hours)**
Industrial automation
Prof. Michele Ermidoro
Institution: University of Bergamo, Bergamo (Italy)

Education

2019 – 2022 **Ph.D. in Engineering and Applied Sciences**
Institution: University of Bergamo, Bergamo (Italy)
Thesis title: Software Quality Assurance for Medical Systems
Supervisor: Prof. Angelo Gargantini

2016 – 2018 **Master of Engineering in Computer Engineering (110/110 cum laude)**
Institution: University of Bergamo, Bergamo (Italy)
Thesis title: Design and implementation of the BGenome database for genomic data management.
Supervisor: Prof. Fabio Previdi

2013 – 2016 **Bachelor of Engineering in Computer Engineering (108/110)**
Institution: University of Bergamo, Bergamo (Italy)
Thesis title: Development of a system for the estimation of the trajectory of a Foucault Pendulum by means of inertial measurements.
Supervisor: Prof. Fabio Previdi

2008 – 2013 **High School Diploma: Information Systems Technician (100/100)**
Institution: ITIS P. Paleocapa, Bergamo (Italy)
Thesis title: Development of an Arduino-based embedded system for the tracking of GPS data, inertial data and temperature, to be used during the motorbike riding.

Summer School Attendance

2022 **TAROT Summer School**
Institution: Complutense University of Madrid, Madrid (Spain) - Held in Ávila (Spain)
July 05-08, 2022

2021 **International Summer School on Software Engineering 2021**
Institution: Free University of Bozen, Bolzano (Italy) - Virtual
September 28-29, 2021

2020 **International Summer School on Software Engineering 2020**
Institution: Free University of Bozen, Bolzano (Italy) - Virtual
July 01-03, 2020

Reasoning Web Summer School
Institution: University of Oslo, Olso (Norway) - Virtual
June 24-26, 2020

TAROT Summer School
Institution: University of Porto, Porto (Portugal) - Virtual
October 19-23, 2020

Visiting

2022 **Visiting Ph.D. Student**
Institution: University of Texas at Arlington, Arlington - TX (USA)
Prof. Yu Lei
August-September 2022

Visiting Ph.D. Student
Institution: University of Texas at Arlington, Arlington - TX (USA)
Prof. Yu Lei
January 2022

2020 **Visiting Ph.D. Student**
Institution: University of Texas at Arlington, Arlington - TX (USA)
Prof. Yu Lei
February 2020

2019 **Visiting Researcher**
Institution: University of Texas at Arlington, Arlington - TX (USA)
Prof. Yu Lei
August-September 2019

Invited Talks and Panel Discussions

2023 **Developing a prototype of a mechanical ventilator controller from requirements to code with ASMETA**
Dagstuhl Seminar - Integrated Rigorous Analysis in Cyber-Physical Systems Engineering
https://www.dagstuhl.de/23041
January 22-27, 2023

Research Publications

Journal Articles

1. A. Bombarda, S. Bonfanti, C. Galbiati, *et al.*, "Guidelines for the development of a critical software under emergency," *Information and Software Technology*, p. 107 061, Sep. 2022. DOI: 10.1016/j.infsof.2022.107061.
2. A. Bombarda, S. Bonfanti, A. Gargantini, Y. Lei, and F. Duan, "RATE: A model-based testing approach that combines model refinement and test execution," *Software Testing, Verification and Reliability*, Dec. 2022. DOI: 10.1002/stvr.1835.
3. A. Abba, C. Accorsi, P. Agnes, *et al.*, "The novel mechanical ventilator milano for the COVID-19 pandemic," *Physics of Fluids*, vol. 33, no. 3, p. 037 122, Mar. 2021. DOI: 10.1063/5.0044445.
4. A. Bombarda, S. Bonfanti, A. Gargantini, P. Pelliccione, and E. Riccobene, "Il successo di mvm, un progetto social e internazionale per realizzare un ventilatore polmonare," *Il giornale dell'ingegnere*, vol. 5, p. 13, Jun. 2021, ISSN: 1974-7144. DOI: http://hdl.handle.net/10446/202112.

Conference Proceedings

1. P. Arcaini, A. Bombarda, S. Bonfanti, A. Gargantini, D. Gamba, and R. Pedercini, "Robustness assessment and improvement of a neural network for blood oxygen pressure estimation," in *2022 IEEE Conference on Software Testing, Verification and Validation (ICST)*, IEEE, Apr. 2022. DOI: 10.1109/icst53961.2022.00040.
2. A. Bombarda, S. Bonfanti, and A. Gargantini, "Automatic test generation with ASMETA for the mechanical ventilator milano controller," in *Testing Software and Systems*, Springer International Publishing, 2022, pp. 65–72. DOI: 10.1007/978-3-031-04673-5_5.
3. A. Bombarda, S. Bonfanti, M. D. Sanctis, *et al.*, "Towards an evaluation framework for autonomous systems," in *2022 IEEE International Conference on Autonomic Computing and Self-Organizing Systems Companion (ACSOS-C)*, IEEE, Sep. 2022. DOI: 10.1109/acsosc56246.2022.00025.
4. A. Bombarda and A. Gargantini, "Parallel test generation for combinatorial models based on multivalued decision diagrams," in *2022 IEEE International Conference on Software Testing, Verification and Validation Workshops (ICSTW)*, IEEE, Apr. 2022. DOI: 10.1109/icstw55395.2022.00027.

5. P. Arcaini, A. Bombarda, S. Bonfanti, and A. Gargantini, "Efficient computation of robustness of convolutional neural networks," in *2021 IEEE International Conference on Artificial Intelligence Testing (AITest)*, IEEE, Aug. 2021. DOI: 10.1109/aitest52744.2021.00015.

6. P. Arcaini, A. Bombarda, S. Bonfanti, and A. Gargantini, "ROBY: A tool for robustness analysis of neural network classifiers," in *2021 14th IEEE Conference on Software Testing, Verification and Validation (ICST)*, IEEE, Apr. 2021. DOI: 10.1109/icst49551.2021.00057.

7. A. Bombarda, S. Bonfanti, C. Galbiati, *et al.*, "Lessons learned from the development of a mechanical ventilator for COVID-19," in *2021 IEEE 32nd International Symposium on Software Reliability Engineering (ISSRE)*, IEEE, Oct. 2021. DOI: 10.1109/issre52982.2021.00016.

8. A. Bombarda, S. Bonfanti, A. Gargantini, and E. Riccobene, "Developing a prototype of a mechanical ventilator controller from requirements to code with asmeta," Nov. 16, 2021. DOI: 10.4204/EPTCS.349.2. arXiv: http://arxiv.org/abs/2111.08204v1 [cs.FL].

9. A. Bombarda, S. Bonfanti, A. Gargantini, and E. Riccobene, "Extending ASMETA with time features," in *Rigorous State-Based Methods*, Springer International Publishing, 2021, pp. 105–111. DOI: 10.1007/978-3-030-77543-8_8.

10. A. Bombarda, E. Crippa, and A. Gargantini, "An environment for benchmarking combinatorial test suite generators," in *2021 IEEE International Conference on Software Testing, Verification and Validation Workshops (ICSTW)*, IEEE, Apr. 2021. DOI: 10.1109/icstw52544.2021.00021.

11. P. Arcaini, A. Bombarda, S. Bonfanti, and A. Gargantini, "Dealing with robustness of convolutional neural networks for image classification," in *2020 IEEE International Conference On Artificial Intelligence Testing (AITest)*, IEEE, Aug. 2020. DOI: 10.1109/aitest49225.2020.00009.

12. A. Bombarda and A. Gargantini, "An automata-based generation method for combinatorial sequence testing of finite state machines," in *2020 IEEE International Conference on Software Testing, Verification and Validation Workshops (ICSTW)*, IEEE, Oct. 2020. DOI: 10.1109/icstw50294.2020.00036.

13. A. Bombarda, S. Bonfanti, and A. Gargantini, "Developing medical devices from abstract state machines to embedded systems: A smart pill box case study," in *Software Technology: Methods and Tools*, Springer International Publishing, 2019, pp. 89–103. DOI: 10.1007/978-3-030-29852-4_7.

14. A. Bombarda, S. Bonfanti, A. Gargantini, M. Radavelli, F. Duan, and Y. Lei, "Combining model refinement and test generation for conformance testing of the IEEE PHD protocol using abstract state machines," in *Testing Software and Systems*, Springer International Publishing, 2019, pp. 67–85. DOI: 10.1007/978-3-030-31280-0_5.

Books and Chapters

1. P. Arcaini, A. Bombarda, S. Bonfanti, A. Gargantini, E. Riccobene, and P. Scandurra, "The ASMETA approach to safety assurance of software systems," in *Logic, Computation and Rigorous Methods*, Springer International Publishing, 2021, pp. 215–238. DOI: 10.1007/978-3-030-76020-5_13.

Reviewer Service

2023 — *International Workshop on Combinatorial Testing (IWCT)*

2022 — *International Workshop on Combinatorial Testing (IWCT)*

— *Springer Computing*

2021 — *Symposium On Applied Computing (SAC)*

— *International Workshop on Combinatorial Testing (IWCT)*

— *IEEE International Conference On Artificial Intelligence Testing (AiTest)*

— *International Workshop on Cyber-Security and Functional Safety in Cyber-Physical Systems (IWCF)*

2019 — *IFIP International Conference on Testing Software and Systems (ICTSS)*

PC Membership

2023 — **International Workshop on Combinatorial Testing**
Organizer of the CT-Competition, a competition among tools for generating combinatorial test suites

PC Membership (continued)

2022 **International Workshop on Combinatorial Testing**
Organizer of the CT-Competition, a competition among tools for generating combinatorial test suites

Skills

Languages

English
- Speaking: B2
- Listening: C1
- Reading: C1
- Writing: C1

French
- Speaking: A1
- Listening: A1
- Reading: A1
- Writing: A1

Italian - Native language

Coding — Java, Python, VBA, VB.NET, C++, IEC 61131 norm (Ladder, SFC, Structured Text), Android App Development, Arduino, SQL, XML, json, Scala, LaTeX, Keras.

Databases — MySQL, PostgreSQL, SQLite, Microsoft SQL Server.

OSs — Microsoft Windows, MacOS, iOS, Android, Linux (including shell bash programming).

Web Dev — HTML, CSS, JavaScript, Apache Web Server, Tomcat Web Server, Django, PHP, Ajax, SpringBoot, gRPC, REST.

General — Software versioning with GIT and SVN, Software Testing (jUnit, PyTest, Combinatorial Testing, Model-based Testing), Matlab, Software Architectural Patterns, UML, Formal Methods (Abstract State Machines, Theorem Provers, Model Checkers, LTL, CTL).

Miscellaneous Experience

Awards and Achievements

2020 **Best Paper on AI-Based Testing**, 2nd IEEE International Conference on Artificial Intelligence Testing (AiTest 2020), *Oxford University, UK*.

2019 **Best Student Paper Award**, TOOLS 50+1:Technology of Object-Oriented Languages and Systems (TOOLS 50+1), *Innopolis, Russia*, EUR 300.00.

Projects and Collaborations with Industrial and External Partners

2022 – 2023 **PAMON**
A parental monitoring mobile app, designed to consider youngs' needs and especially focused on preventing dangerous social challenges.
Institution: University of Bergamo, Bergamo (Italy)

2020 – 2021 **Mechanical Ventilator Milano**
Software tester and software certification supporter for the MVM (Mechanical Ventilator Milano) project, developed for use in the intensive care unit during the COVID-19 pandemic.
Institution: MVM Consortium

2019 – 2020 **Web-application for Construction sites management**
Web application commissioned by the "Carabinieri" Italian police force
Institution: Arma dei Carabinieri (Italy)

2019 **BGenome**
Development of BGenome, a web-app for managing genomical data of the local hospital's patients.
Institution: Ospedale Papa Giovanni XXIII, Bergamo (Italy)

Additional personal information

Driving licenses	A, B.
Organizational skills	Team-working, Ability to organize the work to get it done within assigned deadlines.
Interpersonal skills	I gained very good communication and interpersonal skills through my experience as a professor and teaching assistant at university, conferences, and other courses.