Angelo Gargantini

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Education

He attended Politecnico di Milano, Italy as a student in September 1988 and obtained his Laurea's (master) degree in October 1994 (Full Honor Degree) in electronic engineering. He attended the Ph.D. program at Politecnico di Milano in Computer Science Engineering. He completed his first Ph.D in January 2000. He attended the PhD course in Computer Science at the University of Catania. He completed his second PhD in March 2006.

Professional experiences

From November 1997 to December 1998, he worked as researcher at the Software Engineering Group, Naval Research Laboratory, Washington DC, USA. From July 2000 to December 2005, he has been employed at the University of Catania as software engineer and system administrator. Current position: from January 2005, he has been assistant professor, from 2015 he has been full time associate professor, and from February 2021 he is **full professor** at the University of Bergamo, Italy.

Research Interests

Keywords: Formal methods for Software Engineering, especially specification, design, validation, verification, and testing of medical systems. Model based testing, especially combinatorial interaction testing and logic testing.

Dr. Gargantini's major contributions are:

• The use of model checkers for test generation in a model-based testing approach. The paper with Connie Heitmeyer has more than 520 citations. It pioneered the use of verification techniques for test generation.

• In general, the use of verification techniques for test generation and validation. In particular, Dr. Gargantini has investigated the combinatorial interaction testing in the presence of constraints and the fault detection in Boolean expressions.

• Use of model driven engineering (MDE) applied to formal methods. Together with the team of the University of Milan, he has developed a tool set for the Abstract State Machines.

• Use of formal methods for the specification, verification, and validation of critical systems. In particular, he is one of the leaders of the ASMETA project (https://asmeta.github.io/)

• Automatic techniques for repairing models such as variability models, feature models, and regular expressions.

- Introduction of a precise definition for robustness testing of neural networks and its implementation in a library (Roby)

- Definition of testing methods that treat uncertainty as a first-class concern in order to quantify it and deliver increased confidence in the level of assurance of the final product. Introduction of model-based exploration strategies that generate test cases targeting uncertain components of the system under test.

Recently, he has done some work in the area of health informatics:

• Applying 3D technologies for the treatment of amblyopia in young children. This area of research has originated a project called 3d4amb (http://3d4amb.unibg.it/) which aims at developing applications for the early detection and treatment of amblyopic patients. The 3d4amb project has published 6 international papers and won several prizes and grants from local NGOs.

* Definition of a methodology that respects the standards and guidelines for the development of medical software and its application to different case studies.

* He joined the MVM project with the aim of developing and deploying a mechanical lung ventilator. He has contributed to the success in obtaining the safety certification of the MVM software.

He is in the **top 2% scientists** worldwide according to Scopus (every year from Sept 2022 to Spet 2025) https://www.doi.org/10.17632/btchxktzyw.5.

Services

He is in the editorial board of Springer Nature Computer Science. He has been Program Chair of Tests and Proofs (TAP) 2010 in Malaga. He has been guest editor for the Software Quality Journal (Springer) in 2010. He has been local arrangement chair of the 10th Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering and of the Symposium on Search-Based Software Engineering held in Bergamo in 2015. He has been program chair of the 4th and 5th International Workshop on Combinatorial Testing (IWCT) hosted by the IEEE International Conference on Software Testing, Verification and Validation (ICST). He has been program chair of the 15th and the 16th AMOST (Workshop on Advances in Model Based Testing). In 2020, he is guest editor of the Special Issue on (Artificial) Intelligent Autonomous Systems, IEEE Computer. He has organized the summer school TAROT 2024 (Summer School on Software Testing, Verification & Validation). He has been on the Program Committee of many international conferences and workshops.

He has been director of the degree program in Computer Science Engineering of the University of Bergamo starting from Nov 2019.

He has been a member of the national commission for the abilitation (ASN) from 2023.

Projects

He has participated and is participating to several national and international projects, many financed by the European Community including OPENDREAMS (Esprit project 2000), E-ARBITRATION-T (IST Framework V, 2002), BRICS (EU-FP7 large-scale integrating project 2009 -2013), and POSECCO (7th Framework Programme, 2009-2013). He has been responsible for several projects, including a Vigoni project for exchanges with the University of Saarland (Germany) and two technology transfer projects financed by the Regione Lombardia (AGILTEL and TESTEL). As a principal investigator, he has led two

national projects, one (FISR) on on “Milan Adaptive Mechanical Ventilator in the Presence of Uncertainty” and the other one (PRIN) on SAFEST: “Trust assurance of Digital Twins for medical cyber-physical systems”

Publications

Dr. Gargantini has published around 200 publications, including 40 journal articles.

According to **scholar**.google.com, his papers have 4,297 citations, he has h-index equal to 33.

According to **scopus**, his papers have 2,480 citations, he has h-index equal to 26.

According to **Web of Science**, his papers have 1,552 citations, he has h-index equal to 20.

The complete publication list can be found on his home page.

5 most representative publications are:

Gargantini, Angelo, and Heitmeyer, Constance
Using Model Checking to Generate Tests from Requirements Specifications
in Software Engineering - ESEC/FSE'99, 7th European Software Engineering Conference, Held Jointly with the 7th ACM SIGSOFT Symposium on the Foundations of Software Engineering, Toulouse, France, September 1999 (Eds. Nierstrasz, Oscar and Lemoine, Michel) , Springer Berlin Heidelberg, Lecture Notes in Computer Science, vol. 1687 (1999): 146-162 ISBN 978-3-540-66538-0

Silvia Bonfanti, Angelo Gargantini, and Atif Mashkoor
Design and validation of a C++ code generator from Abstract State Machines specifications
in Journal of Software: Evolution and Process, Wiley, vol. 32, n. 2 (2019)

Paolo Arcaini, Andrea Bombarda, Silvia Bonfanti, Angelo Gargantini, Elvinia Riccobene, and Patrizia Scandurra
The ASMETA Approach to Safety Assurance of Software Systems
in Logic, Computation and Rigorous Methods - Essays Dedicated to Egon Börger on the Occasion of His 75th Birthday, Springer, Lecture Notes in Computer Science, vol. 12750 (2021): 215—238

Andrea Bombarda, Silvia Bonfanti, Cristiano Galbiati, Angelo Gargantini, Patrizio Pelliccione, Elvinia Riccobene, and Masayuki Wada
Guidelines for the development of a critical software under emergency
in Information and Software Technology, Elsevier BV, vol. 152 (2022): 107061

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