

Alessio Gambi | Ph.D.

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Chair for Software Engineering II, University of Passau

Education

Doctorate **2013**
Faculty of Informatics, University of Lugano *Lugano, Switzerland*
title: *Kriging-based self-adaptive controllers for the cloud*
advisor: Prof. Mauro Pezzè

committee: Prof. Antonio Carzaniga, University of Lugano
Prof. Cesare Pautasso, University of Lugano
Prof. Nenad Medvidović, University of Southern California
Prof. Marin Litoiu, York University

Master of Computer Science **2007**
Department of Computer Science, University of Illinois at Chicago *Chicago, USA*
title: *Combining Customization Methodologies in Goal-Oriented Development Frameworks*
advisors: Prof. Carlo Ghezzi and Prof. Ugo Buy

Master of Computer Systems Engineering **2006**
Department of Elettronica ed Informazione, Politecnico di Milano, Magna cum Laude *Milan, Italy*
title: *Combining Customization Methodologies in Goal-Oriented Development Frameworks*
advisor: Prof. Carlo Ghezzi

Bachelor of Computer Systems Engineering **2004**
Department of Elettronica ed Informazione, Politecnico di Milano *Milan, Italy*
title: *Automatic Analysis and Generation of Web Services from HTML Forms*
advisor: Prof. Barbara Pernici

Languages

Italian: Mother-tongue

English: Excellent

German: Basic

B1

Research Experience

Postdoctoral Fellow **2017–now**
Chair for Software Engineering II - University of Passau *Passau, Germany*

topics: Testing Self-Driving Cars Software, Computer Science Education, Software Testing and Analysis

supervisor: Prof. Gordon Fraser

My research on test carving of Android apps won the Facebook Testing and Verification Award in 2019

My research on testing self-driving cars software is conducted in cooperation with BeamNG.GmbH

Postdoctoral Fellow **2015–2017**
Chair for Software Engineering - CISPA/Saarland University *Saarbrücken, Germany*

topics: Software Testing and Analysis, Optimizing Testing over Clouds

supervisor: Prof. Andreas Zeller

My research on transparently deployment of unit tests in the Cloud won an Microsoft Azure Research Award

Postdoctoral Fellow **2014–2015**
Distributed Systems Group - Vienna University of Technology *Vienna, Austria*

topic: Software Quality Assurance of Cloud-based Elastic Computing Systems

supervisor: Prof. Schahram Dustdar

My research on Kriging based cloud-controllers won an Amazon AWS Research Grant

Visiting Researcher **2012–2014**
Distributed Systems Group - Vienna University of Technology *Vienna, Austria*

topic: Testing of Cloud-based Elastic Computing Systems

host: Prof. Schahram Dustdar

This research visit was funded by the SNF Fellowship for Prospective Researchers that I won during my PhD

Visiting Researcher **2010**
IBM Haifa Research Lab *Haifa, Israel*

project: Improving quality of VM placement through early detection of performance isolation anomalies

supervisor: Dr. David Breitgand

Research Assistant **2007–2012**
Faculty of Informatics - University of Lugano *Lugano, Switzerland*

project: Kriging-based self-adaptive controllers for the cloud

supervisor: Prof. Mauro Pezzé

My research on automated testing of Cloud applications won the ATED - ICT Ticino (Industry) Award

Project Assistant **2007**
CEFRIEL – ICT Institute Politecnico di Milano *Milan, Italy*

project: Negotiation of Service Level Agreements

supervisor: Prof. Elisabetta Di Nitto

Teaching Activities

Lecturer <i>Schaffhausen Institute of Technology</i> Architectural Strategy, Master level	2021-now <i>Schaffhausen, Switzerland</i> 2021
Lecturer <i>University of Passau</i> Program Analysis, Master level Programming Styles, Master level Seminar on SBST for Autonomous Cars, Bachelor and Master level Software Testing, Bachelor and Master level (Co-Lecturer)	2017-now <i>Passau, Germany</i> 2021 2019, 2020, 2021 2018, 2019, 2020 2017
Co-Lecturer <i>Saarland University</i> Software Engineering, Bachelor and Master level Seminar on Input Inference, Bachelor and Master level Seminar on Testing AND the Cloud, Bachelor and Master level	2015-2017 <i>Saarbrücken, Germany</i> 2015, 2016, 2017 2017 2015, 2016
Co-Lecturer <i>Vienna University of Technology</i> Distributed Systems and Technologies, Master level Seminar on Distributed Systems, Master level	2014-2015 <i>Vienna, Austria</i> 2014, 2015 2015
Teaching Assistant <i>University of Lugano</i> Bachelor Project, Bachelor level Software Architecture and Design, Master level Software Development, Bachelor level Software Engineering, Master level	2007-2011 <i>Lugano, Switzerland</i> 2011 2009, 2010 2008 2007, 2008
Laboratory Assistant <i>Politecnico di Milano</i> Software Engineering, Master level Informatics 101, Bachelor level	2006 <i>Milan, Italy</i> 2006 2006

Mentoring Activities

University of Passau

- Stephen Banin Panyin, M.Sc., "Vision-Based Multi-Task Learning for Automated Vehicles" *Industrial thesis in collaboration with Edag GmbH* 2021
- Chaitanya Gogineni, M.Sc., "Hybrid Modeling and Prediction of Dynamic Systems: A case study on Permanent Magnet Synchronous Motor Rotor temperature" *Industrial thesis in collaboration with Bosch GmbH* 2021
- Tim Fraunholz, B. Sc., "An Empirical Investigation on Road Similarity and its Application to Testing Autonomous Cars." 2021
- Michael Heine, B.Sc., "Generating Urban-like Scenarios to Spot Fuel-Inefficient Behavior of Autonomous Cars." 2020
- Saikrishna Dhiddi, M.Sc., "An Empirical Investigation on the Application of Statistical Estimators in Mutation Testing." 2020
- Apsara Murali Shima, M.Sc., "Search-based Testing of Passenger Comfort in Self-driven' Car Software." 2020
- Tariq Sameed, M.Sc., "Automatic Driving Simulation Generation to Explore Parameters of Crash Scenarios in Self-Driving Cars." 2020
- Varun Gidwani, M.Sc., "CrashGen: Automatic Generation of Vehicle Crash Scenarios." 2020
- Wenzel Pleyer, M.Sc., "Automating co-simulation for testing Advanced Driver Assistance Systems." *Industrial thesis in collaboration with TraceTronic GmbH* 2020
- Johannes Müller, M.Sc., "Declarative Test Case Generation for Autonomous Cars." 2020
- Stefan Huber, M.Sc., "DriveBuild: Automation of Simulation-based Testing of Autonomous Vehicles." 2019
- Qazi Mujahid, M.Sc., "Automatically Generate Driving Simulations from Geo-Tagged Videos" 2019
- Joussef Yazzi, M.Sc., "Grid-based Object Tracking in Autonomous Driving." *Industrial thesis in collaboration with Zukunft Mobility GmbH* 2019
- Simon Fierbeck, B.Sc., "Comparing Novelty Search and Multi-Objective Search for Testing Self-Driving Car Software." 2019
- Markus Hierl, B.Sc., "Automatic Generation of Driving Simulations from Labeled Video Data" 2019

Saarland University

- Marc Müller, M.Sc., "Improving Self-Driving Car Testing Through Feedback-Driven Procedural Content Generation." *Accepted as demo paper at ICSE'19 and as full paper at ISSA'19* 2018
- Tri Huynh, M.Sc., "Automatic Driving Simulation from Vehicle Crash Reports." *Accepted as demo and poster paper at ICSE'19 and as full paper at ESEC/FSE'19* 2018
- Umidjon Urunov, M.Sc., "Fuzzing Web Apps via Mining JSON Schema and Data Flow." 2018
- Dominik Steiger, M.Sc., "Mining Test Data for Web Applications" 2017
- Pallavi Majumder, M.Sc., "Action Based Test Carving." *A research based on this work won the Facebook Testing and Verification Research Award* 2017
- Sebastian Kappler, M.Sc., "Finding and Breaking Test Dependencies to Speed Up Test Execution." *Finalist at ESEC/FSE'16 SRC and accepted as full paper at ICST'18* 2017

Vienna University of Technology

- Thomas Preißler, M.Sc., "Improving Elasticity Testing Using Container-based Virtualization" 2017
Filip Rydzi, B.Sc., "Model-Based Testing of Cloud-Based Social Network," *Accepted as full paper at SAC'17.* 2015
Christian Kastner, B.Sc., "Virtualization-assisted Diversified Portability Testing" 2015

Professional Activities

EU Research projects

RESERVOIR - Resources and Services Virtualization without Barriers. PI: Prof. Mauro Pezzé
SeCSE - Service Centric System Engineering. PI: Prof. Elisabetta Di Nitto

Program Chair

Tool competition of the International Workshop on Search-Based Software Testing (SBST), 2020, 2021, 2022
Summer School at the International Symposium on Software Testing and Analysis (ISSTA'16)

Program Committee Member

International Conference on Software Testing, Verification and Validation (ICST), Posters-track, 2022
Symposium on Search-Based Software Engineering (SBSE), 2021
International Conference on the Quality of Information and Communications Technology (QUATIC), 2021
Testing Tools Track, International Conference on Software Testing, Verification and Validation (ICST), 2020
International Workshop on Search-Based Software Testing (SBST), 2018
Tool Demo Session, ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE), 2016
Tool Demo Session, International Conference on Automated Software Engineering (ASE), 2015
Demo & Poster Session, International Conference on Web Engineering (ICWE), 2013
International Workshop on Using and Building Cloud Testbeds (UNICO), 2013

Journal Reviewer

ACM Transactions on Software Engineering and Methodology (TOSEM), ACM
IEEE Transactions on Software Engineering (TSE), IEEE
IEEE Transactions on Services Computing (TSC), IEEE
Computer, IEEE
ACM Transactions on Autonomous and Adaptive Systems (TAAS), ACM
Journal of Software Quality (JOSQ), Springer
Computing, Springer
Empirical Software Engineering, Springer
Journal of Systems and Software (JSS), Elsevier

Reviewer

International Conference on Service Oriented Computing (ICSOC), 2013
Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS), 2014, 2015

Honors, Awards, and Grants

Research Project <i>DFG, German Research Foundation</i> project: STUNT – Improving Software Testing Using NovelTy duration: 36 months amount: 250,000 EUR principal investigator: Prof. Gordon Fraser	2020
Testing and Verification Research Award <i>Facebook</i> project: Action Based Test Carving amount: 50,000 USD <i>This award was reported in "la Repubblica" one of the major Italian newspapers.</i>	2019
Microsoft Azure Research Award <i>Microsoft</i> project: CUTe: Cloud-based Unit Testing amount: 20,000 USD	2016
AWS Research Grant <i>Amazon</i> project: Self-adaptive Kriging-based cloud controller amount: 30,000 USD	2013
SNF Fellowship for Prospective Researchers <i>Swiss National Science Foundation</i> project: Runtime Adaptation for Elastic Requirements duration: 18 months amount: 64,000 CHF	2012
ATED - ICT Ticino First Prize <i>ATED - ICT Association</i> project: E-Con: Test Automation in the Cloud co-author: Mario Bisignani	2012
Best Paper Award <i>International Conference on Web Engineering (ICWE '10)</i> paper: Engineering autonomic controllers for virtualized Web applications	2010
Graduation with Honor <i>Politecnico of Milan</i> honor: Magna cum Laude	2006

Keynotes, Invited Talks, and Tutorials

Simulation-based Testing Using BeamNG.Tech Tutorial at the <i>International Workshop on Search-Based Software Testing</i> Co-located with the <i>International Conference on Software Engineering conference (ICSE'21)</i>	2021 <i>Virtual</i>
Generating effective test cases for self-driving car software using PCG Keynote at the <i>Automotive Software Engineering Workshop</i> Co-located with the <i>Software Engineering conference (SE'20)</i>	2020 <i>Innsbruck, AT</i>
Action Based Test Carving Talk at the <i>Facebook Testing and Verification Symposium</i>	2019 <i>London, UK</i>
Generating effective test cases for self-driving cars Talk at the <i>Centre for Research on Evolution Search and Testing Workshop (CREST) London, UK</i>	2019
Practical test dependency detection Talk at the <i>Swedish Association for Software Testing (SAST)</i>	2018 <i>Västerås, Sweden</i>
O!Snap: Cost-Efficient Testing in the Cloud Talk at the <i>IMDEA Software Institute</i>	2016 <i>Madrid, Spain</i>
Testing Elastic Cloud Applications Talk at the <i>LCCC focus group on cloud and control</i>	2014 <i>Lund, Sweden</i>
Kriging-based Self-adaptive Controllers for the Cloud Talk at <i>Vienna University of Technology</i>	2012 <i>Vienna, Austria</i>
Kriging-based Self-adaptive Controllers for the Cloud Talk at <i>Karlsruhe Institute of Technology</i>	2012 <i>Karlsruhe, Germany</i>

Selected Publications

According to Google Scholar, my publications have been cited 726 times (H-index=18, i10-index=24).¹

- [1] V. Nguyen, S. Huber, and **A. Gambi**, "SALVO: Automated Generation of Diversified Tests for Self-driving Cars from Existing Maps," to appear in *Proceedings of the International Conference On Artificial Intelligence Testing*, AITest'21, 2021.
- [2] T. Zohdinasab, V. Riccio, **A. Gambi**, and P. Tonella, "DeepHyperion: Exploring the Feature Space of Deep Learning-based Systems through Illumination Search," in *Proceedings of the International Symposium on Software Testing and Analysis*, ISSTA'21, 2021. DOI: <https://doi.org/10.1145/3460319.3464811>
- [3] **A. Gambi**, T. Huynh, and G. Fraser, "Generating Effective Test Cases for Self-Driving Cars from Police Reports," in *Proceedings of the Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, ESEC/FSE'19, 2019. DOI: <https://doi.org/10.1145/3338906.3338942>
- [4] **A. Gambi**, M. Mueller, and G. Fraser, "Automatically testing self-driving cars with search-based procedural content generation," in *Proceedings of the International Symposium on Software Testing and Analysis*, ISSTA'19, 2019. DOI: <https://doi.org/10.1145/3293882.3330566>
- [5] G. Fraser, **A. Gambi**, M. Kreis, and J.M. Rojas, "Gamifying a Software Testing Course with Code Defenders," in *Proceedings of the Technical Symposium on Computer Science Education*, SIGCSE'19, 2019. DOI: <https://doi.org/10.1145/3287324.3287471>
- [6] **A. Gambi**, J. Bell, A. Zeller, "Practical Test Dependency Detection," in *Proceedings of the International Conference on Software Testing, Verification and Validation*, ICST'18, 2018. DOI: <https://doi.org/10.1109/ICST.2018.00011>
- [7] **A. Gambi**, A. Gorla, A. Zeller, "O!Snap: Cost-Efficient Testing in the Cloud," in *Proceedings of the International Conference on Software Testing, Verification and Validation*, ICST'17, 2017. DOI: <https://doi.org/10.1109/ICST.2017.51>
- [8] **A. Gambi**, M. Pezzè, and G. Toffetti, "Kriging-Based Self-Adaptive Cloud Controllers," *IEEE Transactions on Services Computing*, vol. 9 no. 3, p. 368-381, 2016. DOI: <https://doi.org/10.1109/TSC.2015.2389236>
- [9] **A. Gambi**, W. Hummer, H. L. Truong, and S. Dustdar, "Testing Elastic Computing Systems," *IEEE Internet Computing*, vol. 17, pp. 76-82, Nov 2013. DOI: <https://doi.org/10.1109/MIC.2013.119>
- [10] P. Leitner, Z. Rostyslav, **A. Gambi**, and S. Dustdar, "A framework and middleware for application-level autonomic cloud bursting on top of infrastructure-as-a-service clouds," in *Proceedings of the International Conference on Utility and Cloud Computing*, UCC'13, 2013. DOI: <https://doi.org/10.1109/UCC.2013.39>
- [11] G. Toffetti, **A. Gambi**, M. Pezzè, and C. Pautasso, "Engineering autonomic controllers for virtualized Web applications," in *Proceedings of the International Conference on Web Engineering*, ICWE'10, pp. 66-80, 2010. **Best Paper Award**
DOI: https://doi.org/10.1007/978-3-642-13911-6_5

Additional publications are available on DBLP (<http://dblp.uni-trier.de/pers/hd/g/Gambi:Alessio>) and Google Scholar (<https://scholar.google.com/citations?user=jR-MTtgAAAAJ>)