

Martina De Sanctis

Gran Sasso Science Institute - GSSI

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Personal Information

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Research Topics

Service-Oriented Architecture
Distributed Adaptive Systems
Services Composition and Adaptation
Collective Adaptive Systems
Internet of Things based Systems

Current Position

from June 2020 **Assistant Professor** at the Gran Sasso Science Institute (GSSI) (<http://www.gssi.it>), at the Computer Science department, L'Aquila, Italy.

Past Research Experiences

November 2018 - May 2020 **Postdoctoral researcher** at the Gran Sasso Science Institute (GSSI) (<http://www.gssi.it>), at the Computer Science department, L'Aquila, Italy.

November 2017 - November 2018 **Researcher** at the Distributed Adaptive Systems (DAS) unit (<https://das.fbk.eu/>), at Fondazione Bruno Kessler (FBK), Trento, Italy.

November 2013 - November 2017 **Doctoral researcher** at the Distributed Adaptive Systems (DAS) unit (<https://das.fbk.eu/>), at Fondazione Bruno Kessler (FBK) and Università degli Studi di Trento, Trento, Italy.

Education

November 2013 - November 2017 **Ph.D. in Computer Science** at the Doctoral School in *Information and Communication Technology*, University of Trento and Fondazione Bruno Kessler (FBK), Trento (Italy), with the *maximum score*.

Thesis Title Dynamic Adaptation of Service-Based Systems: a Design for Adaptation Framework.

Defense Date 15th May 2018

Thesis supervisors

Surname	Name	Institution	Country	Role
Pistore	Marco	FBK - Fondazione Bruno Kessler	Italy	Supervisor
Bucchiarone	Antonio	FBK - Fondazione Bruno Kessler	Italy	Co-Supervisor

Commission:
members and roles

Surname	Name	University	Country	Profession	Roles
Dustdar	Schahram	Vienna University of Technology	Austria	Full Professor	Member / Reviewer
Pautasso	Cesare	University of Lugano	Switzerland	Full Professor	President / Reviewer
Baresi	Luciano	Politecnico di Milano	Italy	Full Professor	Member / Secretary

September 2007 - March 2012 **Master's degree in Computer Science**, Faculty of Mathematical, Physical and Natural Sciences of the University of L'Aquila.

Thesis title "Modellazione di performance antipatterns nel linguaggio di descrizione architeturale *Æmilia*." (Performance antipatterns modeling in the Architectural Description Language *Æmilia*).

Topic Realization of:

- a metamodel for the Architectural Description Language "*Æmilia*";
- a transformation mechanism from *Æmilia* textual specifications to *Æmilia* models (text-to-model transformation);
- an engine for automating the detection process of performance antipatterns in *Æmilia* models available at <https://github.com/CatiaTrubiani/panda-aemilia>;

This work has been pursued further and published in the journal *Information and Software Technology*, 2017 (See Publications.)

Supervisor Prof. Vittorio Cortellessa

Co-Supervisor Dott.ssa Catia Trubiani

Final Mark Maximum score (110/110) "cum laude"

February 2008 - **Erasmus program**

June 2008 University of Warsaw - Faculty of Mathematics, Informatics and Mechanics - Warsaw, Poland

2002 - 2006 **Bachelor's Degree in Computer Science**, Faculty of Mathematical, Physical and Natural Sciences of the University of L'Aquila.

Thesis Title "Estensioni strutturali e comportamentali di un tool per la trasformazione di modelli software in modelli di performance". (Structural and behavioral extensions of a tool for the transformation of software models in performance models).

Supervisor Prof. Vittorio Cortellessa

Final Mark 104/110

1997 - 2002 **High school Degree** - Ragioniere Perito Commerciale e Programmatore - Istituto Tecnico Commerciale Statale "B. Pascal" via Bafile, 39 - 64100 Teramo (TE)

Final Mark maximum score (100/100)

Past Work Experiences

May 2012 - May 2013 **Software Developer** Quammodo S.r.l. - L'Aquila, Italy

Business sector: Web-based software applications.

Main responsibilities: Development of web-based, modular, extensible and customizable software applications through the use of technologies such as JEE 6, JSF 2.0, EJB 3.1, JPA2, JAAS. Activities of Test Driven Development (TDD) to support the implementation of a Software Patent (Peso delle Fonti) in the context of legal disputes. Research and analysis of Software Project Management tools based on agile methods (SCRUM).

September 2010 - March 2011 **Software Developer** Tribe ICT (www.tribeict.it) - L'Aquila, Italy

Business sector: Geographic Information Systems (GIS).

Main responsibilities: Design, management, and technological support for the development of a distributed, extensible and customizable GIS framework. The system is based on the uDig platform (<http://www.udig.org>) and exploits the following technologies: Java, Eclipse (RCP, EMF, JFace), JTS, Geoserver, Geonetwork.

Aug - Sept 2007 **Trainee** Tinn S.r.l. (www.tinn.it) - Teramo, Italy

Aug - Sept 2004 *Business sector:* Management systems for public administration.

Main responsibilities: Analysis, development and testing of the project MIIP (Modulo di Immatricolazione on line, Iscrizione e Pagamenti).

Teaching Activities

2020 I held a course on: *Multi-agents systems modeling and simulation*. (duration: 6 hours) at the Gran Sasso Science Institute (GSSI) - L'Aquila, Italy.

2019 I held a seminar for doctoral students entitled: *Smart Cities: a high-level overview*. (duration: 2 hours) as part of the course *Software Systems and Services* at the Gran Sasso Science Institute (GSSI) - L'Aquila, Italy.

2018 I held a tutorial entitled: *A Design for adaptation framework for self-adaptive systems*. (duration: 3 hours) at the 12th IEEE International Conference on Self-Adaptive and Self-Organizing Systems - SASO 2018 - Trento, Italy.

Research Activities

Event Organization

2020 **Publications co-chair** of the 10th International Conference on the Internet of Things (IoT 2020), Malmö University, Sweden - October 6-9, 2020.
Web site: <https://iot-conference.org/iot2020/>

Co-chair of the International Summer School of Software Engineering and Continuous Development, Gran Sasso Science Institute - L'Aquila, Italy - 29 June-03 July 2020.
Web site: <https://cs.gssi.it/devops2020/>

2018 **Co-chair** of the 3rd International Workshop on Engineering Collective Adaptive Systems (eCAS 2018) at SASO 2018.

PC Membership

2020 *15th International Conference on Software Technologies - ICSOFT 2019*

First International Workshop on Modeling Smart Cities - MoSC 2020 at STAF 2020

2019 *14th International Conference on Software Technologies - ICSOFT 2019*

Second international workshop on software engineering aspects of continuous development and new paradigms of software production and deployment - DevOps 2019

1st Workshop on Evaluation and Measurements in Self-Aware Computing Systems - EMSAC 2019 at SASO 2019

4th International Workshop on Engineering Collective Adaptive Systems - eCAS 2019 at SASO 2019.

2018 *3rd International Workshop on Microservices: Science and Engineering - MSE 2018*

The 16th International Conference on Service-Oriented Computing - IC-SOC 2018 - Demo Track

Other Reviewing Activities

- 2019
- **Peer-reviewer** for the book "Microservices - Science and Engineering". Edited by Bucchiarone, A., Dragoni, N., Dustdar, S., Lago, P., Mazzara, M., Rivera, V., Sadovykh, A., Springer.
 - **Peer-reviewer** for the International Journal of Systems and Software, Elsevier.
 - **External Reviewer** of ICSA 2019, IEEE International Conference On Software Architecture, Hamburg, Germany.
 - **External Reviewer** of ICSOC 2019, the 17th International Conference on Service-Oriented Computing, Toulouse, France.
 - **External Reviewer** of SASO 2019, the 13th IEEE International Conference on Self-Adaptive and Self-Organizing Systems, Umea, Sweden.
 - **External Reviewer** of TOOLS50+1 2019, Technology of Object-Oriented Languages and Systems, Innopolis, Russia.
- 2018
- **Peer-reviewer** for the International Journal of Simulation and Process Modelling.
 - **Peer-reviewer** for the International Journal of Systems and Software, Elsevier.
 - **Peer-reviewer** for the ACM Transactions on Autonomous and Adaptive Systems.
 - **External Reviewer** of the First international workshop on software engineering aspects of continuous development and new paradigms of software production and deployment - DevOps 2018.
 - **External Reviewer** of ICSOC 2018, the 16th International Conference on Service-Oriented Computing, Hangzhou, Zhejiang, China.
 - **External Reviewer** of SOCA 2018, the 11th International Conference on Service-Oriented Computing and Applications, Paris, France.
- 2017
- **External Reviewer** of SASO 2017, the 11th IEEE International Conference on Self-Adaptive and Self-Organizing Systems, Tucson, AZ, USA.
 - **External Reviewer** of SEAMS 2017, the 12th International Symposium on Software Engineering for Adaptive and Self-Managing Systems, Buenos Aires, Argentina.
 - **External Reviewer** of SAC 2017, the 32nd ACM SIGAPP Symposium On Applied Computing, Marrakech, Morocco.
 - **External Reviewer** of eCAS 2017, the 2nd eCAS Workshop on Engineering Collective Adaptive Systems, Tucson, AZ, USA.
 - **External Reviewer** of IoT-ASAP 2017, the International Workshop on Engineering IoT Systems: Architectures, Services, Applications, and Platforms, Gothenburg, Sweden.
 - **External Reviewer** of PRIMA 2017, the 20th International Conference on Principles and Practice of Multi-Agent Systems, Nice, France.

- 2016
 - **Peer-reviewer** for the journal IET Software.
 - **External Reviewer** of ICSOC 2016, the 14th International Conference on Service-Oriented Computing, Banff, Canada.
 - **External Reviewer** of FSE 2016, the ACM SIGSOFT International Symposium on the Foundations of Software Engineering, Seattle, WA, USA.
 - **External Reviewer** of ICWS 2016, the 23rd IEEE International Conference on Web Services, San Francisco, CA, USA.
 - **External Reviewer** of SASO 2016, the 10th IEEE International Conference on Self-Adaptive and Self-Organizing Systems, Augsburg, Germany.

- 2015
 - **Peer-reviewer** for the journal IEEE Transactions on Services Computing.
 - **External Reviewer** of ICSOC 2015, the 13th International Conference on Service-Oriented Computing, Goa, India.

- 2014
 - **External Reviewer** of ICSOC 2014, the 12th International Conference on Service-Oriented Computing, Paris, France.

Participation in projects

July 2013 - Participant in the project **ALLOW Ensembles** - (*ICT-2011.9.10 - FET Proactive: Fundamentals of Collective Adaptive Systems (FOCAS)*)
 January 2016

Project Summary The objective of ALLOW Ensembles is to develop a new design principle for large-scale collective systems (CAS) based on the concepts of cells and ensembles. Cells are basic building blocks representing the different components of the system and ensembles are collections of cells collaborating together to accomplish certain goal in a given context. We use Adaptive Pervasive Flows – a programming paradigm based on workflow technology for pervasive systems – to model the behavior of cells as a set of interrelated tasks. This enables the salient principle of cell specialization. It allows for changing the behavior of the individual cell (tasks and order of execution) to fit into an ensemble and to achieve a given goal with high utility in collaboration with other cells of the ensemble. The ALLOW Ensembles concepts will be investigated on the basis of two scenarios that become increasingly relevant on the European scale: integrated urban mobility and smart production chains.

Web site <https://cordis.europa.eu/project/rcn/106345/factsheet/it>

January 2018 - Participant in the project **Smart-Construction** - (*EIT Digital activity #18014*)
 October 2018

Project Summary Smart-Construction is an innovation activity supported by EIT Digital in the field of digital industry providing holistic solutions to automatically monitor workflows and tasks on construction sites. Within the framework of this project, we have developed a product for the automated synchronisation of digital drawings and documentation with the actual progress of the construction site. It integrates portable computing and IoT technologies developed for deployment on construction sites.

Web site <https://bit.ly/2PAMwuk>

Research and training periods spent abroad

September 2017 Visiting period at the Department of Computer Science and Media Technology - Faculty of Technology and Society of the Malmö University (Sweden).

During my visiting, we set the environment for applying the design for adaptation approach of service-based systems in an Internet of Things environment. This way, we demonstrated the domain independent nature of the approach and further defined a software architecture for the dynamic formation and enactment of Emergent Configurations in the IoT (See Publications).

Moreover, I held an invited seminar titled: *A Design for Adaptation Approach of Distributed Service-Based Systems*, available online at: <https://mau.instructure.com/courses/3945/pages/previous-seminars>

Contributed presentations at scientific conferences

September 2019 13th European Conference on Software Architecture - ECSA 2019 - Title: *QoS-based Formation of Software Architectures in the Internet of Things*. - Paris, France.

September 2019 5th Italian Conference on ICT for Smart Cities And Communities - I-CiTies 2019 - Title: *LISCAMBIO: literacy and city-center revitalization*. - Pisa, Italy.

May 2019 Second international workshop on software engineering aspects of continuous development and new paradigms of software production and deployment - DevOps 2019 - Title: *A DevOps Perspective for QoS-aware Adaptive Applications*. - Toulouse, France.

September 2018 12th IEEE International Conference on Self-Adaptive and Self-Organizing Systems - SASO 2018 - Tutorial titled: *A Design for adaptation framework for self-adaptive systems*. - Trento, Italy.

November 2017 15th International Conference on Service-Oriented Computing - ICSOC 2017 - Title: *ATLAS: A world-wide travel assistant exploiting service-based adaptive technologies*. - Malaga, Spain.

June 2016 23rd IEEE International Conference on Web Services - ICWS 2016 - Title: *Incremental composition for adaptive by-design service based systems*. - San Francisco, CA, USA.

November 2015 13th International Conference on Service-Oriented Computing - ICSOC 2015 - Title: *Design for adaptation of distributed service-based systems*. - Goa, India.

12th International Workshop on Engineering Service-Oriented Applications - WESOA@ICSOC 2015 - Title: *Distributed service co-evolution based on domain objects*. - Goa, India.

September 2014 The 3rd European Conference on Service-Oriented and Cloud Computing - ESOCC 2014 - Title: *Domain objects for dynamic and incremental service composition*. - Manchester, UK.

Ph.D. Symposium of the Third European Conference on Service-Oriented and Cloud Computing (ESOCC 2014)- Title: *Domain Objects for Dynamic Service-based Applications*. Published as technical report and available at: http://www.minet.uni-jena.de/preprints/klan_14/ESOCC_PhDSymposium_Proceedings.pdf

Summer Schools Attendance

June 2014 **Attendee.** Attended the *8th Symposium and Summer School On Service-Oriented Computing, 2014* - University of Crete, Greece.

September 2013 **Attendee.** Attended the *EIT ICT Labs Summer School, Intelligent Services for Digital Cities, (ISDC-2013)*, part of the "Digital Cities of the Future" programme of the EIT ICT Labs - University of Trento, Italy.
<https://www.eitdigital.eu/news-events/news/article/summer-school-on-intelligent-services-for-digital-cities/>

Miscellaneous

September 2018 Member of the supporting staff of SASO 2018, the 12th IEEE International Conference on Self-Adaptive and Self-Organizing Systems.

September 2008 Member of the supporting staff of ASE 2008, the 23rd IEEE/ACM International Conference on Automated Software Engineering.

March 2016 Poster at the ICT Days (<http://2016.ictdays.it/en>), Trento, Italy.

Publications

Journal Articles

- 2020 Martina De Sanctis, Antonio Bucchiarone and Annapaola Marconi. **Dynamic Adaptation of Service-Based Applications: a Design for Adaptation Approach**. Submitted with minor revision in *Journal of Internet Services and Applications* - Springer.
The candidate contributed the majority to the article.
- 2019 Martina De Sanctis, Antonio Bucchiarone and Annapaola Marconi. **ATLAS: A new way to exploit world-wide mobility services**. In *Software Impacts* - Elsevier, volume 1. doi:10.1016/j.simpa.2019.100005 Available at: <https://www.sciencedirect.com/science/article/pii/S2665963819300053>
The candidate contributed the majority to the article.
- 2017 Martina De Sanctis, Catia Trubiani, Vittorio Cortellessa, Antinisca Di Marco and Mirko Flamminj. **A model-driven approach to catch performance antipatterns in ADL specifications**. In *Information And Software Technology* - Elsevier, volume 83, pp. 35–54. doi: 10.1016/j.infsof.2016.11.008 Available at: <https://www.sciencedirect.com/science/article/abs/pii/S0950584916303743>
The authors De Sanctis and Trubiani were the main contributors to the article.

Magazine Articles

- 2020 Antonio Bucchiarone, Giacomo Cabri, Roberto Casadei, Mirko D'Angelo, Martina De Sanctis, Simon Dobson, Danilo Pianini, and Mirko Viroli. **On the Social Implications of Collective Adaptive Systems**. Accepted to *IEEE Technology and Society Magazine*. To appear.
The authors contributed equally to the article.
- 2019 Antonio Bucchiarone, Martina De Sanctis, Peter Hevesi, Marco Hirsch, Francisco Javier Royo Abancéns, Pablo Fernández Vivanco, Orkhan Amiraslanov, and Paul Lukowicz. **Smart Construction: Remote and Adaptable Management of Construction Sites through IoT**. In *IEEE Internet of Things Magazine*, volume 2, issue 3, pp.38–45. doi: 10.1109/IOTM.0001.1900044 Available at: <https://ieeexplore.ieee.org/abstract/document/8950968>
The order of authors reflects the extent of their contribution to the article.

Conference Papers

- 2020 Martina De Sanctis, Henry Muccini, Karthik Vaidhyanathan. **Data-driven Adaptation in Microservice-based IoT Architectures**. In *14th European Conference on Software Architecture, (ECSA) 2019*. To appear. - Conference rank: A (core)
The authors contributed equally to the article.

- 2019 Martina De Sanctis, Romina Spalazzese, Catia Trubiani. **QoS-based Formation of Software Architectures in the Internet of Things**. In *13th European Conference on Software Architecture, (ECSA) 2019*, pp. 178–194. doi: 10.1007/978-3-030-29983-5_12 - Conference rank: A (core)
The candidate contributed the majority to the article.
- 2018 Fahed Alkhabbas, Martina De Sanctis, Romina Spalazzese, Antonio Bucchiarone, Paul Davidsson, Annapaola Marconi. **Enacting Emergent Configurations in the IoT Through Domain Objects**. In *16th International Conference on Service-Oriented Computing, (ICSOC) 2018*, pp.279–294. doi: 10.1007/978-3-030-03596-9_19 - Conference rank: A (core)
The authors Alkhabbas, De Sanctis and Spalazzese were the main contributors to the article.
- 2017 Antonio Bucchiarone, Martina De Sanctis, and Annapaola Marconi. **ATLAS: A World-wide Travel Assistant exploiting Service-based Adaptive Technologies**. In *15th International Conference on Service-Oriented Computing, (ICSOC) 2017*, pp. 561–570 - Industrial Track. doi: 10.1007/978-3-319-69035-3_41 - Conference rank: A (core)
The authors Bucchiarone and De Sanctis were the main contributors to the article.
- 2016 Antonio Bucchiarone, Martina De Sanctis, Annapaola Marconi, Marco Pistore and Paolo Traverso. **Incremental Composition for Adaptive by-Design Service Based Systems**. In *23rd IEEE International Conference on Web Services, (ICWS)*, pp. 236–243 - IEEE Computer Society 2016. doi: 10.1109/ICWS.2016.38 - Conference rank: A (core)
The authors contributed equally to the article.
- 2015 Antonio Bucchiarone, Martina De Sanctis, Annapaola Marconi, Marco Pistore and Paolo Traverso. **Design for Adaptation of Distributed Service-Based Systems**. In *13th International Conference on Service-Oriented Computing, (ICSOC)*, pp. 383–393 - Springer 2015. doi: 10.1007/978-3-662-48616-0_27 - Conference rank: A (core)
The authors contributed equally to the article.
- 2014 Antonio Bucchiarone, Martina De Sanctis and Marco Pistore. **Domain Objects for Dynamic and Incremental Service Composition**. In *3rd European Conference on Service-Oriented and Cloud Computing, (ESOCC)*, pp. 62–80 - Springer 2014. doi: 10.1007/978-3-662-44879-3_5
The authors contributed equally to the article.

- 2012 Vittorio Cortellessa, Martina De Sanctis, Antinisca Di Marco and Catia Trubiani. **Enabling Performance Antipatterns to Arise from an ADL-based Software Architecture.** In *Conference on Software Architecture and European Conference on Software Architecture, (WICSA/ECSA)*, pp. 310–314 - IEEE 2012. doi: 10.1109/WICSA-ECSA.212.51
The authors contributed equally to the article.

Demo Papers and Tutorials

- 2018 Martina De Sanctis and Annapaola Marconi. **A Design for Adaptation Framework for Self-Adaptive Systems.** In *12th IEEE International Conference on Self-Adaptive and Self-Organizing Systems, (SASO)*, pp. 3–4, 2018 - Tutorial.
The candidate contributed the majority to the article.

- 2017 Antonio Bucchiarone, Antonio Cicchetti and Martina De Sanctis. **CASTIE: a tool for Collective Adaptive Systems Engineering.** In *11th IEEE International Conference on Self-Adaptive and Self-Organizing Systems, (SASO)*, pp. 385–386, 2017 - Demo Track.
The authors contributed equally to the article.

- 2016 Antonio Bucchiarone, Martina De Sanctis, Annapaola Marconi and Alberto Martinelli. **DeMOCAS: Domain Objects for Service-based Collective Adaptive Systems.** In *14th International Conference on Service-Oriented Computing, (ICSOC)*, pp. 174–178 - Springer 2016. - Demo Track. **Best Demo award.** - Conference rank: A (core)
The authors contributed equally to the article.

Workshop Papers

- 2019 Ludovico Iovino, Martina De Sanctis, Maria Teresa Rossi. **Automated Code Generation for NFC-based Access Control.** Accepted to *3rd International Workshop on Model-Driven Engineering for the Internet-of-Things (MDE4IoT)* at the IEEE / ACM 22nd International Conference on Model Driven Engineering Languages and Systems, (Models - Workshops), pp. 31–38, 2019.
The order of authors reflects the extent of their contribution to the article.

Maria Teresa Rossi, Martina De Sanctis, Ludovico Iovino, Adrian Rutle. **A Multilevel Modelling Approach for Tourism Flows Detection.** Accepted to *6th International Workshop on Multi-Level Modelling (MULTI)* at the IEEE / ACM 22nd International Conference on Model Driven Engineering Languages and Systems, (Models - Workshops), pp. 103–112, 2019. doi: 10.1109/MODELS-C.2019.00020
The order of authors reflects the extent of their contribution to the article.

Martina De Sanctis, Antonio Bucchiarone, Catia Trubiani. **A DevOps Perspective for QoS-aware Adaptive Applications**. Accepted to *Second international workshop on software engineering aspects of continuous development and new paradigms of software production and deployment (DevOps)*, 2019, pp. 95–111.

The candidate contributed the majority to the article.

2017 Antonio Bucchiarone, Antonio Cicchetti and Martina De Sanctis. **Towards a Domain Specific Language for Engineering Collective Adaptive Systems**. Accepted to *2nd Workshop on Engineering Collective Adaptive Systems (eCAS)* at the 11th IEEE International Conference on Self-Adaptive and Self-Organizing Systems, (SASO - Workshops), pp. 19–26, 2017. doi:10.1109/FAS-W.2017.115
The authors contributed equally to the article.

2016 Antonio Bucchiarone, Martina De Sanctis and Annapaola Marconi. **Decentralized Dynamic Adaptation for Service-based Collective Adaptive Systems**. In *14th International Conference on Service-Oriented Computing, (ICSOC) 2016 Workshops - ASOCA*, pp. 5–20, Springer 2016. doi:10.1007/978-3-319-68136-8_1
The authors contributed equally to the article.

2015 Martina De Sanctis, Kurt Geihs, Antonio Bucchiarone, Giuseppe Valetto, Annapaola Marconi and Marco Pistore. **Distributed Service Co-evolution Based on Domain Objects**. In *13th International Conference on Service-Oriented Computing, (ICSOC) 2015 Workshops - WESOA*, pp. 48–63, Springer 2015. doi: 10.1007/978-3-662-50539-7_5
The authors De Sanctis and Geihs were the main contributors to the article.

Languages

Italian Mothertongue
English Intermediate
French Intermediate
Polish Basic

Conversationally fluent
Good understanding
Basic words and phrases only

Signature

Martina De Sanctis