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## SHORT BIOGRAPHY OF ANDREA MARRELLA

**Andrea Marrella**, born **15 August 1982** in Rome (Italy), is a **postdoctoral research fellow** (scientific disciplinary sector **ING-INF/05**) at Sapienza Università di Roma, Italy, Dipartimento di Ingegneria Informatica, Automatica e Gestionale Antonio Ruberti (DIAG - Department of Computer, Control and Management Sciences and Engineering), since 2013.

He got a **PhD in Engineering in Computer Science** (Dottorato di Ricerca in Ingegneria Informatica) from Sapienza Università di Roma in October 2013. He previously studied Engineering in Computer Science (Ingegneria Informatica) at Sapienza Università di Roma, where he obtained a Bachelor Degree in 2005 and a Master Degree in 2009. From 2011, he is qualified to practice as Computer Science Engineer (abilitato all'esercizio della professione di Ingegnere).

### RESEARCH ACTIVITY, KEYNOTES AND INVITED TALKS

The **research activity** of Andrea Marrella concerns **theoretical, methodological, and practical aspects** in different areas of **Computer Science**, including Business Process Management, Modelling, Adaptation, Mining and Resilience, Cyber-Security and Human-Computer Interaction. Such topics are challenged in the application domains of smart manufacturing, healthcare, emergency management and cultural heritage.

Since 2010, Andrea Marrella has developed a **research program** aimed at investigating how to integrate the solid theoretical foundations provided by Automated Planning and Reasoning about actions techniques in Artificial Intelligence (AI) with the practical needs required by Business Process Management (BPM) solutions. Thanks to the recognized results of his research, **he is actually considered as one of the pioneers** of the concrete application of AI techniques to untangle complex challenges from the BPM domain, such as the **automated synthesis of process models**, the **automated adaptation of running processes** and the **optimal alignment of execution traces against their underlying (procedural or declarative) process models**. For this reason, in 2017 he was invited to give the **keynote talk** at the **1st International Workshop on BP Innovation with AI (BPAI'17)** organized within the 15<sup>th</sup> International Conference on Business Process Management (BPM 2017 - GII-GRIN Class A - CORE Class A), where he presented (as a single author) his research on “*What Automated Planning can do for Business Process Management*”.

In addition, he was invited to present the **results of his research at various institutions worldwide**, including University of Toronto (Canada) and York University (Canada) in 2012, Ryerson University (Canada) in 2013, University of Vienna (Austria) and University of Ulm (Germany) in 2014, and University of Tartu (Estonia) in 2016. Finally, **he was invited to organize and give a full-day tutorial on Process Mining** at 18th International Conference on Product-Focused Software Process Improvement (PROFES 2017).

From 2006 to 2010, the research of Andrea Marrella focused on realizing **advanced methodologies and tools** in the field of Human-Computer Interaction (HCI). Specifically, he designed and developed **innovative touch-based graphical user interfaces for pen-based mobile devices** (notice that touch-based interaction for mobile devices started to become popular since late 2008 with the mass production of iPhone 3G) and the

realization of **advanced workflow engines** and **location-based services** for supporting collaborative work of human operators on-the-field in emergency/disaster scenarios.

His **current research** on HCI tackles a well-known (unsolved) challenge in this area, namely the **automated quantification of learnability of interactive systems**. In this direction, he is focusing on developing a **theoretical and practical framework that exploits Process Mining algorithms and technologies to automatically derive the learnability of a system** during its daily use. The **impact** of this research, which requires a strong background and expertise in BPM and HCI, is potentially **ground-breaking** in the HCI field, as it aims at superseding the expensive and time-consuming learnability techniques for observing users in highly controlled environments over extended periods of time.

In 2018, Andrea Marrella contributed to the writing of the second edition of the **white book on the future of cyber-security in Italy**. In this direction, his **current research** on cyber-security is focused, on the one hand, on exploiting **Process Mining techniques** to the **detection of anomalous behaviours** and **prediction of security issues in information systems**. On the other hand, he is investigating user-centred solutions for tackling the **human factors in cyber-security**, in order to **increase cyber-awareness** and **reduce human errors**, which are often the cause of security breaches.

## SCIENTIFIC PUBLICATIONS

Since 2007, Andrea Marrella regularly **publishes the results of his research** in top-level international journals and conferences. Notably, since 2013, he has increasingly established his **scientific independence** by authoring papers presented in collaboration with different authors than the supervisor. Overall, he has co-authored **49 peer-reviewed scientific papers** on the above research topics, including:

- **9 journal articles**, including high impact factor journals such as ACM Transactions on Intelligent Systems and Technology, Expert Systems with Applications (Elsevier), Journal on Data Semantics (Springer), IEEE Internet Computing and Service Oriented Computing and Applications (Springer);
- **2 authored book chapters** on the topics of Process Adaptation in cyber-physical domains and Process Resilience of data-aware business processes;
- **38 workshop and conference papers**, including several class A\*/A conferences (according to the well-known GII-GRIN and CORE rankings) such as AAAI and CAiSE in 2017, IJCAI in 2016, ICAPS in 2016 and 2018, BPM in 2011, 2015 and 2017, ICSOC in 2014, KR in 2014 and CoopIS in 2012.

His Google Scholar profile reports an **h-index** of **14** and an **i10-index** of **17**, with **607 overall citations** (cf. <https://scholar.google.com/citations?user=8zZvFawAAAAJ&hl=en>).

According to the Scopus database, Andrea Marrella meets **100% of the requirements needed to apply for the national scientific habilitation as Associate Professor** for sectors **09/H1** and **01/B1**.

## SCIENTIFIC AWARDS

In 2017, Andrea Marrella received the **Best Paper Award** at the prestigious **CAiSE 2017** conference (29th International Conference on Advanced Information Systems Engineering – GII-GRIN Class A - CORE Class A) for his paper on “Multi-party Business Process Resilience By-Design: A Data-centric Perspective”.

## RESEARCH STAYS AND VISITS

From January 2012 to June 2012, Andrea Marrella has been a **visiting Researcher** at **York University** in Toronto, Ontario (Canada), Department of Computer Science and Engineering, where he collaborated with Prof. Yves Lespérance to the realization of a technique for the automated generation of business process models using partial-order planning algorithms.

From June 2013 to August 2013, he has been a **visiting researcher** at **Ryerson University** in Toronto, Ontario (Canada), Department of Computer Science, where he collaborated with Prof. Mikhail Soutchanski to the formalization of an innovative approach based on action formalisms in Knowledge Representation and Reasoning for the automated synthesis of chemical processes in organic chemistry.

In October and November 2016, he has been a **visiting researcher** at **University of Tartu** in Estonia, where he collaborated with Prof. Marlon Dumas and Prof. Fabrizio Maria Maggi to the realization of a technique based on finite-state automata manipulation and on Automated Planning for solving the trace alignment problem of declarative processes in Process Mining.

## PROJECTS

Andrea Marrella is the **principal investigator** of the research project (progetto di Avvio alla Ricerca) DAKIP (*"Data-aware Adaptation of Knowledge-intensive Processes in Cyber-Physical Domains through Action-based Languages"*), which has been financed by Sapienza Università di Roma in 2016.

Moreover, he is/has been **actively involved** in **several research projects**, including WORKPAD (FP6 European Project) and the Italian projects MAIS, TESTMED, SUPER, FIGO (as Unit Leader), NEPTIS (as OR Leader), IT-SHIRTS (as WP Leader), FILIERASICURA and ACI-I.

## TEACHING EXPERIENCE

Andrea Marrella has an **excellent teaching experience**. Within Sapienza, he is the **main lecturer** of the graduate course of **Enterprise Information Systems** (ING/INF 05 – 6 CFU – semester Spring 2018). Over the years, he has taught as **main lecturer** the graduate course of **Interaction Design** (ING/INF 05 – 6 CFU – semester Spring 2017) and the undergraduate course of **Databases** (ING/INF 05 – 6 CFU – semester Spring 2014). In Fall 2017, he has taught the PhD course of **Process Mining** (3 CFU).

Since 2009, he has been teaching assistant for the following undergraduate courses: **Databases** (Spring 2009, 2010, 2011, 2013, 2015, 2016) and **Process and Service Modeling and Analysis** (Spring 2016, 2017). Furthermore, he gave several seminars and lectures for the following graduate courses: **Great Ideas in ICT** (Spring 2017), **Human-Computer Interaction** (Spring 2010, 2011, 2016, 2017) and **Seminars in Software and Services for the Information Society** (Spring 2012, 2013, 2014, 2015, 2016).

Andrea Marrella has also a **wide experience as a lecturer for industries and companies**. He taught the course of **Process Simulation and Mining** at NESEA in 2015, and the course of **Human-Machine Interaction** at Cineca in 2016 and at SELEX (now incorporated with Leonardo/Finmeccanica) in 2010 and 2012.

## SUPERVISION OF STUDENTS

Since 2010, within DIAG, Andrea Marrella **supervised** and **co-supervised**:

- **2 M.sc. student** and **27 B.sc. students** in Engineering in Management Science on the topics of process modelling, process automation, process choreography design, data quality and big data management through NoSQL technologies.
- **9 M.sc. students** and **1 B.sc. student** in Engineering in Computer Science on the topics of software learnability, user experience design, conformance checking, process mining on databases, process repair, process adaptation and process resilience in cyber-physical and IoT-based environments.

Moreover, he co-supervised **2 M.sc theses** in Computer Science for Software Engineering at the University of Tartu (Estonia) on the topics of process discovery and adaptation. Notably, the majority of his M.sc. students completed their degree with the highest honours, and **7 of them published the results of their thesis in international peer-reviewed scientific workshops and conferences**.

## PROFESSIONAL SERVICE

Andrea Marrella serves/has served regularly as a **reviewer for top class journals** and **conferences**, such as ACM Transactions on Computer-Human Interaction (TOCHI), Information Systems, Data & Knowledge Engineering (DKE), Journal of Artificial Intelligence Research (JAIR), Business Process Management (BPM), Service Oriented Computing (ICSOC), Data Engineering (ICDE), Cooperative Information Systems (COOPIS). Moreover, in 2018 he is acting as **expert reviewer** for the **Discovery Grant Program** financed by **Natural Sciences and Engineering Research Council of Canada**.

Since 2017, Andrea Marrella is the **Information Director** of the **ACM Journal on Data Quality** (ISSN 1936-1955) and is **member of the Editorial Board** of the **International Journal of Information Systems for Crisis Response and Management** (ISSN 1937-9390).

He serves/has served in the **Program Committee** of the 16<sup>th</sup> Int. Conference on Business Process Management (BPM 2018), 14<sup>th</sup> Int. Conference on Advanced Visual Interfaces (AVI 2018), 2017 and 2018 Int. Conference on Software and System Processes (ICSSP 2017 and 2018), 12<sup>th</sup>, 13<sup>th</sup>, 14<sup>th</sup> Int. Conference on Web Information Systems and Technologies (WEBIST 2016, 2017 and 2018), 14<sup>th</sup> Int. Conference on Intelligent Environments (IE'18), 2014 Symposium on Computational Intelligence and Data Mining (CIDM 2014) and of several international workshops.

As far as **organization** and **chairship** of conferences and **workshops**, Andrea Marrella has acted/is acting as:

- Demo & Poster Chair of the 14th ACM Int. Conf. on Advanced Visual Interfaces (AVI 2018)
- Local Chair of the 8th IEEE Int. Conf. on Service Oriented Computing & Applications (SOCA 2015)
- Proceedings Chair of the 23rd Italian Symposium on Advanced Database Systems (SEBD 2015)
- Publicity Chair of the 12th Int. Conf. on Mobile Web and Intelligent Inf. Systems (MobiWis 2015)
- PC Chair of the 2nd Int. W/shop on Knowledge-intensive Business Processes (KiBP 2013)
- Proceedings Chair of the 1st Int. W/shop on Knowledge-intensive Business Processes (KiBP 2012)

## ANDREA MARRELLA CURRICULUM VITAE

### Part I – General Information

Full Name	Andrea Marrella
Date of Birth	15/08/1982
Place of Birth	Rome, Italy
Citizenship	Italian
Spoken Languages	Italian (Native), English (Excellent)

### Part II – Education

#### (II A) – Academic Achievements

Type	Year	Institution	Notes
PhD	2013	Sapienza Università di Roma	PhD in Engineering in Computer Science (Cycle XXV). <u>PhD Thesis</u> : “ <i>SmartPM: Automatic Adaptation of Dynamic Processes at Run-Time</i> ”. <u>Advisor</u> : Prof. Massimo Mecella
Licensure in Engineering	2011	Sapienza Università di Roma	<u>National qualification</u> to practice as a Computer Science Engineer. <u>Final mark</u> : 193/240
University graduation	2009	Sapienza Università di Roma	<u>Master Degree</u> in Engineering in Computer Science. <u>Final mark</u> : 110/110. <u>Master Thesis</u> : “ <i>User-Centered Design Methodologies. The Approach and the Case of the WORKPAD project</i> ”. <u>Advisor</u> : Prof. Massimo Mecella
University graduation	2005	Sapienza Università di Roma	<u>Bachelor Degree</u> in Engineering in Computer Science. <u>Final mark</u> : 107/110. <u>Bachelor Thesis</u> : “ <i>An Environment for the Automatic Generation of User Interfaces</i> ”. <u>Advisor</u> : Prof. Giuseppe Santucci

## (II B) – PhD Schools

Type	Year	Institution	Notes
PhD School	2016	Sapienza Università di Roma	<i>User eXperience (UX) Boot Camp: Analysis of UX Methods, Metrics and Analysis.</i> <u>Course Leader:</u> Prof. Jeff Sauro, University of Denver, Colorado, USA.
PhD School	2010	University of Rostock, Germany	<i>Advanced Course on Petri Nets – Introduction to Theory and Applications and State of the Art in Petri Nets.</i> <u>Course Leader:</u> Prof. Wil van der Aalst, Technical University of Eindhoven, the Netherlands.
PhD School	2010	BiCi (Bertinoro international Center for informatics), University of Bologna, Italy	<u>Course 1:</u> <i>Learning Theory: Statistical and Game-Theoretic Foundations</i> , <u>Course Leader:</u> Prof. Nicolò Cesa-Bianchi, University of Milan, Italy. <u>Course 2:</u> <i>Foundations of Advanced Networking</i> , <u>Course Leader:</u> Prof. Francesco Lo Presti, Università di Roma Tor Vergata, Italy.

## Part III – Appointments

### (III A) – Academic Appointments

Start	End	Institution	Contract/Grant <sup>1</sup>	Position
01/11/2013	present	Dipartimento di Ingegneria Informatica, Automatica e Gestionale, Sapienza Università di Roma	<b>C4, C5, C6, C7, C8</b>	<b>Post-doctoral research fellow</b> in the DASILab group. <u>Research topics:</u> Business Process Management (BPM), Modeling, Adaptation, Mining and Resilience, Cyber-Security, Automated Planning and Reasoning about actions applied to BPM; Human-Computer Interaction.

<sup>1</sup> For each Academic Appointment, the associated contracts or research grants are listed in Section (III B).

01/11/2009	31/10/2013	Dipartimento di Ingegneria Informatica, Automatica e Gestionale, Sapienza Università di Roma	C3, C4	<b>PhD Student</b> under the supervision of Prof. Massimo Mecella. <u>Research topics:</u> Business Process Management (BPM) and Adaptation; Automated Planning and Reasoning about actions applied to BPM; ICT solutions for healthcare and emergency management; Human-Computer Interaction.
25/10/2016	12/11/2016	Institute of Computer Science, University of Tartu (Estonia)	---	<b>Visiting Researcher</b> at University of Tartu (Estonia). Invited by Prof. Marlon Dumas and Dr. Fabrizio Maria Maggi. <u>Research topics:</u> Automated Planning applied to Process Mining.
25/06/2013	14/08/2013	Department of Computer Science at Ryerson University in Toronto, Ontario (Canada)	---	<b>Visiting Researcher</b> at Ryerson University in Toronto, Ontario (Canada), invited by Prof. Mikhail Soutchanski. <u>Research topics:</u> Reasoning about actions and Automated Planning techniques applied to the synthesis of chemical processes.
14/01/2012	07/06/2012	Department of Computer Science and Engineering at York University in Toronto, Ontario (Canada)	---	<b>Visiting Researcher</b> at York University in Toronto, Ontario (Canada), invited by Prof. Yves Lespérance. <u>Research topics:</u> Reasoning about actions and Automated Planning techniques applied to the generation of business process models.

01/08/2007	31/10/2008	Dipartimento di Ingegneria Informatica, Automatica e Gestionale of Sapienza Università di Roma	C2	<b>Research Assistant</b> for the FP6 EU Project WORKPAD under the supervision of Prof. Tiziana Catarci. My activities during this collaboration were the design of the usability tests and the implementation of a process management system for mobile devices.
07/11/2006	30/04/2007	Dipartimento di Ingegneria Informatica, Automatica e Gestionale of Sapienza Università di Roma	C1	<b>Research Assistant</b> for the FP6 EU Project WORKPAD under the supervision of Prof. Tiziana Catarci. My activities during this collaboration were the requirements elicitation and analysis and the design of the user interface of the final system.

### (III B) – Contracts and Research Grants

ID	Start	End	Duration	Institution	Contract Type
C1	01/11/2006	30/04/2007	6 months	Dipartimento di Ingegneria Informatica, Automatica e Gestionale of Sapienza Università di Roma	Fixed term contract (Collaborazione Coordinata e Continuativa)
C2	01/08/2007	31/10/2008	15 months	Dipartimento di Ingegneria Informatica, Automatica e Gestionale of Sapienza Università di Roma	Fixed term contract (Collaborazione Coordinata e Continuativa)
C3	01/11/2009	31/10/2012	36 months	Dipartimento di Ingegneria Informatica, Automatica e Gestionale of Sapienza Università di Roma	PhD Research Grant (Borsa di Studio di Dottorato)
C4	01/11/2012	31/05/2014	18 months (12 out of 18 months were benefited during the PhD)	Dipartimento di Ingegneria Informatica, Automatica e Gestionale of Sapienza Università di Roma	Research Grant (Assegno di Ricerca)



*ai fini della pubblicazione*

<b>C5</b>	01/06/2014	30/06/2016	25 months	Dipartimento di Ingegneria Informatica, Automatica e Gestionale of Sapienza Università di Roma	Research Grant (Assegno di Ricerca)
<b>C6</b>	01/07/2016	31/12/2016	6 months	Dipartimento di Ingegneria Informatica, Automatica e Gestionale of Sapienza Università di Roma	Research Scholarship (Borsa di Studio)
<b>C7</b>	01/01/2017	31/12/2017	12 months	Dipartimento di Ingegneria Informatica, Automatica e Gestionale of Sapienza Università di Roma	Research Grant (Assegno di Ricerca)
<b>C8</b>	01/01/2018	31/12/2018 (expected)	12 months	Dipartimento di Ingegneria Informatica, Automatica e Gestionale of Sapienza Università di Roma	Research Grant (Assegno di Ricerca)

## Part IV – Teaching experience

### (IV A) – Teaching in Academia

Year	Institution	Lecture/Course
2017/2018	Sapienza Università di Roma M.Sc. in Engineering in Management Science	<b>Lecturer</b> (Docente a contratto) of the course of “ <b>Sistemi Informativi Aziendali</b> ” (Enterprise Information Systems – ING/INF 05 – 6 CFU).
2017/2018	Sapienza Università di Roma PhD program in Computer Science and Engineering	<b>Lecturer</b> (Docente) of the course of <b>Process Mining</b> (ING/INF 05 – 3 CFU).
2016/2017	Sapienza Università di Roma M.Sc. in Design, Multimedia and Visual Communication	<b>Lecturer</b> (Docente a contratto) of the course of “ <b>Ambienti Virtuali Interattivi</b> ” (Interaction Design – ING/INF 05 – 6 CFU).
2013/2014	Sapienza Università di Roma B.Sc. in Engineering in Management Science	<b>Lecturer</b> (Docente a contratto) of the course of “ <b>Basi di Dati</b> ” (Databases - ING-INF/05 - 6 CFU).
2010/2011	Sapienza Università di Roma B.Sc. in Engineering in Management Science	<b>Teaching assistant</b> (Tutor) of the course of “ <b>Basi di Dati</b> ” (Databases - ING-INF/05 - 6 CFU). Course Leader: Prof. Tiziana Catarci

2009/2010	Sapienza Università di Roma B.Sc. in Engineering in Management Science	<b>Teaching assistant</b> (Tutor) of the course of “ <b>Basi di Dati</b> ” (Databases - ING-INF/05 - 6 CFU). Course Leader: Prof. Tiziana Catarci
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**(IV B) – Lectures and specialized seminars in Academia**

Year	Institution	Lecture/Course
2016/2017	Sapienza Università di Roma M.Sc. in Computer Science and Engineering	<b>Lectures</b> ( <u>1 talk</u> on Process Mining: Analytics applied to Workflow, for <i>4 academic hours</i> ) for the course of “ <b>Great Ideas in ICT</b> ” (ING-INF/05 - 3 CFU). <u>Course Organizer</u> : Prof. Leonardo Querzoni
2016/2017	Sapienza Università di Roma M.Sc. in Computer Science and Engineering	<b>Lectures</b> ( <u>8 talks</u> on Business Process Modeling, Automation and Execution and Process Mining against declarative processes, for <i>16 academic hours</i> ) for the course of “ <b>Process and Service Modeling and Analysis</b> ” (ING-INF/05 - 6 CFU). <u>Course Leaders</u> : Prof. Giuseppe De Giacomo and Prof. Massimo Mecella
2016/2017	Sapienza Università di Roma M.Sc. in Computer Science and Engineering	<b>Specialized Seminar</b> ( <u>2 talks</u> on advanced prototyping techniques for designing user interfaces for mobile devices, for <i>5 academic hours</i> ) for the course of “ <b>Human-Computer Interaction</b> ” - ING-INF/05 - 6 CFU). <u>Course Leader</u> : Prof. Tiziana Catarci
2015/2016	Sapienza Università di Roma M.Sc. in Computer Science and Engineering	<b>Lectures</b> ( <u>8 talks</u> on Business Process Modeling, Automation and Execution and Process Mining against declarative processes, for <i>16 academic hours</i> ) for the course of “ <b>Process and Service Modeling and Analysis</b> ” (ING-INF/05 - 6 CFU). <u>Course Leaders</u> : Prof. Giuseppe De Giacomo and Prof. Massimo Mecella
2015/2016	Sapienza Università di Roma B.Sc. in Engineering in Management Science	<b>Lectures</b> (for <i>20 academic hours</i> ) for the course of “ <b>Basi di Dati</b> ” (Databases - ING-INF/05 - 6 CFU). <u>Course Leader</u> : Prof. Tiziana Catarci
2015/2016	Sapienza Università di Roma M.Sc. in Computer Science and Engineering	<b>Specialized Seminars</b> ( <u>2 talks</u> on Business Process Modeling, Adaptation and Execution, for <i>4 academic hours</i> ) for the course of “ <b>Seminars in Software and Services for the Information Society</b> ” (ING-INF/05 - 6 CFU). <u>Course Leader</u> : Prof. Massimo Mecella

2015/2016	Sapienza Università di Roma M.Sc. in Computer Science and Engineering	<b>Specialized Seminar</b> (1 talk on the design and evaluation of the user-centered methodology employed in the FP6 project WORKPAD, for 2 <i>academic hours</i> ) for the course of “ <b>Human-Computer Interaction</b> ” - ING-INF/05 - 6 CFU). <u>Course Leader</u> : Prof. Tiziana Catarci
2014/2015	Sapienza Università di Roma B.Sc. in Engineering in Management Science	<b>Lectures</b> (for 20 <i>academic hours</i> ) for the course of “ <b>Basi di Dati</b> ” (Databases - ING-INF/05 - 6 CFU). <u>Course Leader</u> : Prof. Tiziana Catarci
2014/2015	Sapienza Università di Roma M.Sc. in Computer Science and Engineering	<b>Lectures</b> (5 talks on Foundations of Process Modeling with Petri Nets, Business Process Modeling, Simulation, Management, Adaptation and Execution, for 20 <i>academic hours</i> ) for the course of “ <b>Seminars in Software and Services for the Information Society</b> ” (ING-INF/05 - 6 CFU). <u>Course Leader</u> : Prof. Massimo Mecella
2013/2014	Sapienza Università di Roma M.Sc. in Computer Science and Engineering	<b>Lectures</b> (3 talks on Foundations of Process Modeling with Petri Nets, Business Process Modeling and Management, for 12 <i>academic hours</i> ) for the course of “ <b>Seminars in Software and Services for the Information Society</b> ” (ING-INF/05 - 6 CFU). <u>Course Leader</u> : Prof. Umberto Nanni
2012/2013	Sapienza Università di Roma B.Sc. in Communications Engineering	<b>Lectures</b> (for 20 <i>academic hours</i> ) for the course of “ <b>Basi di Dati</b> ” (Databases - ING-INF/05 - 5 CFU). <u>Course Leader</u> : Prof. Silvio Salza
2012/2013	Sapienza Università di Roma M.Sc. in Computer Science and Engineering	<b>Specialized Seminars</b> (2 talks on Business Process Modeling and Management, for 8 <i>academic hours</i> ) for the course of “ <b>Seminars in Software and Services for the Information Society</b> ” (ING-INF/05 - 6 CFU). <u>Course Leader</u> : Prof. Umberto Nanni
2011/2012	Sapienza Università di Roma M.Sc. in Computer Science and Engineering	<b>Specialized Seminars</b> (2 talks on Business Process Modeling and Management, for 8 <i>academic hours</i> ) for the course of “ <b>Seminars in Software and Services for the Information Society</b> ” (ING-INF/05 - 6 CFU). <u>Course Leader</u> : Prof. Umberto Nanni
2010/2011	Sapienza Università di Roma M.Sc. in Computer Science and Engineering	<b>Specialized Seminars</b> (2 talks on the design and evaluation of the user-centered methodology employed in the FP6 Project WORKPAD, for 8 <i>academic hours</i> ) for the course of “ <b>Human-Computer Interaction</b> ” (Interazione Persona-Calcolatore - ING-INF/05 - 6 CFU). <u>Course Leader</u> : Prof. Tiziana Catarci

2009/2010	Sapienza Università di Roma M.Sc. in Computer Science and Engineering	<b>Specialized Seminars</b> (2 talks on the design and evaluation of the user-centered methodology used for the FP6 Project WORKPAD, for 8 <i>academic hours</i> ) for the course of “ <b>Human-Computer Interaction</b> ” (Interazione Persona-Calcolatore - ING-INF/05 - 6 CFU). <u>Course Leader:</u> Prof. Tiziana Catarci
2008/2009	Sapienza Università di Roma B.Sc. in Engineering in Management Science	<b>Lectures</b> (for 20 <i>academic hours</i> ) for the course of “ <b>Basi di Dati</b> ” (Databases - ING-INF/05 - 6 CFU). <u>Course Leader:</u> Prof. Tiziana Catarci

#### (IV C) –Teaching in Industry

Start	End	Institution	Lecture/Course
04/05/2010	05/05/2010	CINI - Consorzio Interuniversitario Nazionale per l'Informatica. Via Salaria 113, 00185 Rome (Italy)	<b>Lecturer</b> (Docente a contratto) for the course “ <b>Human-Machine Interaction</b> ”, held for SELEX - Sistemi Integrati (now incorporated with Leonardo/Finmeccanica <sup>2</sup> ). SELEX is a company that designs and develops systems for Homeland Protection, systems and radar for air defense.
01/01/2011	30/07/2011	Istituto G. Meschini. Viale Giotto 1, 00153 Rome (Italy)	<b>Lecturer</b> (Docente a contratto) for the course of “ <b>Basi di Dati</b> ” (Databases) for the Meschini Institute. The course was held in the range of the IFTS - Istruzione e Formazione Tecnica Superiore (Higher technical education and training) courses.
02/10/2012	03/10/2012	CINI - Consorzio Interuniversitario Nazionale per l'Informatica. Via Salaria 113, 00185 Rome (Italy)	<b>Lecturer</b> (Docente a contratto) for the course “ <b>Human-Machine Interaction</b> ”, held for SELEX - Sistemi Integrati (now incorporated with Leonardo/Finmeccanica). SELEX is a company that designs and develops systems for Homeland Protection, systems and radar for air defense, battlefield management, etc.
13/10/2015	15/10/2015	NESEA. via Flavio Domiziano 10, 00145 Rome (Italy)	<b>Lecturer</b> (Docente a contratto) for the course “ <b>Process Simulation and Mining</b> ”, held for NESEA <sup>3</sup> . Nesea is an Italian consulting ICT company.

<sup>2</sup> <http://www.leonardocompany.com/en>

<sup>3</sup> <http://www.nesea.it/>

25/02/2016	03/03/2016	Consorzio Interuniversitario CINECA. via Magnanelli 6/3, 40033 Casalecchio di Reno, Bologna (Italy)	<b>Lecturer</b> (Docente a contratto) for the course of “ <b>Human-Computer Interaction</b> ”, held for CINECA <sup>4</sup> . CINECA is a non-profit consortium, made up of 70 Italian universities, four national research centers, and the Ministry of Universities and Research (MIUR), which aims at supporting the Italian scientific community through supercomputing and scientific visualization tools.
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#### (IV D) – Theses Supervisor

Since 2010, within DIAG, Andrea Marrella **co-supervised**:

- **2 M.sc. student** and **27 B.sc. students** in Engineering in Management Science on the topics of process choreography design, data quality and big data management through NoSQL technologies.
- **9 M.sc. students** and **1 B.sc. student** in Engineering in Computer Science on the topics of software learnability, conformance checking, process mining on databases, process repair, process adaptation and process resilience in cyber-physical and IoT-based environments.

Moreover, he co-supervised **2 M.sc theses** in Computer Science for Software Engineering at the University of Tartu (Estonia) on the topics of process discovery and adaptation. Notably, the majority of his M.sc. students completed their degree with the highest honours and **7 of them published the results of their thesis in international peer-reviewed scientific workshops and conferences** (see below for more details).

- M. de Leoni, **G. Lanciano**, **A. Marrella**. *Aligning Partially-Ordered Process-Execution Traces and Models Using Automated Planning*. In: 28th Int. Conf. on Automated Planning and Scheduling (ICAPS 2018), AAAI Press, Delft, the Netherlands, 24-29 June 2018
- F. Leotta, **A. Marrella**, M. Mecella, **F. Palucci**, **C. Seri**, T. Catarci. *Encouraging persons to visit cultural sites through mini-games*. In: EAI Endorsed Transactions on Serious Games, Volume 18, Issue 14, EAI, January 2018
- M. de Leoni, **G. Lanciano**, **A. Marrella**. A Tool for Aligning Event Logs and Prescriptive Process Models through Automated Planning. In: 15th Int. Conf. on Business Process Management (BPM 2017), Demo Track, CEUR Workshop Proceedings (Volume 1920), Barcelona, Spain, 10-15 September 2017
- **T. Collerton**, **A. Marrella**, M. Mecella, T. Catarci. Route Recommendations to Business Travelers Exploiting Crowd-Sourced Data. In: 14th Int. Conf. on Mobile Web and Intelligent Information Systems (MobiWIS 2017), Springer Int. Publishing, Prague, Czech Republic, 21-23 August 2017
- **O. Hanteer**, **A. Marrella**, M. Mecella, T. Catarci. *A Petri-Net Based Approach to Measure the Learnability of Interactive Systems*. In: 13th Int. Conf. on Advanced Visual Interfaces (AVI 2016), ACM, Bari, Italy, 7-10 June 2016
- **A. Marrella**, **P. Halapuu**, M. Mecella, S. Sardina. *Automated Process Adaptation in Cyber-Physical Domains with the SmartPM System*. In: 8th Int. Conf. on Service-Oriented Computing and Applications (SOCA 2015), IEEE, Rome, Italy, 19-21 October 2015
- **A. Marrella**, **P. Halapuu**, M. Mecella, S. Sardina. *SmartPM: An Adaptive Process Management System for Executing Processes in Cyber-Physical Domains*. In: 13th Int. Conf. on Business Process

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<sup>4</sup> <https://www.cineca.it/en>

Management (BPM 2015), Demo Track, CEUR Workshop Proceedings (Volume 1418), Innsbruck, Austria, 31 August - 3 September 2015

- **F. Cossu, A. Marrella**, M. Mecella, A. Russo, S. Kimani et al. *Supporting Doctors through Mobile Multimodal Interaction and Process-aware Execution of Clinical Guidelines*. In: 7th Int. Conf. on Service Oriented Computing & Applications (SOCA 2014), IEEE, Matsue, Japan, 17-19 November 2014
- **F. Cossu, A. Marrella**, M. Mecella, A. Russo, G. Bertazzoni, M. Suppa, F. Grasso. *Improving Operational Support in Hospital Wards through Vocal Interfaces and Process-Awareness*. In: 25th Int. Symposium on Computer-Based Medical Systems (CBMS 2012), IEEE, Rome, Italy, 20-22 June 2012

The following papers, based on theses of M.sc. students supervised by Andrea Marrella, are currently under review:

- **G. Capezzuto**, F. M. Maggi, **A. Marrella**, Abel Armas Cervantes. *Explaining Non-Compliance of Business Process Models through Automated Planning*. Under review at: 16th Int. Conf. on Business Process Management (BPM 2018), Springer, Sydney, Australia, 9-14 September 2018
- A. Augusto, R. Conforti, M. Dumas, M. La Rosa, F. Maria Maggi, **A. Marrella**, M. Mecella, **A. Soo**. *Automated Discovery of Process Models from Event Logs: Review and Benchmark*. Under Review at: IEEE Transactions on Knowledge and Data Engineering (TKDE, IEEE, ISSN: 1041-4347)

## Part V – Scientific Awards and Society Memberships

Year	Title
2017	<b>Best Paper Award</b> at the prestigious <b>CAISE 2017</b> conference (29th International Conference on Advanced Information Systems Engineering) for the paper: “Multi-party Business Process Resilience By-Design: A Data-centric Perspective”.
2013-in progress	Member of the Italian Association for Artificial Intelligence (AI*IA).

## Part VI – Funding Information [grants as PI-principal investigators or I-investigator]<sup>5</sup>

Year	Title	Program	Role	Grant value
2017-2019	<b>FILIERASICURA</b>	Project lead by Sapienza CIS (Cyber Intelligence and Information Security Research Center)	Participant	---
2017-2019	<b>IT-SHIRT</b> - “IT empowering faSHIon design creators with a next-generation co-cReation ecosysTem”	Project funded by Sapienza Università di Roma	WP3 Leader	€ 37.000

<sup>5</sup> See “Part XII - Further Information” for further details on the specific participation to the projects.

2015-2018	<b>NEPTIS</b> – “Soluzioni ICT per la fruizione e l’esplorazione aumentata di Beni Culturali”	Programma Operativo Nazionale Ricerca e Competitività (PON R&C –PON03PE_00214_3)	OR-4 Leader	Financing to Sapienza: € 202.897
2016-2017	<b>DAKIP</b> – “Data-aware Adaptation of Knowledge-intensive Processes in Cyber-Physical Domains through Action-based Languages”	Project funded by Sapienza Università di Roma (Progetto di Avvio alla Ricerca)	Principal Investigator	€ 2.000
2014-2016	<b>ACI-I</b> – “Development of an ontology modeling for ACI and experimentation of the semantic technologies for accessing data”	Project funded by ACI (Automobile Club d’Italia) in collaboration with Sapienza Università di Roma	Participant	€ 120.000
2014-2015	<b>FIGO</b> – “Un Framework aperto ed Integrabile basato su modelli di nuova generazione per la Gestione ottimizzata e il cOnsolidamento di sistemi IT che prevedono l’erogazione di servizi B2B mediante l’utilizzo massivo di device mobile, anche attraverso il tracciamento ed il monitoraggio dei processi di business”	Project funded by Regione Lazio (POR FESR Lazio 2007/2013)	Unit Leader	€ 110.000
2014	<b>SUPER</b> – “SUPporting E-health knowledge-intensive pRocesses”	Project funded by Sapienza Università di Roma	Participant	€17.000
2013	<b>TESTMED</b> – “meTodi e tEcniche per la geSTione dei processi nella MEDicina D’urgenza”	Project funded by Sapienza Università di Roma	Participant	€24.000
2006–2009	<b>WORKPAD</b> – “An Adaptive Peer-to-Peer Software Infrastructure for Supporting Collaborative Work of Human Operators in Emergency/Disaster Scenarios”	Project funded by the European Union 6th Framework Programme (FP6)	Participant	Overall funding from EU: €1.850.000 Financing to Sapienza: €315.000
2005	<b>MAIS</b> - “Multichannel Adaptive Information Systems”	Project funded by Italian FIRB 2001	Participant	Financing to Sapienza: €1.200.000

## **Part VII – Research Activities**

The **research activity** of Andrea Marrella concerns **theoretical, methodological, and practical aspects** in different areas of **Computer Science**, including Business Process Management, Modelling, Adaptation, Mining and Resilience, Cyber-Security and Human-Computer Interaction. Such topics are challenged in the application domains of smart manufacturing, healthcare, emergency management and cultural heritage.

Since 2007, Andrea Marrella regularly **publishes the results of his research** in top-level international journals and conferences. Notably, since 2013, he has increasingly established his **scientific independence** by authoring papers presented in collaboration with different authors than the supervisor. Overall, he has co-authored **49 peer-reviewed scientific papers** on the above research topics.

Since 2011, his research activity has been mainly devoted to investigate how to integrate the solid theoretical foundations provided by action-based formalisms in Artificial Intelligence (AI) with the practical needs required by Business Process Management (BPM) solutions. Thanks to the recognized results of his research, **he is actually considered as one of the pioneers of the concrete application of AI techniques to untangle complex challenges from the BPM domain**, such as the **automated synthesis of process models**, the **automated adaptation of running processes** and the **optimal alignment of execution traces against their underlying (procedural or declarative) process models**. For this reason, he was invited to give the **keynote talk** in the First Workshop on BP Innovation with Artificial Intelligence (BPAI'17) organized within the BPM 2017 conference (GII-GRIN Class A - CORE Class A), where he presented his research on “*What Automated Planning can do for BPM*” [W1]. He was also invited to publish (as a single author) an article at the Journal of Data Semantics (Springer) on this topic [U6].

From 2006 to 2010, the research of Andrea Marrella focused on realizing **advanced methodologies and tools** in the field of Human-Computer Interaction (HCI). Specifically, he designed and developed **innovative touch-based graphical user interfaces for pen-based mobile devices** (notice that touch-based interaction for mobile devices started to become popular since late 2008 with the mass production of iPhone 3G) and the realization of **advanced workflow engines** and **location-based services** for supporting collaborative work of human operators on-the-field in emergency/disaster scenarios.

His **current research** on HCI tackles a well-known (unsolved) challenge in this area, namely the **automated quantification of learnability of interactive systems**. In this direction, he is focusing on developing a **theoretical and practical framework that exploits Process Mining algorithms and technologies to automatically derive the learnability of a system** during its daily use. The **impact** of this research, which requires a strong background and expertise in BPM and HCI, is potentially **ground-breaking** in the HCI field, as it aims at superseding the expensive and time-consuming learnability techniques for observing users in highly controlled environments over extended periods of time.

In 2018, Andrea Marrella contributed to the writing of the second edition of the **white book on the future of cyber-security in Italy**. In this direction, his **current research** on cyber-security is focused, on the one hand, on exploiting **Process Mining techniques** to the **detection of anomalous behaviours** and **prediction of security issues in information systems**. On the other hand, he is investigating user-centred solutions for tackling the **human factors in cyber-security**, in order to **increase cyber-awareness** and **reduce human errors**, which are often the cause of security breaches.

Andrea Marrella is affiliated to **DASIlab** (Data and Service Integration) at Dipartimento di Ingegneria Informatica Automatica e Gestionale Antonio Ruberti, and is a member of the **Data and Service Management research group** and of the **Human-Computer Interaction research group**. His overall research activity has been carried out in Rome (Italy), Tartu (Estonia), and Toronto (Canada) during a 6-month visit during his PhD.

His main research accomplishments in all the areas of interest are summarized below (see “Part IX - Publications” for a fully comprehensive list of publications, together with the respective publication venues).



## Keywords

## Brief Description

### Business Process Management

*Application of AI techniques to tackle complex challenges in the BPM field*

*Data-aware and Knowledge-intensive Processes*

**Business Process Management (BPM)** is an active research area that is based on the observation that each product and/or service that a company provides to the market is the outcome of a number of activities performed. Business processes are the key instruments for organizing such activities and understanding their interrelationships.

In the context of the BPM field, **the research of Andrea Marrella** concentrates on *providing a formally well-founded view to BPM using formalisms developed for reasoning about actions in AI, such as situation Calculus, Indigolog and Automated Planning*. Specifically, in his PhD Thesis [P1], Andrea Marrella has demonstrated that action-based languages provide a rich and natural framework for supporting the formal declarative specification and executable semantics of data-aware business processes and for automating a number of reasoning tasks that arise in this context, such as: the *automated generation of process models*, the *automated adaptation of business processes at run time* and the *optimal alignment of execution traces against their underlying (procedural or declarative) process models*. A detailed description of the above topics is provided in the subsequent boxes.

**Andrea Marrella is also involved** in *investigating and designing solutions to the management of Data-aware and Knowledge-intensive Processes (KiPs)* [W6]. In 2015, he wrote a complete state-of-the-art and an evaluation framework for KiPs, which is published in the Journal on Data Semantics (Springer) [J6] and is currently his most cited paper (99 citations according to Google Scholar). On this topic, he also organized two editions of the *Knowledge-intensive Business Processes (KIBP) Workshop*, which were collocated with the international conferences KR 2012 and SOCA 2013, respectively.

In 2017, he wrote - together with Prof. Manfred Reichert of Ulm University (Germany) – a *systematic literature review on data-aware business processes*, which is currently under review at the Software and System Modeling journal (Springer) [U4]. Preliminary results of this research have been also published in national and international conferences [C11, N2].

All the above topics were also investigated within the DAKIP, WORKPAD, SUPER and FIGO projects.

### Process Modeling

*Automated generation of process models via planning techniques*

*Automated synthesis of chemical process models through action-based formalisms in AI*

**Process Modeling** is the first and most important step in the BPM lifecycle, which intends to provide a high-level specification of a business process that is independent from implementation and serves as a basis for process automation and verification.

On this topic, **Andrea Marrella has co-authored** with Yves Lespérance (York University, Canada) some works describing *how AI planning can be employed to the automated generation of process models at design-time in case of incomplete knowledge* [J3, C17, W3]. These works are the result of a research started in 2012 during his appointment at York University of Toronto (Canada).

In 2013, **Andrea Marrella has also investigated** the *formalization of an innovative approach based on action formalisms in Knowledge Representation and Reasoning for the automated synthesis of chemical process models in organic chemistry*. This effort produced two publications [W4, W5], which have been the result of a research started in 2013 (in collaboration with Prof. Mikhail Soutchanski) during his appointment at Ryerson University of Toronto (Canada).

<b>Process Adaptation</b>	<b>Process Adaptation</b> is the ability of a business process to react to exceptional circumstances (that may be or may not be foreseen) and to adapt/modify its structure accordingly. Since 2010, <b>Andrea Marrella has developed a research program</b> aimed at addressing the main issues of automated process adaptation in BPM.
<i>Automated process adaptation in cyber-physical domains through action-based formalisms in AI</i>	On this area, <b>his first publications</b> were targeted to <i>define a general technique to repair running processes in unpredictable environments</i> [C18, C20] and to <i>demonstrate that not only it is possible to employ AI planning techniques for the synthesis of recovery procedures, but also that such techniques can be successfully integrated with real BPM environments</i> [C21, C22].
	<b>The main outcome</b> of this line of research has been the <i>development of a formal framework and a concrete implementation, called SmartPM, for solving the challenge of automated adaptation of data-aware business processes at run-time</i> . The theoretical approach underlying SmartPM has been presented at the prestigious KR'16 conference (GII-GRIN Class A+, CORE Class A*) [c16], where it has received 34 citations (to date), while its development as a fully-fledged PMS has been recently published in the top-ranked ACM Transactions on Intelligent Systems and Technologies [J5]. SmartPM is receiving considerable attention by the scientific community, to such an extent that Rick Hull (Senior Research Scientist at IBM T.J. Watson Research Center), in his keynote talk on " <i>Rethinking BPM in a Cognitive World: Transforming how we Learn and Perform Business Processes</i> " delivered at the BPM'16 conference, has described SmartPM as: "[...] <i>an excellent demonstration of how a smart integration of significant AI technologies can lead to the solution of complex practical problems in the BPM domain</i> ".
	<b>The obtained research results</b> [J1, J5, C7, C12, C13, C15, C16, W2] have established <b>Andrea Marrella as one of the most influential researchers in the field of automated process adaptation</b> , and this is further testified by the fact that he was invited to write an overview chapter on " <i>Adaptive Process Management in Cyber-Physical Domains</i> ", published in the Book: "Advances in Intelligent Process-Aware Information Systems" (Springer) [B2].
	Andrea Marrella has also investigated the above topic in the research project DAKIP, funded by Sapienza Università di Roma in 2016.

<b>Process Mining</b>	<b>Process mining</b> is about extracting knowledge from event logs commonly available in today's information systems. These techniques provide new means to discover, monitor and improve processes in a variety of application domains. In the context of process mining, <i>trace alignment</i> consists of verifying whether the observed behavior of a process, stored in an event log, is compliant with its underlying model that encodes how it is allowed to be executed, and to repair it in order to ensure that norms and regulations are not violated.
<i>Trace alignment through planning techniques</i>	In 2016 and 2017, together with other international colleagues, <b>Andrea Marrella has developed three novel algorithms</b> to solve the trace alignment problem in process mining against procedural and declarative process models. <i>The developed algorithms, which leverage on AI planning techniques to the computation of optimal alignments, are able to outperform the existing approaches even of several orders of magnitude</i> . Andrea Marrella published these algorithms in the prestigious ICAPS'16 [C8] and ICAPS'18 [C1] (GII-GRIN Class A, CORE Class A*) and AAAI'17 [C6] (GII-GRIN Class A++, CORE A*) conferences and in the top-ranked Expert Systems with Applications journal (Elsevier) [J4]. Other works on this topic
<i>Benchmarks and frameworks for evaluating process discovery approaches</i>	

are: [C3, N1, U1]. Notice that part of the above research has been performed in collaboration with Prof. Marlon Dumas and Prof. Fabrizio Maria Maggi, during the appointment at University of Tartu (Estonia).

Moreover, in 2017 **Andrea Marrella has submitted an article** (with renowned experts in the field of process mining) *developing a framework and a benchmark for classifying the automated discovery approaches available in the research literature*, which is currently under review at IEEE Transactions on Knowledge and Data Engineering (TKDE, IEEE) [U3].

Thanks to his research on process mining, in 2017 **Andrea Marrella was invited to organize and give a full-day tutorial on Process Mining** at 18th International Conference on Product-Focused Software Process Improvement (PROFES 2017). The results of this tutorial has been published in [C2].

## Process Resilience

*Design-time approaches to improve resilience of data-aware processes*

**Process Resilience** determines the long-term ability of a business process to successfully and robustly deal with adversities, so that the most frequent identified failures at run-time can be possibly incorporated in the process models. This will allow to make the future instantiations of a process model more robust against deviations and to mitigate the impact of exceptional situations.

In the context of Process Resilience, the **research of Andrea Marrella** is focusing on *investigating design-time approaches to model processes in a way that they will result more resilient at run-time from a data-aware perspective*. On this topic, he published a paper [C5] at the prestigious CAiSE'17 conference (ranked as "class A", according to both GII-GRIN and CORE rankings), where he received the **Best Paper Award**. Furthermore, he was also invited to write a chapter for the book "Conceptual Modeling Perspectives" published by Springer [B1], and he wrote a journal article (that is currently under review) at the high-ranked Information Systems journal (Elsevier) [U5].

## Human-Computer Interaction

*User-centered Design methodologies for effective design of Process Management Systems*

*Multimodal User Interfaces (UIs)*

*Learnability of Interactive Systems*

*Gamification and crowd-sourcing techniques*

**Human-Computer Interaction (HCI)** is a research topic focusing on the interfaces between users and computers. In the context of HCI, the **research of Andrea Marrella** concentrates on:

(i) *designing and realizing concrete process management systems for emergency operators that act in disaster situations by leveraging on user-centered design methodologies* [J7,J9,C24,C27,W7,W8];

(ii) *designing multimodal user interfaces (UIs) for mobile devices in the healthcare and emergency management settings* [J8,C14,C19,C23,C25,C26];

(iii) *investigating how to automatically derive learnability metrics associated to the usage of a system using Process Mining techniques* [C10,U2];

(iv) *developing approaches based on gamification and crowd-sourcing techniques to improve the user experience of humans visiting a cultural site or a museum* [J2,C4,C9,N3].

The above research topics were also investigated within the MAIS, WORKPAD, TESTMED, SUPER, NEPTIS and IT-SHIRTS projects.

<b>Cyber Security</b>	<p>The research field of <b>Cyber-Security</b> investigates solutions for protecting computers, networks, programs and data from unauthorized access or attacks that are aimed for exploitation. This field is of growing importance due to the increasing presence of connected artifacts (such as sensors and smartphones) producing huge amounts of data and events that may dramatically influence the reliability of modern information systems.</p> <p>In 2018, Andrea Marrella <b>contributed to the writing of the second edition of the white book on the future of cyber-security in Italy</b>. In this direction, In the context of Cyber-Security, the <b>research of Andrea Marrella</b> concentrates on:</p> <p><i>(i) exploiting Process Mining techniques to the detection of anomalous behaviours and the prediction of security issues in information systems;</i></p> <p><i>(ii) investigating user-centred solutions for tackling the human factors in cyber-security, in order to increase cyber-awareness and reduce human errors, which are often the cause of security breaches.</i></p> <p>The above research topics are also investigated within the FILIERASICURA project.</p>
<i>Detection of anomalous behaviours</i>	
<i>Prediction of security issues</i>	
<i>Human Factors in Cybersecurity</i>	

## Part VIII – Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
Journal Papers [international]	9	Google Scholar	2008	2018
Book Chapters [scientific]	2	Google Scholar	2017	2017
Conference Papers [international]	27	Google Scholar	2007	2018
Conference Papers [national]	3	Google Scholar	2014	2017
International Workshops [scientific]	8	Google Scholar	2008	2017
Edited Works [scientific]	2	Google Scholar	2012	2015
Technical Reports [scientific]	2	Google Scholar	2011	2016
Theses [academic]	3	Sapienza	2005	2013
Papers under review	6	-----	---	---

Metrics	Google Scholar	Scopus
Number of Research Products*	49	46
Total Citations	607	354
Average Citations per Product°	13,19 (12,39)	7,86 (7,69)
Hirsch (H) index	14	12
i10-index	17	12
Normalized H index''	3,5 (1,75)	3 (1,5)

\* Edited works, technical reports and theses are not considered in the list of research products.

° The *average citations* are calculated on the basis of the peer-reviewed articles published from 2007 to 2017. Some of the 2018 articles have been accepted for publication but not still published in the respective proceedings, therefore they are included separately in the computation (see the value in round brackets).

'' *Normalized H index* is the H-index divided by the academic seniority. Notice that Dr. Andrea Marrella graduated in 2009, got his PhD in October 2013 and his first scientific publication relates to December 2007. For the computation of the metric, the academic seniority has been calculated in two different ways: (i) as the time span from the completion of the PhD, which can be estimated to be 4 years and 4 months (rounded down to 4 years); (ii) as the time span from the starting of the PhD, which can be estimated to be 8 years and 4 months (rounded down to 8 years); in the latter case, the value of the metric is in the round brackets.

## National Habilitation Requirements

According to Scopus, as of Feb 26, 2018, Andrea Marrella's indicators meet 100% of the requirements\*\* to apply for the national scientific habilitation as Associate Professor for sector 09/H1 (SISTEMI DI ELABORAZIONE DELLE INFORMAZIONI) and 01/B1 (INFORMATICA):

Indicator**	Required value (09/H1)	Required value (01/B1)	My Values
Hirsch (H) index [in the last 10 years]	6	6	11
Total citations [in the last 10 years]	99	118	332
Journal articles [in the last 5 years]	4	5	5

\*\*See: [http://attiministeriali.miur.it/media/282834/tabellevalori-sogliaallegatedm29luglio2016\\_602.pdf](http://attiministeriali.miur.it/media/282834/tabellevalori-sogliaallegatedm29luglio2016_602.pdf)

## Part IX – Publications<sup>6</sup>

### International Journals<sup>7</sup>

J1. **[SELECTED PUBLICATION]**

**A. Marrella**, M. Mecella, S. Sardina. *Supporting Adaptiveness of Cyber-Physical Processes through Action-based Formalisms*. In: AI Communications (ISSN 0921-7126), Volume 31, Issue 1, pp. 47-74, IoS Press, February 2018 **[JCR 0.654/0.871] [SJQ Q2/Q3] [GS 1] [SC 0]**

J2. F. Leotta, **A. Marrella**, M. Mecella, F. Palucci, C. Seri, T. Catarci. *Encouraging persons to visit cultural sites through mini-games*. In: EAI Endorsed Transactions on Serious Games (ISSN 2034-8800), Volume 18, Issue 14, EAI, January 2018

J3. **[SELECTED PUBLICATION]**

**A. Marrella**, Y. Lespérance. *A planning approach to the automated synthesis of template-based process models*. In: Service Oriented Computing and Applications (ISSN 1863-2386), Volume 11, Issue 4, pp. 367-392, Springer London, December 2017 **[IF 1.691] [SJQ Q1/Q2] [GS 2] [SC 1]**

J4. **[SELECTED PUBLICATION]**

M. de Leoni, **A. Marrella**. *Aligning Real Process Executions and Prescriptive Process Models through Automated Planning*. In: Expert Systems with Applications (ISSN 0957-4174), Volume 82, pp. 162-183, Elsevier, October 2017 **[JCR 3.928/3.526] [SJQ Q1] [GS 9] [SC 6]**

J5. **[SELECTED PUBLICATION]**

**A. Marrella**, M. Mecella, S. Sardina. *Intelligent Process Adaptation in the SmartPM System*. In: ACM Transactions on Intelligent Systems and Technology (ISSN: 2157-6904), Volume 8, Issue 2, ACM, January 2017 **[JCR 3.196/10.473] [SJQ Q1] [GS 11] [SC 7]**

J6. **[SELECTED PUBLICATION]**

C. Di Ciccio, **A. Marrella**, A. Russo. *Knowledge-intensive Processes. Characteristics, Requirements and Analysis of Contemporary Approaches*. In: Journal on Data Semantics (ISSN 1861-2032), Volume 4, Issue 1, pp. 29-57, Springer Berlin Heidelberg, March 2015 **[IF 1.501] [SJQ Q1/Q2] [GS 99] [SC 61]**

J7. T. Catarci, M. de Leoni, **A. Marrella**, M. Mecella, A. Russo, M. Bortenschlager, R. Steinmann. *WORKPAD: Process Management and Geo-Collaboration Help Disaster Response*. International Journal of Information Systems for Crisis Response and Management (ISSN 1937-9390), Volume 3, Issue 1, pp. 32-49, IGI Global, January-March 2011

J8. S. R. Humayoun, T. Catarci, M. de Leoni, **A. Marrella**, M. Mecella, M. Bortenschlager, R. Steinmann. *Designing Mobile Systems in Highly Dynamic Scenarios. The WORKPAD Methodology*. In: International Journal on Knowledge, Technology and Policy (ISSN 0897-1986), Volume 22, Issue 1, pp. 25-43, Springer Netherlands, March 2009

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<sup>6</sup> The **12 publications selected for the evaluation** are explicitly tagged with the label **[SELECTED PUBLICATION]**. For such publications, the number of citations on Google Scholar is reported in the format **[GS #]**, while the number of citations on Scopus is reported in the format **[SC #]**. Notice that the 12 selected publications are also included separately in the document: "Allegato D1 - Elenco\_12\_Pubblicazioni.pdf"

<sup>7</sup> The quality of a journal is assessed through the following metrics (all metrics are updated with 2016 annual values):

- Incites Journal Citation Reports (**JCR**) calculates the global/5-year Impact Factor of a journal.
- (In absence of JCR) Impact Factor (**IF**) extracted from the web page of the specific journal.
- SCImago Journal Rank (**SJR**) measures the scientific influence of a journal and ranges from Q3 (top) to Q4.

J9. **[SELECTED PUBLICATION]**

T. Catarci, M. de Leoni, **A. Marrella**, M. Mecella, B. Salvatore, G. Vetere, S. Dustdar, L. Juszczak, A. Manzoor, Hong-Linh Truong. *Pervasive and Peer-to-Peer Software Environments for Supporting Disaster Responses*. In: IEEE Internet Computing Journal (ISSN 1089-7801), Volume 12, Issue 1, pp. 26-37, IEEE, January-February 2008 [**JCR 1.521/2.946**] [**SJR Q1**] [**GS 99**] [**SC 54**]

## Book Chapters

- B1. **A. Marrella**, M. Mecella, B. Pernici, G. Plebani. *Design-time Models for Resiliency*. In: Book on Conceptual Modeling Perspectives (ISBN 978-3-319-67270-0), pp. 105-120, Springer, October 2017
- B2. **A. Marrella**, M. Mecella. *Adaptive Process Management in Cyber-Physical Domains*. In: Book on Advances in Intelligent Process-Aware Information Systems (ISBN 978-3-319-52179-4), Intelligent Systems Reference Library, Vol. 123, pp. 15-48, Springer International Publishing, May 2017

## International Conferences<sup>8</sup>

C1. **[SELECTED PUBLICATION]**

M. de Leoni, G. Lanciano, **A. Marrella**. *Aligning Partially-Ordered Process-Execution Traces and Models Using Automated Planning*. In: Proceedings of the 28th International Conference on Automated Planning and Scheduling (ICAPS 2018), AAAI Press, Delft, the Netherlands, 24-29 June, 2018 [**CORE A\***] [**GII-GRIN A**] [**GS 0**] [**SC 0**]

- C2. A. Janes, F. M. Maggi, **A. Marrella**, M. Montali. *From Zero to Hero: A Process Mining Tutorial*. In: Proceedings of the 18th International Conference on Product-Focused Software Process Improvement (PROFES 2017), pp. 625-629, Springer, Innsbruck, Austria, 29 November – 1 December 2017

- C3. M. de Leoni, G. Lanciano, **A. Marrella**. *A Tool for Aligning Event Logs and Prescriptive Process Models through Automated Planning*. In: Proceedings of the 15th International Conference on Business Process Management (BPM 2017), Demonstration Track, CEUR Workshop Proceedings (Vol. 1920), Barcelona, Spain, 10-15 September 2017

- C4. T. Collerton, **A. Marrella**, M. Mecella, and T. Catarci. *Route Recommendations to Business Travelers Exploiting Crowd-Sourced Data*. In: Proceedings of the 14th International Conference on Mobile Web and Intelligent Information Systems (MobiWIS 2017), pp. 3-17, Springer International Publishing, Prague, Czech Republic, 21-23 August 2017

C5. **[SELECTED PUBLICATION]**

G. Plebani, **A. Marrella**, M. Mecella, M. Mizmizi, B. Pernici. *Multi-party Business Process Resilience by Design: A Data-centric Perspective*. **Best Paper Award**. In: Proceedings of the 29th International Conference on Advanced Information Systems Engineering (CAiSE 2017), pp. 110-124, Springer International Publishing, Essen (Germany), 12-16 June 2017 [**CORE A**] [**GII-GRIN A**] [**GS 1**] [**SC 0**]

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<sup>8</sup> The quality of a conference is assessed according to the well-known GII-GRIN (A++, A+: excellent, top notch conferences, A: very good events) and CORE (A\*: top 4%, A: top 14%) rankings.

- C6. **[SELECTED PUBLICATION]**  
G. De Giacomo, F. M. Maggi, **A. Marrella**, F. Patrizi. *On the Disruptive Effectiveness of Automated Planning for LTLf-based Trace Alignment*. In: Proceedings of the Thirty-First AAAI Conference on Artificial Intelligence (AAAI-17), pp. 3555-3561, AAAI Press, San Francisco, USA, 4-9 February 2017 **[CORE A\*]** **[GII-GRIN A++]** **[GS 7]** **[SC 4]**
- C7. **A. Marrella**, M. Mecella, S. Sardina. *An Adaptive Process Management System Implementation based on Situation Calculus, Indigolog and Classical Planning*. In: Proceedings of the 25th International Joint Conference on Artificial Intelligence (IJCAI 2016), Demonstration Track, pp. 4258-4259, AAAI Press, New York, USA, 9-15 July 2016
- C8. **[SELECTED PUBLICATION]**  
G. De Giacomo, F. M. Maggi, **A. Marrella**, S. Sardina. *Computing Trace Alignment against Declarative Process Models through Planning*. In: Proceedings of the 26th International Conference on Automated Planning and Scheduling (ICAPS 2016), pp. 367-375, AAAI Press, London, UK, 12-17 June 2016 **[CORE A\*]** **[GII-GRIN A]** **[GS 6]** **[SC 4]**
- C9. T. Catarci, F. Leotta, **A. Marrella**, M. Mecella, D. Sora, P. Cottone, G. Lo Re, M. Morana, M. Ortolani, V. Agate, G. Renato, G. Meschino, G. Pecoraro. *Your Friends Mention It. What About Visiting It? A Mobile Social-Based Sightseeing Application*. In: Proceedings of the 13th International Conference on Advanced Visual Interfaces (AVI 2016), pp. 300-301, ACM, Bari, Italy, 7-10 June 2016
- C10. O. Hanteer, **A. Marrella**, M. Mecella, T. Catarci. *A Petri-Net Based Approach to Measure the Learnability of Interactive Systems*. In: Proceedings of the 13th International Conference on Advanced Visual Interfaces (AVI 2016), pp. 312-313, ACM, Bari, Italy, 7-10 June 2016
- C11. **A. Marrella**, M. Mecella, A. Russo, S. Steinau, K. Andrews, M. Reichert. *Data in Business Process Models. A Preliminary Empirical Study*. In: Proceedings of the 8th IEEE International Conference on Service Oriented Computing & Applications (SOCA 2015), pp. 116-122, IEEE, Rome, Italy, 19-21 October 2015
- C12. **A. Marrella**, M. Mecella, P. Halapuu, S. Sardina. *Automated Process Adaptation in Cyber-Physical Domains with the SmartPM System*. In: Proceedings of the 8th IEEE International Conference on Service Oriented Computing & Applications (SOCA 2015), pp. 59-64, IEEE, Rome, Italy, 19-21 October 2015
- C13. **A. Marrella**, M. Mecella, P. Halapuu, S. Sardina. *SmartPM: An Adaptive Process Management System for Executing Processes in Cyber-Physical Domains*. In: Proceedings of the 13th International Conference on Business Process Management (BPM 2015), Demonstration Track, CEUR Workshop Proceedings (Vol. 1418), pp. 115-119, Innsbruck, Austria, 31 August - 3 September 2015
- C14. F. Cossu, **A. Marrella**, M. Mecella, A. Russo, S. Kimani et al. *Supporting Doctors through Mobile Multimodal Interaction and Process-aware Execution of Clinical Guidelines*. In: Proceedings of the 7th IEEE International Conference on Service Oriented Computing & Applications (SOCA 2014), pp. 183-190, IEEE, Matsue, Japan, 17-19 November 2014
- C15. **A. Marrella**, M. Mecella, S. Sardina, P. Tucceri. *SmartPM: Automated Adaptation of Dynamic Processes*. In: Proceedings of the 12th International Conference on Service-Oriented Computing (ICSOC 2014), Demonstration Track, pp. 423-427, Springer International Publishing, Paris, France, 3-6 November 2014



C16. **[SELECTED PUBLICATION]**

**A. Marrella**, M. Mecella, S. Sardina. *SmartPM: An Adaptive Process Management System through Situation Calculus, IndiGolog, and Classical Planning*. In: Proceedings of the 14th International Conference on Principles of Knowledge Representation and Reasoning (KR 2014), AAAI Press, Vienna, Austria, 20-24 July 2014 **[CORE A\*]** **[GII-GRIN A+]** **[GS 34]** **[SC 22]**

C17. **A. Marrella**, Y. Lespérance. *Synthesizing a Library of Process Templates through Partial-Order Planning Algorithms*. In: Proceedings of the 14th International Conference on Business Process Modeling, Development and Support (BPMDS 2013), in conjunction with CAiSE 2013, pp. 277-291, Springer Berlin Heidelberg, Valencia, Spain, 17-18 June 2013

C18. **[SELECTED PUBLICATION]**

**A. Marrella**, A. Russo, M. Mecella. *Planlets: Automatically Recovering Dynamic Processes in YAWL*. In: Proceedings of the 20th International Conference on Cooperative Information Systems (CoopIS 2012), pp. 268-286, Springer Berlin Heidelberg, Rome, Italy, 10-14 September 2012 **[CORE A]** **[GII-GRIN A]** **[GS 24]** **[SC 22]**

C19. F. Cossu, **A. Marrella**, M. Mecella, A. Russo, G. Bertazzoni, M. Suppa, F. Grasso. *Improving Operational Support in Hospital Wards through Vocal Interfaces and Process-Awareness*. In Proceedings of the 25th IEEE International Symposium on Computer-Based Medical Systems (CBMS 2012), pp. 1-6, IEEE, Rome, Italy, 20-22 June 2012

C20. **A. Marrella**, M. Mecella, A. Russo. *Featuring Automatic Adaptivity through Workflow Enactment and Planning*. In: Proceedings of the 7th International Conference on Collaborative Computing: Networking, Applications and Worksharing (CollaborateCom 2011), pp. 372-381, IEEE, Orlando, Florida, USA, 15-18 October 2011

C21. **A. Marrella**, M. Mecella, A. Russo, A.H.M. ter Hofstede, S. Sardina. *Making YAWL and SmartPM Interoperate: Managing Highly Dynamic Processes by Exploiting Automatic Adaptation Features*. In: Proceedings of the 9th International Conference on Business Process Management (BPM 2011), Demonstration Track, CEUR Workshop Proceedings (vol. 820), Clermont-Ferrand, France, 28 August - 2 September 2011

C22. **A. Marrella**, M. Mecella. *Continuous Planning for solving Business Process Adaptivity*. In: Proceedings of the 12th International Conference on Business Process Modeling, Development and Support (BPMDS 2011), Springer Berlin Heidelberg, pp. 118-132, London, UK, 20-21 June 2011

C23. **A. Marrella**, M. Mecella, A. Russo. *Collaboration On-the-field: Suggestions and Beyond*. In: Proceedings of the 8th International Conference on Information Systems for Crisis Response and Management (ISCRAM 2011), Lisbon, Portugal, 8-11 May 2011

C24. T. Catarci, M. de Leoni, **A. Marrella**, M. Mecella, M. Bortenschlager, R. Steinmann. *The WORKPAD Project Experience: Improving the Disaster Response through Process Management and Geo Collaboration*. In: Proceedings of the 7th International Conference on Information Systems for Crisis Response and Management (ISCRAM 2010), Seattle, USA, 2-5 May 2010

C25. S. R. Humayoun, T. Catarci, M. de Leoni, **A. Marrella**, M. Mecella, M. Bortenschlager, R. Steinmann. *The WORKPAD User Interface and Methodology: Developing Smart and Effective Mobile Applications for Emergency Operators*. In: Proceedings of the 5th International Conference on Universal Access in Human-Computer Interaction (UAHCI 2009), pp. 343-352, Springer Berlin Heidelberg, San Diego, USA, 19-24 July 2009

- C26. A. Capata, **A. Marrella**, R. Russo, M. Bortenschlager, H. Rieser. *A Geo-based Application for the Management of Mobile Actors during Crisis Situations*. In: Proceedings of the 5th International Conference on Information Systems for Crisis Response and Management (ISCRAM 2008), pp. 219-229, Washington DC, USA, 4-7 May 2008
- C27. M. de Leoni, **A. Marrella**, M. Mecella, F. De Rosa, A. Poggi, A. Krek, F. Manti. *Emergency Management: from User Requirements to a Flexible P2P Architecture*. In: Proceedings of the 4th International Conference on Information Systems for Crisis Response and Management (ISCRAM 2007), pp. 271-279, Delft, the Netherlands, 13-16 May 2007

### National Conferences

- N1. M. de Leoni, **A. Marrella**. *How Planning Techniques Can Help Process Mining: The Conformance-Checking Case*. In: Proceedings of the 25th Italian Symposium on Advanced Database Systems (SEBD 2017), CEUR Workshop Proceedings (Vol. 2037), Squillace Lido, Catanzaro, Italy, 25-29 June 2017
- N2. **A. Marrella**, M. Mecella, A. Russo, S. Steinau, K. Andrews, M. Reichert. *A Survey on Handling Data in Business Process Models (Discussion Paper)*. In: Proceedings of the 23th Italian Symposium on Advanced Database Systems (SEBD 2015), Curran Associates, pp. 304-311, Gaeta, Italy, June 14-17 2015
- N3. **A. Marrella**, S. Vassos. *Story Generation in PDDL using Character Moods: A Case Study on Iliad's First Book*. In: 8th Hellenic Conference on Artificial Intelligence (SETN 2014), pp. 583-588, Springer International Publishing, Ioannina, Greece, 15-17 May 2014

### International Workshops

- W1. **A. Marrella**. *What Automated Planning can do for Business Process Management*. In: Proceedings of the 1st International Workshop on BP Innovation with AI (BPAI 2017), pp. 7-19, Springer International Publishing, Barcelona, Spain, 11 September 2017
- W2. **A. Marrella**, M. Mecella. *Cognitive Business Process Management for Adaptive Cyber-Physical Processes* In: Proceedings of the 1st International Workshop on Cognitive Business Process Management (CBPM 2017), pp. 429-439, Springer International Publishing, Barcelona, Spain, 11 September 2017
- W3. **A. Marrella**, Y. Lespérance. *Towards a Goal-Oriented Framework for the Automatic Synthesis of Underspecified Activities in Dynamic Processes*. In: Proceedings of the 2nd International Workshop on Knowledge-intensive Business Processes (KiBP 2013), pp. 361-365, IEEE, Kauai, USA, 16 December 2013
- W4. A. Masoumi, M. Soutchanski, **A. Marrella**. *Organic Synthesis as Artificial Intelligence Planning*. In: Proceedings of the 6th International Workshop on Semantic Web Applications and Tools for Life Sciences (SWAT4LS 2013), CEUR Workshop Proceedings (Vol. 1114), Edinburgh, UK, 10 December 2013
- W5. A. Masoumi, **A. Marrella**, M. Soutchanski. *Towards a Planning-based Approach to the Automated Design of Chemical Processes*. In: Proceedings of the Workshop on AI meets Business Processes (AIBP 2013), pp. 61-70, CEUR Workshop Proceedings (Vol. 1101), Turin, Italy, 6 December 2013

- W6. C. Di Ciccio, **A. Marrella**, A. Russo. *Knowledge-intensive Processes: An Overview of Contemporary Approaches*. In: Proceedings of the 1st International Workshop on Knowledge-intensive Business Processes (KiBP 2012), pp. 33-47, CEUR Workshop Proceedings (Vol. 861), Rome, Italy, 15 June 2012
- W7. M. de Leoni, **A. Marrella**, A. Russo. *Process-aware Information Systems for Emergency Management*. In: Proceedings of the International Workshop on Emergency Management through Service Oriented Architectures (EMSOA) co-located with the ServiceWave 2010 Conference, pp. 50-58, Springer Berlin Heidelberg, Ghent, Belgium, 13 December 2010
- W8. M. de Leoni, **A. Marrella**, M. Mecella, S. Valentini, S. Sardina. *Coordinating Mobile Actors in Pervasive and Mobile Scenarios: An AI-based Approach*. In: Proceedings of the 17th International Workshops on Enabling Technologies: Infrastructures for Collaborative Enterprises (WETICE 2008), pp. 82-87, IEEE, Rome, Italy, 23-25 June 2008

#### Edited Works

- E1. D. Lembo, R. Torlone, **A. Marrella**. *Proceedings of the 23rd Italian Symposium on Advanced Database Systems*, SEBD 2015, Gaeta, Italy, June 14-17, 2015. Curran Associates, Inc. 2015, ISBN 978-1-5108-1087-7
- E2. A. H. M. ter Hofstede, M. Mecella, S. Sardina, **A. Marrella**. *Proceedings of the 1st International Workshop on Knowledge-intensive Business Processes*, KiBP 2012, Rome, Italy, June 15, 2012. CEUR Workshop Proceedings, vol. 861, ISSN 1613-0073

#### Technical Reports

- T1. T. Catarci, S.R. Humayoun, F. Leotta, **A. Marrella**, M. Mecella, A. Poggi. *HORIZON: A Development Methodology for Collaborative Projects*. In: DIAG Technical Reports. 2015
- T2. M. de Leoni, **A. Marrella**, M. Mecella, S. Sardina. *SmartPM - Featuring Automatic Adaptation to Unplanned Exceptions*. Technical Report of Dipartimento di Informatica e Sistemistica Antonio Ruberti, Sapienza Università di Roma. June 2011

#### Papers under Review

- U1. G. Capezzuto, F. M. Maggi, **A. Marrella**, Abel Armas Cervantes. *Explaining Non-Compliance of Business Process Models through Automated Planning*. Under review at: 16th International Conf. on Business Process Management (BPM 2018), Springer, Sydney, Australia, 9-14 September 2018 [GII-GRIN/CORE Class A]
- U2. **A. Marrella**, T. Catarci. *Measuring the Learnability of Interactive Systems using a Petri Net Based Approach*. Under review at: 2018 Conference on Designing Interactive Systems (DIS 2018), ACM, Hong Kong, 9-13 June 2018 [GII-GRIN Class A-]
- U3. A. Augusto, R. Conforti, M. Dumas, M. La Rosa, F. Maria Maggi, **A. Marrella**, M. Mecella, **A. Soo**. *Automated Discovery of Process Models from Event Logs: Review and Benchmark*. Under Review at: IEEE Transactions on Knowledge and Data Engineering (TKDE, IEEE, ISSN: 1041-4347)

- U4. S. Steinau, **A. Marrella**, K. Andrews, F. Leotta, M. Mecella, M. Reichert. *DALEC: A Framework for the Systematic Evaluation of Data-centric Approaches to Process Management Software*. Under Review at: International Journal on Software and Systems Modeling (SoSyM, Springer, ISSN: 1619-1374)
- U5. P. Plebani, **A. Marrella**, M. Mecella, B. Pernici. *A Design-time Data-centric Maturity Model for Assessing Resilience in Multi-Party Business Processes*. Under Review at: Information Systems (Elsevier, ISSN: 0306-4379)
- U6. **A. Marrella**. *Automated Planning for Business Process Management*. Under Review at: Journal on Data Semantics (Springer, ISSN 1861-2032)

## Theses

- P1. **A. Marrella**. *SmartPM: Automatic Adaptation of Dynamic Processes at Run-Time*. PhD Thesis in Engineering in Computer Science (Cycle XXV), Sapienza Università di Roma, Italy. October 2013
- M1. **A. Marrella**. *User-Centered Design Methodologies. The Approach and the Case of the WORKPAD project*. M.Sc. Thesis in Engineering in Computer Science, Sapienza Università di Roma, Italy. October 2009
- B1. **A. Marrella**. *An Environment for the Automatic Generation of User Interfaces*. B.Sc. Thesis in Engineering in Computer Science, Sapienza Università di Roma, Italy. May 2005

## Part X – Keynotes, Invited talks, Tutorials and Papers presentation

### (X A) – Keynote Talks

- “What Automated Planning can do for Business Process Management”. Keynote talk held at the 1st International Workshop on BP Innovation with AI (BPAI’17), organized within the 15th International Conference on Business Process Management (BPM 2017), Barcelona, Spain, 11 September 2017

### (X B) – Invited Talks

Andrea Marrella was invited by colleagues of international universities to present the results of his research at various institutions worldwide:

- “The use of AI Planning for BPM”. Seminar held at University of Tartu (Estonia), November 2, 2016. Invited by Prof. Marlon Dumas.
- “Applying Process Management Methods and Techniques to Pervasive and Smart Environments” at Vienna University of Economics and Business (Vienna, Austria), July 21, 2014. Invited by Prof. Jan Mendling.
- “Challenges in Dynamic Processes: Mining for Semi-structured Information, Providing Run-time Automated Adaptation, Representing and Enacting Data-centric Processes”. Seminar held at Ulm University (Ulm, Germany) together with Prof. Massimo Mecella, January 16, 2014. Invited by Prof. Manfred Reichert.
- “Synthesizing a Library of Process Templates through Partial-Order Planning Algorithms”. Seminar held at Ryerson University (Toronto, Canada), July 3, 2013. Invited by Prof. Mikhail Soutchanski.

- “Run-time Adaptation of Knowledge-intensive Processes through AI Techniques: Research Challenges and Some Solutions”. Seminar held at York University (Toronto, Canada), February 14, 2012. Invited by Prof. Yves Lespérance.
- “Run-time Adaptation of Knowledge-intensive Processes through AI Techniques: Research Challenges and Some Solutions”. Seminar held at the University of Toronto (UoT, Toronto, Canada), February 8, 2012. Invited by Prof. Sheila McIlraith.

#### (X C) – Tutorials

- “From Zero to Hero”. Tutorial to be held at 18th International Conference on Product-Focused Software Process Improvement (PROFES 2017), Innsbruck, Austria, 29 November 2017.

#### (X D) – Papers Presentation

Andrea Marrella has presented the results of his research in the following events:

Year	Event	Paper
2017	2017 HFES Europe Chapter - Human Factors & Ergonomics Society	An Approach to Objectively Measure the Learnability of Interactive Systems
2017	15th Int. Conference on Business Process Management (BPM 2017)	A Tool for Aligning Event Logs and Prescriptive Process Models through Automated Planning
2016	25th Int. Joint Conference on Artificial Intelligence (IJCAI-16)	An Adaptive Process Management System Implementation based on Situation Calculus, Indigolog and Classical Planning
2016	26th Int. Conference on Automated Planning and Scheduling (ICAPS 2016)	Computing Trace Alignment against Declarative Process Models through Planning
2015	13th Int. Conference on Business Process Management (BPM 2015)	SmartPM: An Adaptive Process Management System for Executing Processes in Cyber-Physical Domains
2015	23rd Italian Symposium on Advanced Database Systems (SEBD 2015)	A Survey on Handling Data in Business Process Models (Discussion Paper)
2015	8th IEEE International Conference on Service-Oriented Computing and Applications, (SOCA 2015)	Automated Process Adaptation in Cyber-Physical Domains with the SmartPM System
2014	2th Int. Conference on Service Oriented Computing (ICSOC 2014)	SmartPM: Automated Adaptation of Dynamic Processes
2014	14th Int. Conference on Principles of Knowledge Representation and Reasoning (KR 2014)	SmartPM: An Adaptive Process Management System through Situation Calculus, IndiGolog, and Classical Planning

2013	14th Int. Conference on Business Process Modeling, Development and Support (BPMDS 2013)	Synthesizing a Library of Process Templates through Partial-Order Planning Algorithms
2013	Workshop on "AI meets Business Processes", 13th Conference of the Italian Association for Artificial Intelligence (AlxIA 2013)	Towards a Planning-Based Approach to the Automated Design of Chemical Processes
2013	2nd International Workshop on Knowledge-intensive Business Processes (KiBP 2013)	Towards a Goal-oriented Framework for the Automatic Synthesis of Underspecified Activities in Dynamic Processes
2012	20th Int. Conference on Cooperative Information Systems (CoopIS 2012)	Planlets: Automatically Recovering Dynamic Processes in YAWL
2011	7th International Conference on Collaborative Computing: Networking, Applications and Worksharing (CollaborateCom 2011)	Featuring Automatic Adaptivity through Workflow Enactment and Planning
2011	9th Int. Conference on Business Process Management (BPM 2011)	Making YAWL and SmartPM Interoperate: Managing Highly Dynamic Processes by Exploiting Automatic Adaptation Features
2011	12th Int. Conference on Business Process Modeling, Development and Support (BPMDS 2011)	Continuous Planning for Solving Business Process Adaptivity
2011	8th Int. Conference on Information Systems for Crisis Response and Management (ISCRAM 2011)	Collaboration On-the-field: Suggestions and Beyond

## Part XI – Professional Service

Andrea Marrella is regularly involved in the main events and activities organized by the scientific community, related to his research areas. Notably, since 2017, he acts as:

- **Information Director** of the ACM Journal on Data Quality (ISSN 1936-1955).
- **Expert reviewer** for the **Discovery Grant Program** financed by **Natural Sciences and Engineering Research Council of Canada**.

### (XI A) – Editorial Board Membership of International Journals

Since 2017, Andrea Marrella is member of the Editorial Board of the International Journal of Information Systems for Crisis Response and Management (ISSN 1937-9390).

**(XI B) – Conferences and Workshops Organization and Chairship**

As far as organization and chairship of conferences and workshops, Andrea Marrella has acted/is acting as:

- Demo & Poster Chair of the 36th ACM Int. Conf. on Advanced Visual Interfaces (AVI 2018)
- Local Chair of the 8th IEEE Int. Conf. on Service Oriented Computing & Applications (SOCA 2015)
- Proceedings Chair of the 23rd Italian Symposium on Advanced Database Systems (SEBD 2015)
- Publicity Chair of the 12th Int. Conf. on Mobile Web and Intelligent Inf. Syst. (MobiWis 2015)
- PC Chair of the 2nd Int. Workshop on Knowledge-intensive Business Processes (KiBP 2013)
- Proceedings Chair of the 1st Int. Workshop on Knowledge-intensive Business Processes (KiBP 2012)

**(XI C) – Program Committee Membership**

Andrea Marrella serves/has served in the Program Committee of:

- 16th International Conference on Business Process Management (BPM 2018)
- 14th International Conference on Advanced Visual Interfaces (AVI 2018)
- 2018 International Conference on Software and System Processes (ICSSP 2018)
- 14th International Conference on Web Information Systems and Technologies (WEBIST 2018)
- 14th International Conference on Intelligent Environments - Video & Demo track (IE 2018)
- 1st International Workshop on Artificial Intelligence for BPM (AI4BPM 2018)
- 2nd International Workshop on BP-Meet-IoT (BP-Meet-IoT 2018)
- 6th International Workshop on Declarative/Decision/Hybrid Mining and Modelling for Business Processes (DeHMiMoP'18)
- 2017 International Conference on Software and System Processes (ICSSP 2017)
- 13th International Conference on Web Information Systems and Technologies (WEBIST 2017)
- 1st International Workshop on BP Innovations with Artificial Intelligence (BPAI 2017)
- 5th International Workshop on Declarative/Decision/Hybrid Mining and Modelling for Business Processes (DeHMiMoP'17)
- 1st International Workshop on BP-Meet-IoT (BP-Meet-IoT 2017)
- 3rd International Workshop on the Role of Real-world objects in BPM Systems (RW-BPMS 2017)
- 12th International Conference on Web Information Systems and Technologies (WEBIST 2016)
- 9th International Workshop on Evolutionary Business Processes (EVL-BP 2016)
- 2nd International Workshop on the Role of Real-world objects in Business Process Management Systems (RW-BPMS 2016)
- 1st International Workshop on Decision and Rule Mining (DRUM 2015)
- 1st International Workshop on the Role of Real-world objects in Business Process Management Systems (RW-BPMS 2015)
- 2014 Symposium on Computational Intelligence and Data Mining - Special Session on Business Process Analytics, Process Mining and Process Big Data (CIDM 2014)

**(XI D) – Reviewer for International Journals, Conferences and Workshops**

Andrea Marrella serves/has served regularly as a reviewer for:

- **International Journals:**

- ACM TOCHI - Transactions on Computer-Human Interaction (ACM)
- JAIR - Journal of Artificial Intelligence Research (AAAI Press)
- Data & Knowledge Engineering (Elsevier)
- Information Systems (Elsevier)
- Reviewer for Journal on Data Semantics (Springer)
- Business & Information Systems Engineering (Springer)
- Frontiers of Computer Science (Springer)
- MTAP - Multimedia tools and Applications (Springer)
- Journal of Software: Evolution and Process (Wiley)
- Reviewer for International Journal of Cooperative Information Systems (World Scientific)
- Reviewer for Machines (MDPI)
- Applied Sciences (MDPI)
- Methods of Information in Medicine (Schattauer)
- AI Communications (IoS Press)

- **International Conferences:**

- Information and Knowledge Management (CIKM)
- Data Engineering (ICDE)
- Business Process Management (BPM)
- Business Information Systems (BIS)
- Service Oriented Computing (ICSOC)
- Services Computing (SCC)
- Service Oriented Computing & Applications (SOCA)
- Cooperative Information Systems (COOPIS)
- Mobile Software Eng. and Systems (MOBILESoft)
- Advanced Visual Interfaces (AVI)
- Web Information System Engineering (WISE)
- Information Systems for Crisis Response and Management (ISCRAM)
- ACM Multimedia (ACMMM)

- **International Workshops:**

- Knowledge-intensive Business Processes (KiBP)

- **National Conferences:**

- Italian Symposium on Advanced Database Systems (SEBD)
- Conference of the Italian SIGCHI Chapter (CHIItaly)



## **Part XII – Further Information**

### **(XII A) – Participation to Research Projects**

Andrea Marrella is/has been involved in the following research projects:

1. (December 2017 – present) ***IT-SHIRT -- IT-empowering faSHlon design creators with a next-generation co-cReation ecosysTem*** – The IT-SHIRT project aims at investigating (i) CAD tools for real-time collaboration of designers over virtual 3D models of fashion garments, (ii) software engines on top of CAD tools to provide designers with smart recommendations and creative support, (iii) online and offline digital showroom platforms, and (iv) social marketing engines for capturing consumer feedback and providing targeted marketing recommendations. **Andrea Marrella is the scientific coordinator of WP3**, entitled: “Techniques and Methods for the IT-SHIRT fashion-CAD (F-CAD)”, which is in charge of the definition of innovative basic techniques and methods for 3D collaborative modelling, interactive animation of virtual garment, real-time rendering of cloth materials, mixed-initiative design via computational creators, etc., and their possible prototype realization.
2. (January 2017 - present) ***FILIERASICURA*** – The FilieraSicura project aims at investigating how to make more trusted and secure the supply chain (SC) of a domestic critical infrastructure. It will tackle the problem of securing the SC by developing a novel, dedicated methodology. This result will be achieved by targeting the core aspects of the SC in depth. In the range of the project, **Andrea Marrella is investigating how the application of Process Mining techniques can be leveraged to the detection of anomalous behaviors and the prediction of security issues** by analyzing the execution logs recorded by information systems.
3. (September 2016 – September 2017) ***Data-aware Adaptation of Knowledge-intensive Processes in Cyber-Physical Domains through Action-based Languages*** – The increasing application of process-oriented approaches in new challenging cyber-physical domains beyond business computing (e.g., healthcare, emergency management, etc.) has led to reconsider the level of flexibility and support required to manage knowledge-intensive processes (KiPs) in such domains. A KiP is influenced by user decision making and coupled with contextual data and knowledge production acquired/produced by sensors/actuators disseminated in the environment, and must be robust to unexpected conditions and adaptable to unanticipated exceptions. To tackle this issue, this research project focuses on providing a formally well-founded view to KiPs through the use of action-based languages developed for reasoning about actions in Artificial Intelligence, which provide a natural framework for the formal specification of mechanisms to model world changes and responding to anomalous situations in an automated way during KiP execution. **Andrea Marrella is the principal investigator of this research project**, which is funded by Sapienza Università di Roma.
4. (January 2015 – March 2018) ***NEPTIS*** – “Soluzioni ICT per la fruizione e l’esplorazione aumentata di Beni Culturali”. The NEPTIS Project focuses on developing ICT-based solutions for augmented fruition and exploration of cultural heritage. Concretely, it aims at implementing an integrated system to create services and applications supporting smart itineraries, which will offer to citizens, tourists and visitors an assisted access and a personalized experience before, during and after their visits to physical cultural assets. In this project, **Andrea Marrella is acting as Scientific Leader of OR4** (ORs correspond to Work Packages of the project), entitled: “Sistema per la definizione e creazione di servizi a supporto dell’esperienza culturale”. Among the others, one of the main tasks of Andrea Marrella was to develop the planning-based reasoning engine for the generation “on-the-fly” of personalized paths to visit a cultural area based on users’ preferences.

5. (July 2014 – July 2016) **ACI-I** – Development of an ontology modeling for ACI (Automobile Club d'Italia) and experimentation of semantic technologies for accessing data. In this project, **Andrea Marrella participated to the following activities:**
  - Knowledge gathering over the domain of interest
  - Ontology development
  - Data source analysis
6. (September 2014 – September 2015) **FIGO** – “Un Framework aperto ed Integrabile basato su modelli di nuova generazione per la Gestione ottimizzata e il cOnsolidamento di sistemi IT che prevedono l'erogazione di servizi B2B mediante l'utilizzo massivo di device mobile, anche attraverso il tracciamento ed il monitoraggio dei processi di business”. The FIGO project developed an open framework that allows performing process mining and data mining techniques on processes and data coming from Telecommunication companies. **Andrea Marrella has covered the role of unit leader of the Process Mining component.**
7. (January 2013 – December 2013) **SUPER** – “SUPporting E-health knowledge-intensive pRocesses”. In the range of SUPER, **Andrea Marrella led the realization of a Process Management System for the management of health care activities.**
8. (January 2013 – December 2013) **TESTMED** – “*meTodi e tEcniche per la geSTione dei processi nella MEDicina D'urgenza*”. In the range of TESTMED, **the activity of Andrea Marrella was targeted to the development of multimodal interfaces for mobile systems** to be used by doctors and nurses in hospital wards.
9. (November 2006 - September 2009) **WORKPAD** – *An Adaptive Peer-to-Peer Software Infrastructure for Supporting Collaborative Work of Human Operators in Emergency/Disaster Scenarios*. The European project WORKPAD (financed by the Sixth Framework Program FP6) has developed an innovative software infrastructure (software, models, services) and communication technologies for supporting collaborative work of human operators in emergency/disaster scenarios. **The main activities held by Andrea Marrella** in the range of the project were:
  - Requirements elicitation and analysis
  - Study of User-Centered methodologies and approaches
  - Realization and design of user interfaces
  - Drafting of several project deliverables
  - Active participation to project meetings
  - Design and analysis of usability tests
  - Implementation of the main software module in the range of the project: a Process Management System developed for mobile devices
10. (June 2005 - December 2005) **MAIS** - *Multichannel Adaptive Information Systems*. The MAIS project investigated the concept of adaptation at all levels in information systems, from application level to network and device level. In particular, the requirements posed by multichannel information systems were studied. In the range of the MAIS Project, **Andrea Marrella led the realization of the prototype “Automatic Generation of User Interfaces”** - report 7.3.8.