Curriculum Vitae et Studiorum

Marco Montali

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SHORT BIO

I am an *Associate Professor* at the Faculty of Computer Science, Free University of Bozen-Bolzano. I received a BEng *cum laude* in Computer Science Engineering in 2003, a MEng *cum laude* in Computer Science Engineering in 2005, and a PhD in Electronics, Computer Science and Telecommunications Engineering in 2009.
I hold two Italian habilitations as Full Professor in Computer Engineering and in Computer Science.
My research activity focusses on foundational and applied techniques grounded in artificial intelligence and formal methods for the intelligent management of dynamic systems operating over data, with a specific focus on business process management and multiagent systems.
On these topics, I authored a *Springer monograph* and *more than 170 papers*, many of which appeared in top-tier international journals and conferences, such as ACM Trans. On the Web, ACM Trans. on Intelligent Systems and Technology, Journal of Artificial Intelligence Research, Information Systems, Formal Aspects of Computing, TPLP, Information&Computation, PODS, IJCAI, AAAI, KR, AAMAS, ECAI, BPM, CAiSE, CIKM, ICSOC.
I have been investigator in the EU STREP Project ACSI (Artifact-Centric Service Interoperation) and in the EU IST-IP Project Optique (Scalable End-user Access to Big Data), as well as principal investigator and co-investigator in several local and transnational projects focused on business processes and data. I also hold a Faculty Award from Accenture.
My current h-index is *36*, and my current i-10 index is *90*, with *5150* overall citations (source: Google Scholar, as of November 20, 2020). According to a recent study on standardised citation metrics, I belong to the *top 2% most cited scientists worldwide*.
My PhD dissertation received the 2007-2009 *"Marco Cadoli" Distinguished Dissertation Award*, given by the Italian Association for Logic Programming to the most outstanding Italian thesis focused on computational logic. In 2015, I received the *"Marco Somalvico" 2015 Prize* from the Italian Association for Artificial Intelligence. The prize is given to the best under 35 Italian researcher who autonomously contributed to advance the state-of-the-art in Artificial Intelligence. I am also recipient of *8 best paper awards*.
I am currently *Vice-dean of teaching* and *Director* of the *Master Degree Course in Computational Data Science* in the Faculty of Computer Science, Free University of Bozen-Bolzano, where I also teach courses on *data and process modelling*.
I am one of the co-founders of *Ontopic s.r.l.*, the first spin-off of the Free University of Bozen-Bolzano, which aims at developing next-generation semantic technologies for intelligent data access and integration.

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1 Personal Information

Name:	Marco Montali
Place of birth:	Verona (Italy)
Date of birth:	27/09/1981
Nationality:	Italian
Number of children:	3
Address:	Faculty of Computer Science Free University of Bozen-Bolzano Piazza Domenicani 3, 39100 Bolzano, Italy
Telephone number:	+39-0471 016116
Fax:	+39-0471 016009
Email:	montali@inf.unibz.it
Web:	http://www.inf.unibz.it/~montali/
Orchid:	0000-0002-8021-3430
Languages:	**Italian** *Native speaker* **English** *C1* level (*IELTS Academic 7.5*) **German** *B2* level (*Patentino di bilinguismo B*)

2 Education Since Leaving School

2000 – 2003

Bachelor Degree in Computer Engineering, obtained on July 23, 2003 at the Faculty of Engineering, *University of Bologna*. BEng thesis title: *Modelling interaction in multiagent systems* (supervisor: Prof. Paola Mello). Final mark *110/110 cum laude*.

2003 – 2005

Master Degree in Computer Engineering, obtained on October 26, 2005 at the Faculty of Engineering, *University of Bologna*. MEng thesis title: *A graphical language for the specification and verification of protocols* (supervisor: Prof. Paola Mello). Final mark: *110/110 cum laude*.

2006 – 2009

PhD in Computer Science, Electronics and Telecommunications Engineering, obtained on April 8, 2009 at the *University of Bologna*. PhD thesis title: *Specification and Verification of Declarative Open Interaction Models - A Logic-Based Framework* (supervisor: Prof. Paola Mello).

03/12/2013

Italian Associate Professorship Habilitation in Computer Engineering. Scientific sector: *09/H1 (Sistemi di Elaborazione delle Informazioni)*.

19/01/2015

Italian Associate Professorship Habilitation in Computer Science. Scientific sector: *01/B1 (Informatica)*.

09/09/2019

Italian Full Professorship Habilitation in Computer Engineering. Scientific sector: *09/H1 (Sistemi di Elaborazione delle Informazioni)*.

11/09/2019

Italian Full Professorship Habilitation in Computer Science. Scientific sector: *01/B1 (Informatica)*.

3 Employment and Appointments Held

3.1 Present Appointment

From 01/07/2017

Associate Professor at the Faculty of Computer Science, *Free University of Bozen-Bolzano* (UNIBZ). Scientific Sector: *ING-INF/05* (*Sistemi di Elaborazione delle Informazioni*).
Promotion obtained with a score of 93/100.
Responsibilities: Research and teaching activity focussed on *intelligent techniques for the combined management of business processes and data, to improve IT support for business and domain experts*. Coordination of and participation to European and local research projects. Active effort in establishing connections with the industry. Student supervision. Several management duties at the faculty level, including leading responsibilities in teaching (course coordination, vice-deanship).

3.2 Professional Experience

Jan. 2005 – Dec. 2005

Technology transfer research on the *formalisation and verification of clinical guidelines and healthcare protocols*, funded by the SPINNER consortium[1].
Responsibilities: Applied research and technology transfer on modeling, verification and compliance checking of computer-interpretable clinical guidelines (CIGs). Participants: Department of Electronics, Computer Science and Systems (University of Bologna), Department of Engineering (University of Ferrara), Dianoema s.p.a. (leading company, in Europe, on the development of healthcare information systems).

Jan. 2009 – Apr. 2009

Postdoctoral fellow working on *process mining: analysis of business process audit trails*, funded by C.I.N.I.[2].
Responsibilities: Foundational and applied research on the analysis of event logs and their conformance checking against business rules/constraints, in the context of the Italian project FIRB RBNE05BFRK "TOCAI.IT: Knowledge-Oriented Technologies for the Integration of Networked Enterprises".

May 2009 – Oct. 2009

Postdoctoral fellow working on the *application of AI techniques for the analysis of foreign tourist flows*, funded by the Department of Electronics, Computer Science and Systems (DEIS), University of Bologna.
Responsibilities: Foundational and applied research on rule-based decision support systems for matching and proposing touristic packages, in the context of the Italian project MIUR PRIN 2007-7WWCR8 "Forms of correlations among italian style, tourist flows and consumer trends related to made in Italy".

Oct. 2009 – Apr. 2011

Senior IT consultant at Image Line[3], an innovative SME developing web portals and information systems for e-agricolture, with a community of more than 100 000 users.
Responsibilities: IT consultancy for the head of the company on short- and medium-term strategic objectives. Analysis, design and implementation of an integrated CRM and invoicing system. Re-engineering and extension of the company information system. Staff training on innovation and advanced topics in conceptual modelling, information systems, and software engineering.

Jul. 2010

Adjunct researcher at the Architecture for Information Systems group, Eindhoven University

[1] *Spinner* is the intermediary organization managing the global grant of the Emilia Romagna Regional Operative Program (ROP) 2007-2013, European Social Fund (ESF), Axis IV Human Capital, Objective 2 "Regional Competitiveness and Employment".

[2] Consorzio Interuniversitario Nazionale per l'Informatica, `www.consorzio-cini.it/`

[3] VAT no. 01070780398, via G. Marcucci 24, 48018 Faenza (RA)

of Technology, to collaboratively work on *process mining and runtime operational decision support*. The research visit has been funded by the Netherlands Organization for Scientific Research (NWO).
Responsibilities: foundational and applied collaborative research together with Prof. van der Aalst and several members of the Architecture for Information Systems group, to study the emergent topic of operational decision support, with a particular focus on process monitoring and logic-based techniques for the runtime verification of process executions.

Nov. 2009 – Apr. 2011
Postdoctoral researcher working on *a declarative approach for the specification and verification of clinical guidelines* at the Department of Electronics, Computer Science and Systems (DEIS), University of Bologna.
Responsibilities: Foundational and applied research on declarative models for process modelling, with particular attention to clinical guidelines and pathways. Development of techniques and tools for reasoning on such models along their entire lifecycle, from design-time verification and runtime support/monitoring to a-posteriori conformance checking and mining.

May. 2011 – May. 2014
Researcher with a fixed-term contract (RTD Junior) at the Faculty of Computer Science, *Free University of Bozen-Bolzano* (UNIBZ). Scientific Sector: *INF/01* (*Informatica*).
Responsibilities: basic and applied research activity related to the foundations of knowledge representation and databases, with a particular focus on the formal modelling and verification of business processes and dynamic systems operating over data. Teaching and student supervision. Participation to European and local research projects.

Jun. 2014 – Jun. 2017
Senior Researcher with a fixed-term contract (*RTD Senior*) at the Faculty of Computer Science, *Free University of Bozen-Bolzano* (UNIBZ). Scientific Sector: *ING- INF/05* (*Sistemi di Elaborazione delle Informazioni*).
Responsibilities: Research and teaching activity focussed on *intelligent techniques for the combined management of business processes and data*. Coordination of and participation to European and local research projects. Student supervision. Several management tasks at the faculty level, and in third mission.

Mar. 2020
Winner of a 1-month **visiting researcher** position at ENS-Paris Saclay, to work with Prof. Serge Haddad and other members of the LSV lab on the formal specification, verification, and mining of *multi-perspective Petri net models*.
The research visit could not happen due to COVID-19 restrictive measures.

4 Research

My research activity focusses on methods, principles, and techniques grounded in artificial intelligence and formal methods for the formal specification, verification, synthesis, planning, monitoring, mining, and intelligent management of dynamic systems operating over data.

Technically, I am studying the synergic integration of several different models and languages, on the one hand to capture the system dynamics, and on the other hand to account for the underlying data. To capture the system dynamics, I am currently investigating: (i) classical control-flow models such as variants of Petri nets and transition systems, as well as concrete modeling languages such as the BPMN standard for business process modeling; (ii) interplay between process and decision models, with particular reference to the DMN standard; (iii) declarative, flexible and constraint-based formalisms; (iv) rule-based specifications; (v) action languages, situation calculus, and Golog; (vi) intelligent agents and multiagent systems for inter-organizational processes; (vii) declarative distributed systems with different communication modalities. To account for the underlying data, I am considering: (i) standard relational databases with constraints; (ii) conceptual models based on UML and other class-based formalisms; (iii) volatile data produced and consumed during the process execution; (iv) business

objects and artifacts; (v) knowledge bases and description-logic ontologies working under incomplete information.

To develop effective techniques operating over such combined models, I advocate an interdisciplinary approach that integrates insights and results from artificial intelligence, formal methods, conceptual modelling, business process management, data management, and process mining.

My research aims at bridging the gap between theory and practice. On the one hand, I devise formal models and rigorous techniques to understand the computational boundaries of several key problems defined over the entire lifecycle of data-aware dynamic systems, from design-time verification to runtime monitoring and data-driven analysis and mining. On the other hand, I work on connecting such models and techniques to concrete, end user-oriented languages and methodologies, and I am also interested in the effective development of algorithms and research prototypes.

I coordinate the *PRISM* (*PRocess-aware Information Systems Management* research group at the Computer Science Faculty, Free University of Bozen-Bolzano. In particular, I coordinate the research activity of one assistant professor with fixed-term contract (RTDa), two post-docs, and two PhD students (with one additional PhD student as co-supervisor).

I carry out my research with several members of the faculty, and in collaboration with a worldwide network of excellent researchers (cf. Section 4.5).

4.1 Current Research Lines

I expand next the main lines of research I am pursuing now. References point to the publication list.

4.1.1 Constraint-Based Approaches for Flexible Process Management

This line of research started during my PhD studies, when the issue of flexibility in business processes and multiagent interaction protocols was put forward by many prominent authors. To recover flexibility, many different techniques were proposed, either acting on the process modeling languages (i.e., by designing more flexible processes), or on the execution infrastructure (i.e., by handling deviations and changes at enactment time). I extensively contributed to the first thread of research, focused on flexibility by design. Traditionally, processes are modelled following an imperative, closed approach, explicitly defining all and only acceptable courses of execution. This is too restrictive in a knowledge-intensive setting, where process executors require flexibility and adaptivity to the current circumstances. To resolve this critical mismatch, I studied novel process modelling paradigms based on the notion of *business constraint*. Differently from conventional approaches, a constraint-based process defines a minimal set of (temporal/dynamic) constraints, leaving the process executors free to decide how to actually unfold an execution of that process, as long as such constraints are respected.

During my PhD I introduced the paradigm of *open, declarative interaction models* to capture constraint-based processes, studying and extending *Declare*, one of the reference constraint-based process modelling languages. I studied how to formalise the resulting framework using computational logics, in particular extensions of logic programming and temporal logics on finite traces [JI-15, BA-1, JI-18, CI-93]. I then worked on making *Declare* multi-perspective, so as to incorporate metric temporal conditions and data [JI-15, BA-1, CI-82, WI-158, JI-23], as well as aspects related to requirements engineering [WI-154, JI-20] and agent interaction [JI-12].

More recently, we have studied how to extend constraint-based process models considering two fundamental aspects. The first aspect is about dealing with *object-centric behavioral constraints* to declaratively capture business constraints that correlate over data objects, and can consequently elegantly capture multi-case processes involving one-to-many and many-to-many relationships among the manipulated objects [WI-179, BC-48, CI-126]. Such processes are widespread in reality, but contemporary process modelling notations struggle in representing them properly.

The second aspects aims at modelling *uncertain constraints*, which may or not hold. A first stepping stone in this line has been reached by introducing a novel probabilistic temporal logic over finite traces coupled with automata-based techniques for reasoning [CI-144]. A relevant fragment of this logic has been identified, in which a sort of separability property for reasoning on the probabilistic and temporal aspects of the logic in a loosely-coupled can be employed to reason with the same worst-case complexity of the standard logic (without uncertainty). This fragment naturally applies to BPM,

and we have in fact used it to model uncertain constraint-based process models and define various techniques for probabilistic conformance checking, discovery, and monitoring [CI-143, CI-142].

For such contributions, my PhD thesis received the **"Marco Cadoli" Distinguished Dissertation Award** (cf. Section 5.1.1). I also authored a highly-cited Springer monograph presenting the key results of this research [BA-1].

4.1.2 Integrated Modelling and Verification of Processes and Data

I have always been fascinated by the integration of processes and data so as to get a holistic, end-to-end understanding of how dynamic systems operate. This became my central topic of research in 2011, when I moved to the Free University of Bozen-Bolzano, and started working in the context of the EU FP7 STREP Project ACSI (*Artifact Centric Service Interoperation*). While business processes are typically captured by focusing on the control-flow dimension, that is, on how the execution of activities can be structured along time, in the last two decades it has been increasingly recognised that BPM needs to acknowledge the interplay between the process and the data dimension to really have an impact on organizations. Interestingly, the importance of this integration was not only stressed by academia, but also by the industry (see, e.g., a series of reports by Forrester in 2009-2010).

In this intriguing area of research, I contributed to seminal results that deeply impacted the BPM and artificial intelligence communities, concerning in particular conceptual and formal modelling of data-aware processes, as well as the verification of such models, which is extremely challenging as data-aware processes are infinite-state systems [CI-75].

My research in this setting can be classified along three main threads.

In a first line of research, we are studying modelling and verification of data-aware processes in a data-centric paradigm, where the main focus is on the data dimension, and processes are seen as a mechanism to evolve data objects. We have produced novel results on the boundaries of verifiability for these processes, considering: (i) complete data structured in a relational database with constraints [CI-73, CI-89, JI-30, CI-118, CI-102, CI-125]; (ii) incomplete data in the presence of a domain ontology/conceptual data model [CI-69, JI-21, CI-77]; (iii) data structured in a relational database that is accessed through a semantic layer [CI-70, CI-74]; (iv) incomplete data in presence of constraints that may be violated by the execution of processes, consequently requiring to handle inconsistency [CI-78, CI-99]. Such foundational results have been complemented by a methodological investigation, with a twofold goal: (i) introduce modelling guidelines that guarantee the verifiability of the produced models[CI-85, JI-26, JI-27]; (ii) translate such foundational results into actual software prototypes for modelling, enactment, and abstract state-space construction using standard relational databases and SQL engines as underlying technology [WI-173, CI-84, WI-174, CI-130].

In a second thread of research, we took an alternative view on data-aware processes, showing how traditional activity-centric models can be enriched with data and decisions. We have in particular studied BPMN and variants of Petri nets to model and analyse: (i) multiple-instance processes with resources [JI-27]; (ii) processes updating and taking decisions on case-variables [CI-120, CI-132]; (iii) processes operating at once over case and persistent relational data [JI-29, CI-134], validating the resulting languages in the context of enterprise application integration with standard [CI-121] and multimedia [CI-122] data; (iv) BPMN-based processes where the alignment between the lifecycle of data objects and their manipulation by the process tasks is checked using constraint programming techniques [JI-40].

In a third, recent thread of research, we consider how to make well-established infinite-state model checking techniques and tools based on Satisfiability Modulo Theories (SMT) applicable to handle parameterised verification problems for data-aware processes. In this setting, the data component is split into two parts: the first is read-only, whereas the second can be updated during the execution of the process. Parameterised verification amount to check properties regardless of the content of the read-only data, so as to ascertain its robustness. We have beinh focussing in particular on the parameterised verification problem of safety properties, showing, at once: (i) how insights from model theory can be used to lift well-established SMT backward reachability procedures for array-based systems to the more sophisticated case of artifact-centric systems, deriving new decidability results [BC-49]; (ii) how corresponding algorithmic techniques can be implemented on top of the well-established MCMT SMT-based model checker, getting a running implementation with a very competitive per-

formance [CI-129, BC-49]; (iii) how the resulting SMT-based approach can be used to formalise and verify data-aware extensions of BPMN [CI-128].

By distilling the main features of the various approaches proposed in the literature and in our previous work, we finally proposed a balanced model that suitably trades off between expressiveness and simplicity, and that appears to be particularly suited to capture multi-case processes manipulating data objects with one-to-many and many-to-many interactions [CI-141].

The results produced in this research led to 2 best paper awards, and a number of tutorials and invited keynotes at international events. They also constitute the core scientific contributions for which I received the prestigious **Artificial Intelligence "Marco Somalvico" 2015 career prize** (cf. Section 5.1.2). We are currently preparing a Springer book on *integrated models for processes and data*.

Decision Models, Decision-Aware Processes, and Strategic Reasoning

A very interesting setting is the one where the master data managed within an organisation are used not only to drive the execution of business processes, but also to take operational decisions. Recently, the OMG has introduced a new standard, called DMN (*Decision Model and Notation*) to represent operational decisions.

Our contributions in this area have been twofold. On the one hand, we have been studying how to formalise the DMN standard and define several algorithmic techniques for analysing DMN decision models expressed with the S-FEEL language [CI-104, JI-31]. This has been further extended by considering decision models interpreted in the presence of background, structural knowledge of the organisational domain [CI-110, JI-36].

On the other hand, we have been studying how DMN models can be integrated with process models paving the way towards combined reasoning on processes, decisions, and the data that glue the two components. We have defined techniques for tackling combined reasoning via data abstraction in a model that combines Petri nets with simple case data and decisions that are expressed using languages that match or extend DMN S-FEEL [CI-120, CI-132]. In this setting, we have considered in particular a suitably refined notion of (data-aware) soundness, showing constructive techniques for checking it [JI-39].

On top of this model, we have then started a new line of research where techniques usually studied in artificial intelligence and multiagent systems become instrumental to strategically reason on decision-aware processes. In particular, we have devised techniques to check whether cooperative process participants can enforce good properties of the process regardless the behaviour of non-cooperative ones, showing how to actually synthesise corresponding strategies in the case of (data-aware) soundness [JI-39] and linear-time properties mentioning data constraints [CI-139].

The results produced in this research led to 2 best paper awards.

4.1.3 Process Mining and Operational Decision Support

Process mining [WI-163] is an innovative approach at the intersection of model-driven engineering and data science, whose purpose is to analyse the event data generated through the execution of processes, so as to obtain insights on how processes are executed in reality, and enable continuous improvement based on facts.

My contributions in this area can be grouped along five directions. First of all, while a large share of process mining focuses on automated discovery of imperative process models from event data, I contributed to create the sub-field of "declarative process discovery", whose main goal is to extract temporal rules from event data [CI-57, JI-11, CI-81, CI-101, CI-108, JI-28].

Second, I am studying how to empower process mining techniques with reasoning capabilities, so as to improve the quality of the discovered models and check their properties. We have in particular targeted declarative process discovery [CI-101, CI-108, JI-28, JI-34] as well as discovery of Petri nets with data-aware decisions based on decision trees [CI-120, CI-132].

Third, since more than a decade I am devising techniques and tools based on computational logic to tackle the fundamental problem of conformance checking, that is, of analysing whether the actual behaviors traced in the event data are aligned with the expected behaviors expressed by a process model. In particular, I studied the setting where conformance checking is assessed at run-time, i.e.,

monitoring evolving execution traces [JI-25]. We have devised sophisticated monitoring techniques based on logic programming and event calculus [WI-158, JI-13, JI-23, CI-114], as well as temporal logics over finite traces and automata [CI-68, CI-72, CI-92], also dealing with uncertainty [CI-143, CI-142]. The proposed techniques have been tested on real case studies, considering collaborative project management [WI-157], wastewater management plants [JI-14], and clinical guidelines [CI-56, BC-43].

A fourth activity, still at its infancy, is focused on discovery and conformance checking considering variants of (lightweight) data-aware processes, where the main contribution of data is to properly correlate the execution of tasks, and in turn reveal the complex one-to-many and many-to-many relationships existing within the process.

Last but not least, I recently focused on the problem of data preparation for process mining, that is, how event data for process mining can be extracted from legacy information systems where events may be only implicitly present. I have contributed to the definition of a methodology and working toolchain for data preparation that relies on a unique combination of semantic technologies and techniques based on ontology-based data access and integration [CI-111, CI-112, CI-113].

For this research I obtained 1 best paper award. Our 2015 compliance monitoring survey [JI-25] is still nowadays the top-downloaded paper in the prestigious Information Systems journal.

4.1.4 Open Multiagent Systems

Open multiagent systems are distributed systems where heterogeneous components (such as human actors, intelligent agents, software services) interact so as to jointly achieve goals that they could not pursue in isolation. Such systems are suitable to capture inter-organizational business processes, and complex business interactions between organizations and their external stakeholders. Of particular interest, in these settings, is the usage of social commitments to regulate multiagent interactions in a declarative way, and capture flexible business contracts. Virtually all approaches based on commitments do not tackle the actual data exchanged by agents, and mainly focus on modelling and verification, without considering runtime monitoring and the complex temporal conditions associated to commitments. My research has tackled these two fundamental limitations: we have extended the commitment framework with temporal and data-related aspects [WI-161, CI-61, CI-64, JI-22, CI-96], and devised corresponding monitoring [CI-61, CI-64, JI-22], simulation [JI-19], and formal verification [CI-96] techniques.

Recently, we have also brought forward the paradigm of ontology-based data access to obtain a contractual, commitment-oriented view of timestamped data stored in a legacy relational database, so as to reconstruct and query the state of normative and contractual primitives [**?**].

Finally, we are currently investigating the problem of verifying (data-aware) parameterised multiagent systems where unboundedly many agents may participate and interact. Specifically, we are bridging the gap between these problems and SMT-based verification, obtaining a foundational framework [CI-145] directly equipped with an operational counterpart based on the MCMT model checker for array-based systems [CI-140].

For this research, I obtained 3 best paper awards and one test-of-time award.

4.2 Research Impact

The high relevance of my scientific work is witnessed by the prestigious venues in which my research results have been published, by the wide recognition of my research track by the scientific community (cf. Section 5), and by the bibliometric indexes related to my publication record.

I co-authored a *Springer monograph and more than 170 peer-reviewed scientific publications*, published in world-class referred international journals such as *ACM Transactions on the Web*, *ACM Transactions on Intelligent Systems and Technology*, *Journal of Artificial Intelligence Research*, *Information&Computation*, *Journal of Autonomous Agents and Multiagent Systems*, *Information Systems*, *Formal Aspects of Computing*, as well as prestigious and highly selective conferences such as *IJCAI*,*AAAI*, *AAMAS*, *KR*, *PODS*, *CIKM*, *ECAI*, *BPM*, *ICLP*, *ICSOC*, *CAiSE*, *EDOC*.
According to *Google Scholar*, as of November 20, 2020:

- my papers have received **5150 overall citations** (*3581* since 2014);

- I have have an **h-index**[4] of **36** (*28* since 2014);
- I have an **i-10 index**[5] of **90** (*65* since 2014).

According to *Scopus*, as of November 20, 2020:

- my papers have received **2989 overall citations**;
- I have have an **h-index of 28**.

According to a recent study on standardised citation metrics[6], I belong to the **top 2% most cited scientists worldwide**.

4.3 Scholarships

2005 • *1-year technology transfer grant* on the *formalisation and verification of care flows*, awarded by the SPINNER Consortium[7].

2006 • *3-year MIUR*[8] *scholarship* for a PhD in Electronics, Computer Science and Telecommunications Engineering, University of Bologna.

2009 • *2-year postdoctoral research scholarship* at the Department of Electronics, Computer Science and Systems, University of Bologna.

2010 • *1-month visitor travel grant*, awarded by the Netherlands Organization for Scientific Research (NWO). Hosting Institution: Architecture for Information Systems group, Eindhoven University of Technology.

4.4 Research Grants and Projects

I have been involved in a number of international, national, and regional research projects. The following table summarizes the research funds I have obtained as principal investigator or co-investigator. Numbers are in Euro. Some useful remarks:

- UNIBZ CRC are single-unit projects funded by the Free University of Bozen-Bolzano through an anonymous, selective peer-review process involving international reviewers.
- UNIBZ ID projects are interdisciplinary projects funded by the Free University of Bozen-Bolzano through an anonymous, selective peer-review process involving international reviewers. They involve two principal investigators from two different Faculties (one acting also as overall coordinator of the project).
- The startup budget is assigned to a single person by the Free University of Bozen-Bolzano when that person starts his/her activity as a new professor, based on a project proposal. The budget ranges from 0 to 50K.

[4] A researcher has a value of the Hirsch-index (or h-index) equal to h if h of her/his N publications have at least h citations each, while the other $N-h$ publications have not more than h citations each. The h-index measures the cumulative impact of the scientific production of a researcher, evaluated by means of the number of citations that her/his work has obtained.

[5] The i10-index is the number of publications with at least 10 citations.

[6] Ioannidis JPA, Boyack KW, Baas J (2020) Updated science-wide author databases of standardized citation indicators. PLoS Biol 18(10): e3000918. `https://doi.org/10.1371/journal.pbio.3000918`

[7] *Spinner* is the intermediary organization managing the global grant of the Emilia Romagna Regional Operative Program (ROP) 2007-2013, European Social Fund (ESF), Axis IV Human Capital, Objective 2 "Regional Competitiveness and Employment".

[8] Italian Ministry of Education, Universities and Research.

Funding agency	Project title	Funding for the Fac. of CS, UNIBZ		Overall project coordinator
		As Faculty PI	As Faculty Co-PI	
UNIBZ CRC	VeriClig: Automated Extraction and Verification of Clinical Guidelines		60 000	Fac. of CS, UNIBZ (Diego Calvanese)
UNIBZ CRC	KENDO: Knowledge-driven Enterprise Distributed Computing	46 000		Fac. of CS, UNIBZ (Marco Montali)
UNIBZ CRC	PARCIS: Process-aware Reliability Checking for Information Systems		23 000	Fac. of CS, UNIBZ (Werner Nutt)
UNIBZ CRC	OnProm: Ontology-Driven Process Mining		50 000	Fac. of CS, UNIBZ (Diego Calvanese)
Euregio Proj. Network	KAOS: Knowledge-Aware Operational Support		83 000	Fac. of CS, UNIBZ (Diego Calvanese)
UNIBZ CRC	PWORM: Planning for Workflow Management		70 000	Fac. of CS, UNIBZ (Sergio Tessaris)
UNIBZ CRC	REKAP: Reasoning and Enactment for Knowledge-Aware Processes	99 000		Fac. of CS, UNIBZ (Marco Montali)
UNIBZ CRC	DACoMan: Data-Aware Controllers for Manufacturing		64 000	Fac. of CS, UNIBZ (Paolo Felli)
ERDF 2014-2020	IDEE: Data Integration for Energy Efficiency		225 000	R3GIS company (Paolo Viskanic)
CHIST-ERA 2014-2020	PACMEL: Process-aware Analytics Support based on Conceptual Models for Event Logs		125 000	Fac. of CS, UNIBZ (Diego Calvanese)
UNIBZ Startup	VERBA: VERification of Business Artifacts	50 000		Fac. of CS, UNIBZ (Marco Montali)
UNIBZ Internal	DUB: Discovery of University Business processes	30 000		Fac. of CS, UNIBZ (Marco Montali)
UNIBZ ID	WineID: Wine Identity Card	60 000		Fac. of ST, UNIBZ (Emanuele Boselli)
Accenture Fac. Award	QUEST: QUErying Security Trails	50 000		Fac. of CS, UNIBZ (Marco Montali)
Research contract	SPMI: Semantic Process Mining in Industry	17 000		Fac. of CS, UNIBZ (Marco Montali)
	TOTAL	352 000	700 000	

A fine-grained description of my participation to research projects is listed next.

PRIN 2005

Investigator for the MIUR PRIN italian Project 2005-011293 *Specification and Verification of Agents Interaction Protocols*, Coordinator Prof. Alberto Martelli.

FIRB 2005

Investigator for the FIRB Italian Project RBNE05BFRK *TOCAI.IT: Knowledge-Oriented Technologies for Enterprise Aggregation in Internet*, Coordinator Prof. Maurizio Lenzerini. In particular, I contributed to activity 9: "Discovery and Classification of Processes and Intra/Inter-Organizational Knowledge".

PRIN 2007

Investigator for the MIUR PRIN Italian Project 2007-7WWCR8 *Forms of Correlation between Italian Style, Touristic Flows and Made in Italy's Consumers Trends.*, Coordinator Prof. Bernardo Valli.

Feb. 2012 – Feb. 2014

Coordinator (jointly with Diego Calvanese) for the 2-year project *Automated Extraction and Verification of Clinical Guidelines*, supported with $\sim$ 60 000 € by the Foundation of the Free University of Bozen-Bolzano.

May 2011 – May 2013

Investigator for the EU FP7 IST-STREP Project *Artifact-centric Service Interoperation*

(ACSI). The goal of the project is to dramatically reduce the effort and time-to-usage of designing, deploying, and maintaining environments that support service collaborations. The project was coordinated by IBM Israel, and the additional partners were Sapienza Università di Roma, Italy, Imperial College, U.K., Technische Universiteit Eindhoven, Netherlands, Tartu Ulikool, Estonia, Indra Software Labs, Spain, and Collibra, Belgium.
The project was funded with 452 800 € for the Free University of Bozen-Bolzano, and got an evaluation of *excellent*.

Jun. 2011 - May. 2014

Investigator for the Project *MAnaGing Completeness of Data* (MAGIC). The goal of the project is to develop approaches and techniques to manage the quality of data, considering in particular their completeness. The problem investigated by considering not only the data, but also the business processes that, in many situations, are used to manipulate such data.
The project involved the IT department of the province, as well as the Land Systems branch of the international automotive supplier GK.N Driveline, and was funded with $\sim$ 250K€ by the Autonomous Province of Bozen-Bolzano.

Nov. 2013 - Oct. 2016

Investigator for the EU FP7 IST-IP Project *Scalable End-user Access to Big Data* (Optique). The main objective of Optique is to develop an extensible platform that provides a complete and generic solution to the data access challenges posed by big data. It brings about a paradigm shift for data access by providing a semantic end-to-end connection between users and data sources, enabling users to rapidly formulate intuitive queries, and seamlessly integrating data spread across multiple distributed data sources. The project was coordinated by the University of Oslo, Norway, and the additional partners are Oxford University, U.K., Hamburg University of Technology, Germany, Sapienza Universià di Roma, Italy, National and Kapodistrian University of Athens, Greece, Fluid Operations AG, Gemany, Siemens AG, Germany, Statoil, Norway, and DNV, Norway.
The project was funded with 873 000 € for the Free University of Bozen-Bolzano.

Since Jan. 2015

Principal investigator for the UNIBZ Project *KENDO: Knowledge-driven ENterprise Distributed cOmputing*. KENDO aims at developing a formal, verifiable and executable framework for enterprise distributed systems (EDSs) empowered with knowledge. The core aspect of KENDO is to inject domain and technological knowledge encompassing both static (data-related) and dynamic (process-related) aspects into the upper layers of the internet stack (from application down to networking), and use such knowledge to drive their computation. In this way, the system nodes become able to exploit their knowledge, together with the data they acquire from the interaction with users and other nodes, to take informed decisions and perform their computation.
The project was funded with 45 475 € by the Free University of Bozen-Bolzano.

Jan. 2015-Dec. 2018

Principal co-investigator for the UNIBZ CRC Project *Process-aware Reliability Checking for Information Systems (PARCIS)*. Formalisms for representing and defining the flow of activities in a business process are increasingly employed for specifying the usage of information systems. Recently both practitioners and researchers have perceived the need to enrich business process modelling languages by features to describe how processes access and modify relevant data. In research, the interplay of processes and data has been usually investigated by following a top-down approach, which aimed at decidable fragments of expressive formalisms and envisaged model checkers as the target reasoning platform. In PARCIS, we pursued a bottom-up approach, drawing upon concepts and techniques from classical database research by (i) limiting the interactions of processes and databases to well-understand types of queries, (ii) focusing on properties of processes that can be captured in terms of properties of queries and integrity constraints, and (iii) following an approach to "compile away" the process model into queries in expressive query languages, so that reasoning consists in performing well-known inferences on queries.

The project was funded with 22 783 € by the Free University of Bozen-Bolzano.

Since Jan. 2016

Principal co-investigator for the UNIBZ CRC Project *OnProm: Ontology-Driven Process Mining*. OnProm focusses on the fundamental, but typically neglected, phase, of data preparation for process mining. Process mining techniques assume that the input data are explicitly organized in a well-defined event log. However, enterprises do not usually have such an explicit representation, while they employ information systems that reflect the domain knowledge, and where event-related information is only implicitly preent. OnProm aims at bridging the gap between domain-oriented information systems and the event logs required for process mining. In particular, we want to exploit well-assessed techniques and tools coming from intelligent data management and ontology-based data access, in order to help domain experts in extracting event-related information from the legacy data present in the enterprise information systems.
The project was supported by the Eindhoven University of Technology (Prof. van der Aalst), and funded with $\sim$ 50 000 € by the Free University of Bozen-Bolzano.

Jun. 2016-May 2019

Principal co-investigator for the Euregio (Bolzano-Innsbruck-Trento) Interregional Project Network IPN12 *Knowledge-Aware Operational Support*. KAOS aims at creating a new generation of operational support techniques for business process management, by empowering them with domain knowledge. In particular, KAOS will develop a foundational framework of concepts covering organisations, processes, participants and information, providing the basis for the realization of operational support techniques that enjoy flexibility and are able to support domain experts and business analysts in the effective execution and supervision of business processes.
The project was coordinated by the Free University of Bozen-Bolzano, and involves the University of Innsbruck and FBK-IRST from Trento.
The project was funded by Euregio with $\sim$ 82 700 € for the Free University of Bozen-Bolzano.

Since Jan. 2017

Investigator for the ERDF Project *Collaborative Construction Process Management (COCkPiT)*. Globally, the construction industry is one of the main fields of economy. During the research project build4future, the PRECISE methodology for managing the whole lifecycle of a construction process has been introduced. PRECISE decomposes a construction process in three main phases: the modelling of the process, the scheduling of the activities to be performed on-site, and the runtime monitoring of the construction progress. In particular, the modelling of the process was done in the context of workshops among the participating companies who defined *(i)* a representation of the building; *(ii)* the tasks to be executed, and *(iii)* the resources needed. Currently, there is no commercial system available to support all the three phases of modelling, scheduling and monitoring in a satisfactory way. The objectives of our proposed project COCkPiT are to close this gap and provide: (Obj1) Full support for the collaborative definition of process models. (Obj2) Full support for short-term capacity scheduling based on the real-time construction progress. (Obj3) Full support for construction progress measurement on-site. The overall outcome of the project will be a framework for collaborative and real-time management of processes in construction, based on Industry 4.0 principles. The project is coordinated by the Faculty of Computer Science at UNIBZ, and involves the Faculty of Science and Technology at UNIBZ, Fraunhofer Italia, and a network of SMEs operating in the region.
The project is funded by the European Regional Development Fund with 747.700 €.

From Jun. 2017

Principal co-investigator for the UNIBZ Project *Planning for Workflow Management (PWORM)*. The need to extend business processes with the capability to handle complex data objects has lead to significant practical and theoretical advances in the field of business process modelling. On the practical side, there are several well-established suites for control flow and data modelling; nonetheless, they lack of support for formal verification tasks taking into account data as well as control flow. On the theoretical side, there is a significant literature for data aware processes far from concrete BPM architectures, and they are difficult to apply to

existing systems. As a consequence they struggle to produce an impact in the Business Process community. With this project we aim at bridging the gap between these two separate worlds by providing a concrete framework for modelling data-aware processes capturing common features of widely used BPM suites and a set of automated reasoning services to support its usage. In particular, we aim at demonstrating the advantages of using automated planners to provide reasoning services for BPM systems.
The project is funded with $\sim 70\,000$ € by the Free University of Bozen-Bolzano.

From Jan. 2018
Principal investigator for the UNIBZ Project *Reasoning and Enactment for Knowledge-Aware Processes (REKAP)*. The ultimate goal of REKAP is to develop a foundational framework, and a corresponding prototype implementation, for the specifying, enacting, and reasoning upon knowledge-aware processes. These are integrated models combining processes, domain knowledge, and data, so as to give a holistic view of how a company operates as a whole. Three concrete goals are foreseen. First, we want to make knowledge-aware business processes executable on top of standard relational technology. Second, we want to enrich the devised execution framework with verification capabilities, making the foundational results present in the literature finally operational. Third, we want to characterize the notion of "event" in the context of knowledge-aware business processes, so as to understand how an atomic execution step of the process reflects into an update on the underlying database. While this is well-understood in the case of pure control-flow processes, the presence of data makes it a particularly challenging task, instrumental to make well-established process analysis and mining techniques applicable also in this knowledge-rich setting.
The project is funded with 99 000 € by the Free University of Bozen-Bolzano.

From Aug. 2018
Principal co-investigator for the UNIBZ Project *Data-Aware Controllers for Manufacturing (DACoMan)*. In the vision of Industry 4.0, modern manufacturing activities are geographically distributed, creating a multi-tier structure in which multiple enterprises realise the so-called manufacturing-as-a-service paradigm. One key requirement in this complex setting is to assess in real time whether and how the specification of the process required to manufacture a given product (or one of its subassemblies) can be executed in a given facility. Crucially, the process specification of desired products merge two fundamental aspects: the control-flow, which prescribes all the possible arrangements of manufacturing and assembly operations that need to be executed, and the data dimension, which enriches such description with the specification of required operation parameters, data manipulation directives and a set of requirements on the data collected. In this project, we propose suitable and novel data-aware representations of manufacturing resources, product specifications and production processes, together with classes of practical and implementable algorithmic approaches for the computation of data-aware controllers. Moreover, we introduce a formal specification language for the additional requirements to be imposed on the executions of such data-aware controllers. This allows us to apply formal techniques for data-aware product specifications and for providing provable certifications before, during and after production.
The project is funded with 64 000 € by the Free University of Bozen-Bolzano.

From Oct. 2019 **Faculty principal Co-investigator** of the UNIBZ unit for the ERDF 2014-2020 Project *Data Integration for Energy Efficiency (IDEE)*. The aim of the IDEE project is to develop a technological infrastructure based on semantic technologies for the integration of data concerning buildings, with an emphasis on the energy related data, and to provide techniques and tools for the visualization and analysis of such data. The project is developing a case study based on the municipality of Merano, where current and historical data about energy consumption: (gas, electricity, distance-heating), as well as cadaster data will be accessed and integrated using the ontology-based data access technology developed by the KRDB Resarch Centre for Knowledge and Data at UNIBZ. The project is coordinated by R3-GIS, a local company specialised in the development of geographical information systems to manage building and energy-related data, and has as additional participant Alperia, the main energy provider in

South Tyrol.
The project is funded through European Social Funds with $\sim 225\,000$ € for the Free University of Bozen-Bolzano.

From Feb. 2019 **Principal investigator** for the UNIBZ personal start-up project *VERification of Business Artifacts (VERBA)*. VERBA aims at providing a proof-of-concept, concrete verification framework for business artifacts, one of the main conceptual frameworks for the representation of integrated models for business processes and master data. This is achieved by relying on one of the most promising technologies for the verification of infinite-state systems, namely model checking with Satisfiability-Modulo-Theories (SMT). While SMT model checkers have been already successfully applied in practice to verify programs and parameterized distributed systems, their application in the context of data-aware processes is still unexplored, yet very promising.
The project is funded by UNIBZ with 50 0000 €.

From Mar. 2019 **Faculty principal Co-investigator** of the UNIBZ unit for the CHIST-ERA 2014-2020 Project *Process-aware Analytics Support based on Conceptual Models for Event Logs (PACMEL)*. Nowadays great attention is paid to the Industry 4.0. concept whose central idea is the exploitation of large amounts of data generated by different kinds of sensors, to enact highly automatized, robust processes and to develop high quality monitoring systems of process realization that support intelligent semi-autonomous decision making. At the same time, big data analytics as core competency and a process-oriented management approach are very often indicated as one of the main pillars of any modern company. Towards this, the main objective of PACMEL is to develop a process-aware analytics framework for analyzing data from sensors and devices to enable the use of this data for process modeling and analysis, with the aim of improving the business processes according to the BPM cycle.
The project is funded by MIUR through the CHIST-ERA framework with $\sim 125\,000$ € for the Free University of Bozen-Bolzano.

From Aug. 2019 (expected) **Faculty Principal Investigator** of the Computer Science Faculty for the UNIBZ ID Project *Wine Identity Card (WineID)*. The project brings forward a new approach to treat the analytical data of the samples obtained testing different winemaking procedures for Pinot blanc and Pinot noir (two top wines produced in South Tyrol). The aim is to identify and validate new protocols to assess wine authenticity (use of admitted / not admitted winemaking procedures, additives and coadiuvants, type of the grape - blend) which will be proposed to wine control authorities to update or integrate the current methods. This is achieved by synergically integrating the enology competencies of the UNIBZ Faculty of Science and Technology, with those in process and data analytics of the UNIBZ Faculty of Computer Science. The winemaking processes for Pinot blanc and noir will be modeled, and chemical data will be collected on real process executions, considering raw materials, intermediates of production, and finished products. The collected, multi-dimensional data will be then analyzed using techniques grounded in data and process analytics.
The project is coordinated by the Faculty of Science and Technology, and is funded by UNIBZ with $\sim 60\,000$ € for the Faculty of Computer Science.

4.5 Main Research Collaborations

- W.M.P. van der Aalst (RWTH Aachen). Topics: *process mining and operational decision support.*
- M. Dumas (University of Tartu). Topics: *modeling, verification and mining of declarative process and decision models.*
- P. Abdullah, M. F. Atig (University of Uppsala), Aiswarya C. (Chennai Mathematical Institute), A. Deutsch (University of California San Diego). Topics: *formal verification of data-aware processes.*
- E. Teniente, M. Estanol (Universitat Politecnica de Catalunya). Topics: *artifact-centric process models.*
- J. Lobo (Universitat Pompeu Fabra Barcelona). Topics: *declarative distributed computing.*
- G. Delzanno (University of Genoa). Topics: *verification of contact-tracing protocols.*

- S. Rinderle-Ma, D. Ritter (University of Vienna). Topics: *application integration flows, enterprise integration patterns.*
- G. De Giacomo, F. Patrizi (Sapienza Università di Roma). Topics: *AI techniques for process and data management.*
- C. Ghidini, C. Difrancescomarino (FBK-IRST, Trento). Topics: *enterprise modeling, AI techniques for process management and analytics.*
- P. Mello, F. Chesani (University of Bologna). Topics: *open multiagent systems, discovery of temporal rules from data.*
- G. Plebani (Polytechnic University of Milan). Topics: *process management with IoT and cyber-physical systems.*
- S. Ghilardi (University of Milan). Topics: *model checking of data-aware processes.*
- M. de Leoni (University of Padua). Topics: *modeling, strategic reasoning, and discovery techniques for decision-aware processes.*

5 Prizes and Awards

I have received several career prizes and best paper awards in recognition of the significance and impact of my research.

5.1 Career Awards

I have received **two national awards** in recognition of my career. They are described next in detail. In addition:

- In May 2010, I have been *runner-up* for the **Lions prize for scientific research and technological innovation**, awarded by the Lions Club to the best PhD thesis defended in 2009–2010, and carried out within the PhD School for Information Science and Engineering at the University of Bologna.
- I have received the **Faculty Outstanding Achievement Award of 2016**, as a member of the Faculty of Computer Science at the Free University of Bozen-Bolzano who provided outstanding scientific contributions and service to the Faculty.
- I have received the **Faculty Best Teacher Award of 2018**, in recognition of my teaching effort within the study programs of the Faculty of Computer Science at the Free University of Bozen-Bolzano. The award has been given based on student votes.
- In 2020, I was runner-up for the 2019 edition of the *South Tyrol Research Prize for young researchers*, as one of the **top-three under 40 researchers in South Tyrol**.

5.1.1 "Marco Cadoli" GULP Distinguished Dissertation Award

On June 25, 2009, I received the **"Marco Cadoli" Distinguished Dissertation Award**, awarded by the Italian Association for Logic Programming (GULP - Gruppo ricercatori e Utenti di Logic Programming) to the *best Italian PhD thesis focused on computational logics and defended in the period 2007–2009*. The evaluation procedure has been carried out by an international panel of leading experts[9]. Two reviews are attached.

Robert A. Kowalski - *Professor Emeritus, Department of Computing, Logic and Artificial Intelligence Group, Imperial College London, UK*

I decided to read the entire thesis, because it contains so much interesting and important material. The thesis contains both wide-ranging background work and the original contributions of the thesis itself. The contributions of the thesis include not only significant contributions to theory, but also important work on practical implementation and applications.

The subject of the thesis, the Specification and Verification of Declarative Open Interaction Models, is exceptionally broad and outward-looking. The thesis bridges the gap between the methods of Computational Logic developed mainly in Artificial Intelligence and the tools and techniques developed in such otherwise unrelated domains as Business Process Management, Clinical Guidelines and Careflow Protocols, Service-Oriented and

[9]The *panel* is published here: `http://lia.deis.unibo.it/gulp/Burocrazia/bando-premi-tesi-2009.html`

Multi-Agent Systems. Most PhD theses are restricted to a single domain and narrowly deal with only theoretical, implementation of application issues.
In addition to the original work presented in the thesis, the thesis includes a analysis of and comparison with related work, including the use of Linear Temporal Logic and Model Checking. Montali presents convincing evidence for the benefits of his approach, but is modest in his acknowledgement of its limitations and in his assessment of related work.
This is one of the best PhD theses I have seen in a long time.

Wil M.P. van der Aalst - *Full Professor, Department of Mathematics & Computer Science, Eindhoven University of Technology, Eindhoven, The Netherlands*

The thesis is truly excellent and I would like to nominate the work for the best dissertation award. The work covers a broad area and provides deep and interesting results. Moreover, the work is supported by a nice set of tools. The framework consists of ConDec, CLIMB (a subset of SCIFF), g-SCIFF, and REC. It is shown that CLIMB is more expressive than LTL and this is demonstrated using ConDec. This is supported by checks at design-time and run-time. Moreover, the approach provides all kinds of additional support. Very interesting is the ability to discover declarative models. This is challenging and highly relevant.
The thesis work has resulted in a large number of high-quality publications. Moreover, the work has been presented at top conferences.

*5.1.2 Artificial Intelligence "Marco Somalvico" 2015 AI*IA Prize*

On September 25, 2015, I received the **Artificial Intelligence "Marco Somalvico" 2015 Prize**, given every two years by the Italian Association for Artificial Intelligence (AI*IA) to *best Italian researcher under 35 years of age who autonomously contributed to advance the state-of-the-art in Artificial Intelligence.*

The Committee was constituted by Maria Teresa Pazienza (Chair), Nicola Leone, and Pietro Torasso. The English translation of an excerpt of the Committee judgement follows:

> Marco Montali has provided several significant contributions to Artificial Intelligence, especially in the areas of:
>
> - knowledge representation,
> - automated reasoning and computational logic,
> - multiagent systems.
>
> He has demonstrated interest and ability to advance the state of the art with theoretical and applied contributions.
>
> *Of particular significance and impact is his contribution to the development of innovative AI techniques in the context of Business Process Management, an area in which he is one of the top recognized persons in Europe (in spite of his young age). This stresses his ability in providing innovative contributions in research fields that are interdisciplinary and of great interest for AI researchers.*
>
> Marco Montali's contributions have appeared in top AI journals and conferences, su as JAIR, JAAMAS, ACM TIST, AAAI, AAMAS, KR. Furthermore, many of his works have received a high number of citations, including the monograph derived from his PhD thesis, which anticipates many of the research lines successfully pursued during the last years. The autonomy of the candidate is confirmed by his remarkable international visibility, by his wide research network (witnessed by the long list of national and international co-authors), as well as by his active involvement in national and international research projects.

5.2 Best Paper Awards and Other Mentions

- **Best paper award** at the 7th International Symposium "From Agent Theory to Agent Implementation" (AT2AI-7), Vienna (Austria), April 6-7 2010, for the paper *Monitoring Time-Aware Social Commitments with Reactive Event Calculus.*
- In 2011, the paper *Social Commitments in Time: Satisfied or Compensated* has been selected as one of the "best of DALT" **highly influential (most cited) papers**, within the Declarative Agent Languages and Technologies workshop series.

- **Best paper award** at the 7th International Conference on Web Reasoning and Rule Systems (RR-2013), Mannheim (Germany), July 27-29 2013, for the paper *Verification and Synthesis in Description Logic Based Dynamic Systems.*
- **Best paper award** at the 13th International Conference on Business Process Management (BPM 2015), Innsbruck (Austria), August 31 - September 3 2015, for the paper *Ensuring Model Consistency and Minimality in Declarative Process Discovery.*
- **Outstanding IJCAI PC Member** at the 25th International Joint Conference on Artificial Intelligence (IJCAI 2016), New York City (USA), July 9-15 2016.
- **Best paper award** at the 14th International Conference on Business Process Management (BPM 2016), Rio de Janeiro (Brasil), September 18-22 2016, for the paper *Semantics and Analysis of DMN Decision Tables.*
- **Best paper award** at the 1st International Joint Conference on Rules and Reasoning (RuleML+RR 2017), London (UK), July 12-15 2017, for the paper *Semantic DMN: Formalizing decision models with domain knowledge.*
- **Runner-up best paper** at the 6th European Conference on Service-Oriented and Cloud Computing (ESOCC 2017), Oslo (Norway), September 27-29 2017, for the paper *IoT-based Compliance Checking of Multi-party Business Processes modeled with Commitments.*
- **Best paper award** at the 22nd International Enterprise Computing Conference (EDOC 2018), Stockholm (Sweden), October 16-19 2018, for the paper *Formalizing Application Integration Patterns.*
- **Distinguished IJCAI PC Member** at the 27th International Joint Conference on Artificial Intelligence and the 23rd European Conference on Artificial Intelligence (JCAI-ECAI 2018), Stockholm (Sweden), July 13-19 2018.
- **Best paper award** at the 23rd International Enterprise Computing Conference (EDOC 2019), Paris (France), October 28-31 2019, for the paper *Representing and Querying Norm States Using Temporal Ontology-Based Data Access.*
- **Best paper award** at the 23rd International Conference on Principles and Practice of Multi-Agent Systems (PRIMA 2020), AoE (online), November 18-20 2020, for the paper *A SMT-based Implementation for Safety Checking of Parameterized Multi-Agent Systems.*

6 Experience in Academic Teaching

I started being a teaching assistant for University-level courses when I was only 22. Since then, I have been consistently and continuously involved in teaching, first as a teaching assistant for BEng and MEng courses at the University of Bologna, and then as a lecturer for BSc and MSc courses at the Free University of Bozen-Bolzano. In addition, I have been involved in teaching activity and scientific dissemination with a variety of audiences, from elementary and high-school students to undergraduate, graduate and PhD students, from scientists and researchers to professionals working in the industry, and even the general audience. I am passionate about teaching, and I always try to convey even very technical and difficult concepts in an understandable way, balancing rigorous and formal presentation with concrete and effective examples. I do my best to actively involve the audience during my talks, and to establish a friendly and informal environment. I always fine-tune and adapt my slides, my speech, the drawings I do on the blackboard, and the examples I use, carefully taking into account who is listening.

Since 2015, I am actively involved in the management of study programs at the Free University of Bozen-Bolzano, and had the possibility of designing, and coordinating, a new MSc program in computational data science. Since 2019, I am Vice-Dean of teaching for the Faculty of Computer Science.

6.1 Teaching Assistance

A.Y. 2003/2004
Operating Systems BEng in Computer Engineering, University of Bologna.

A.Y. 2005/2006
Operating Systems BEng in Computer Engineering, University of Bologna.

2005 – 2011
Seminars, class and lab lectures for the *Fundamentals of Artificial Intelligence* and *Applications of Artificial Intelligence* courses, MEng in Computer Engineering, Univ. of Bologna.

A.Y. 2006/2007
Lab of Computer Science, BEng in Computer Engineering, University of Bologna.

A.Y. 2007/2008
Lab of Computer Science, BEng in Computer Engineering, University of Bologna.

A.Y. 2008/2009
Fundamentals and Lab of Computer Science BEng in Automation Engineering, University of Bologna.

Fundamentals of Computer Science, BEng in Computer Engineering, University of Bologna.

A.Y. 2017/2018
Database Systems, BSc in Computer Science, Free University of Bozen-Bolzano.

Programming Paradigms, BSc in Computer Science, Free University of Bozen-Bolzano.

6.2 Lectureship of BSc and MSc Courses

A.Y. 2011/2012
Lecturer of *Distributed Systems* (4ECTS), Bachelor in Computer Science and Engineering, Free University of Bozen-Bolzano.
General lecturer evaluation: *definitely positive* 33,33%; *generally positive* 53,34%; *generally negative* 13,33%; *definitely negative* 0%; *missing value* 0%.

Lecturer of *Conceptual Modeling for Information Systems* Â (4ECTS), MSc in Computer Science, Free University of Bozen-Bolzano.
General lecturer evaluation: *definitely positive* 50,00%; *generally positive* 50,00%; *generally negative* 0%; *definitely negative* 0%; *missing value* 0%.

A.Y. 2012/2013
Lecturer of *Knowledge Representation and Ontologies* Â (8ECTS – 4 taught by him), Erasmus Munds European Master in Computational Logic, Free University of Bozen-Bolzano.
General lecturer evaluation: *definitely positive* 80,00%; *generally positive* 20,00%; *generally negative* 0%; *definitely negative* 0%; *missing value* 0%.

Lecturer of *Conceptual Modeling for Information Systems* Â (4ECTS), MSc in Computer Science, Free University of Bozen-Bolzano.
General lecturer evaluation: *definitely positive* 73,33%; *generally positive* 26,67%; *generally negative* 0%; *definitely negative* 0%; *missing value* 0%.

A.Y. 2013/2014
Lecturer of *Data and Process Modelling* (8ECTS), MSc in Computer Science, Free University of Bozen-Bolzano.
Excerpt from the evaluation by students attending the course:

- Does the teacher stimulate / motivate interest in the subject?
  Definitely YES 40,00%; *generally YES* 60,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.
- Does the teacher explain the subject clearly?
  Definitely YES 40,00%; *generally YES* 60,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.

A.Y. 2014/2015

Lecturer of *Data and Process Modelling* (8ECTS), MSc in Computer Science, Free University of Bozen-Bolzano.
Excerpt from the evaluation by students attending the course:

- Does the teacher stimulate / motivate interest in the subject?
  Definitely YES 57,00%; *generally YES* 43,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.
- Does the teacher explain the subject clearly?
  Definitely YES 43,00%; *generally YES* 57,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.
- Does the teacher display teaching ability?
  Definitely YES 57,00%; *generally YES* 43,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.

Lecturer of a 32-hour advanced course on *Data and Process Modelling*, delivered in April and May 2015 to ∼30 IT experts working for the Province of Bozen-Bolzano.
Overall lecturer evaluation: 4.7/5.

A.Y. 2015/2016

Lecturer of *Data and Process Modelling* (8ECTS), MSc in Computer Science, Free University of Bozen-Bolzano.
Excerpt from the evaluation by students attending the course:

- Does the teacher stimulate / motivate interest in the subject?
  Definitely YES 71,00%; *generally YES* 29,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.
- Does the teacher explain the subject clearly?
  Definitely YES 57,00%; *generally YES* 43,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.
- Does the teacher display teaching ability?
  Definitely YES 71,00%; *generally YES* 29,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.

A.Y. 2016/2017

Lecturer of *Data and Process Modelling* (8ECTS), MSc in Computer Science, Free University of Bozen-Bolzano.
Student evaluations not available.

A.Y. 2017/2018

Lecturer of *Data and Process Modelling* (8ECTS), MSc in Computer Science, Free University of Bozen-Bolzano.
Student evaluations not available.

A.Y. 2018/2019

Lecturer of *Data and Process Modelling* (6ECTS), MSc in Computational Data Science, Free University of Bozen-Bolzano.
Excerpt from the evaluation by students attending the course:

- Does the teacher stimulate / motivate interest in the subject?
  Definitely YES 86,00%; *generally YES* 14,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.
- Does the teacher explain the subject clearly?
  Definitely YES 86,00%; *generally YES* 14,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.
- Does the teacher display teaching ability?
  Definitely YES 100,00%; *generally YES* 0,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.

Lecturer of *Intelligent Systems* (6ECTS), BSc in Computer Science, Free University of Bozen-Bolzano.
Excerpt from the evaluation by students attending the course:

- Does the teacher stimulate / motivate interest in the subject?
  Definitely YES 42,00%; *generally YES* 48,00%; *generally NO* 5%; *definitely NO* 5%; *missing value* 0%.
- Does the teacher explain the subject clearly?
  Definitely YES 63,00%; *generally YES* 37,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.
- Does the teacher display teaching ability?
  Definitely YES 68,00%; *generally YES* 32,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.

A.Y. 2019/2020

Lecturer of *Data and Process Modelling* (6ECTS), MSc in Computational Data Science, Free University of Bozen-Bolzano.
Excerpt from the evaluation by students attending the course:

- Does the teacher stimulate / motivate interest in the subject?
  Definitely YES 55,00%; *generally YES* 45,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.
- Does the teacher explain the subject clearly?
  Definitely YES 55,00%; *generally YES* 45,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.
- Does the teacher display teaching ability?
  Definitely YES 73,00%; *generally YES* 27,00%; *generally NO* 0%; *definitely NO* 0%; *missing value* 0%.

Lecturer of *Data and Process Modelling for Business Informatics* (6ECTS), BSc in Informatics and Management of Digital Business, Free University of Bozen-Bolzano.

Responsible for the *Capstone projects*, projects carried out by students on real data provided by companies and institutions, as part of the MSc in Computational Data Science.

6.3 Tutorials and Advanced Courses

A.Y. 2014/2015

Lecturer of *Research Methods* (4ECTS), module *Presenting Scientific Work*, PhD in Computer Science, Free University of Bozen-Bolzano.

A.Y. 2015/2016

Lecturer of *Research Methods* (4ECTS), module *Presenting Scientific Work*, PhD in Computer Science, Free University of Bozen-Bolzano.

A.Y. 2016/2017

Lecturer of *Research Methods* (4ECTS), module *Presenting Scientific Work*, PhD in Computer Science, Free University of Bozen-Bolzano.

Lecturer of *Verification of Data-Centric Systems* (together with Diego Calvanese), Summer School on Logic, Artificial Intelligence, and Verification (LAIVe 2017), TU Wien, Austria, July 3-5,2017.

Lecturer of *OBDA For Log Extraction in Process Mining*, 13th Reasoning Web Summer School (RW 2017), Birkbeck College London, UK, July 7-11, 2017.

Lecturer of *Verification of Data-Aware Processes* (together with Diego Calvanese), 29th European Summer School in Logic, Language, and Information (ESSLLI 2017), University of Toulouse, France, 17-28 July, 2017.

A.Y. 2017/2018

Tutorial on *Integrated modeling and verification of processes and data* at the *15th International*

Conference on Business Process Management (BPM 2017), Barcelona, Spain, September 10-15, 2017.

Tutorial on *Process mining: from zero to hero at the 18th International Conference on Product-Focused Software Process Improvement (PROFES 2017)*, Innsbruck, Austria, November 30-December 1, 2017.

A.Y. 2019/2020

Accepted advanced course on *Data-aware processes - modeling and verification* at the *6th Advanced Course on Petri Nets*, Torun, Poland, September 06-11, 2020.

6.4 Supervision and Evaluation of Theses

I strongly support collaborative research, and I particularly enjoy supporting students and young researchers in developing their ideas and research vision.

6.4.1 Theses Evaluation Panels

2017 **President** of the evaluation commission for the *2017 AI*IA "Marco Cadoli" award*, given to the best Italian PhD dissertation in artificial intelligence.

Member of the evaluation commission for the *2017 Best BPM Dissertation Award*, given to the best PhD dissertation in business process management.

2018 **Member** of the evaluation commission for the *2018 Best BPM Dissertation Award*, given to the best PhD dissertation in business process management.

2019 **Member** of the evaluation commission for the *2019 Best BPM Dissertation Award*, given to the best PhD dissertation in business process management.

2020 **President** of the evaluation commission for the *2020 Best Process Mining Dissertation Award*, given to the best PhD dissertation in process mining.

Member of the evaluation commission for the *2020 Best BPM Dissertation Award*, given to the best PhD dissertation in business process management.

Member of the evaluation commission for the *2020 Leonardo Lesmo Best Master Thesis Award*, given by the Italian Association for Artificial Intelligence (AIxIA) to the best AI Master thesis defended in an Italian University.

6.4.2 Supervision of PhD Theses

2011 – 2015

Co-supervisor of Dmitry Solomakhin on the topic *combining process and ontological modelling.* The thesis was not concluded, since Dmitry found a job in the industry.

2012 – 2015

Supervisor of Anna Roubickova on the topic *theoretical and experimental analysis of case-based planning techniques.*

2012 – 2016

Co-supervisor of Ario Santoso on the topic *verification of data-aware business processes in the presence of ontologies.*

2014 – 2019

Supervisor of Andrey Rivkin on the topic *integrated modeling, execution, and verification of processes and data.* With his PhD dissertation, Andrey won the *Best PhD student award* within the Faculty of Computer Science, Free University of Bozen-Bolzano.

2017 – now

Supervisor of Alessandro Gianola on the topic *SMT techniques for the verification of data-aware processes.*

2018 – now

Co-supervisor of Williams Rizzi (jointly with Chiara Ghidini and Chiara Difrancescomarino from FBK-IRST) on the topic *predictions and recommendations in process mining.*

2019 – now

Co-supervisor of Francesco Di Cosmo (jointly with Diego Calvanese) on the verification of declarative distributed systems.

2020 – now

Supervisor of Alessandro Burigana on epistemic reasoning for interorganisational processes.

6.4.3 Evaluation of PhD Theses

2012 • **Reviewer and member of the examination panel** for the defense of the PhD Thesis *Reasoning about Actions in Transaction Logic*, by Martin Rezk, Free Univ. of Bozen-Bolzano.

2013 • **External reviewer** for the PhD Thesis *Process Mining of Artful Processes*, by Claudio di Ciccio, Sapienza Università di Roma.
• **Reviewer and member of the examination panel** for the defense of the PhD Thesis *Context-aware Music Recommendation: Recommending Music for Places of Interest*, by Marius Kaminskas, Free Univ. of Bozen-Bolzano.

2014 • **Member of the final examination committee** for the PhD in Computer Engineering at *Sapienza University of Rome*.

2015 • **Vice-chair of the examination panel** for the PhD defense by Silvano Colombo Tosatto on *Proving Regulatory Compliance: Business Processes, Logic, Complexity*, University of Luxembourg and University of Turin.

2016 • **Member of the examination panel** for the PhD defense by Montserrat Estanol on *Artifact-centric Business Process Models in UML: Specification and Reasoning*, Universitat Politecnica de Catalunya.

2018 • **Member of the final examination committee** for the PhD in Computer Science and Engineering at the *University of Bologna*.
• **Reviewer and member of the examination panel** for the PhD Defense by Marvin Triebel on *Preserving Data Integrity in Distributed Systems*, Humboldt-Universität zu Berlin.

2019 • **Reviewer and member of the examination panel** for the PhD Defense by Eduardo González López de Murillas on *Process Mining on Databases: Extracting Event Data from Real Life Data Sources*, Eindhoven University of Technology.
• **Reviewer and member of the examination panel** for the PhD Defense by Guangming Li on *Process Mining based on Object-Centric Behavioral Constraint (OCBC) models*, Eindhoven University of Technology.
• **Reviewer and member of the examination panel** for the PhD Defense by Alexey A. Mitsyuk on *Structure-Preserving Process Model Repair Based on Event Logs*, National Research University Higher School of Economics Faculty of Computer Science, Moscow.

2020 • **External reviewer** for the PhD studies by Mathilde Boltenhagen on *Optimization Techniques for Conformance Checking and Model Repair in Process Mining*, ENS-Paris Saclay, Paris.

6.4.4 Supervision of Master Theses

2013 • **Supervisor** of the MSc thesis by Andrey Rivkin, European Master in Computational Logic, on *Formal Verification of Data-Aware Business Processes Based on Petri Nets*.

2015 • **Supervisor** of the MSc thesis by *Alina Aleksandrova*, European Master in Computational Logic, on *Engineering data-aware commitment-based multiagent systems*.
• **Supervisor** of the MSc thesis by *Manfred Gerstgrasser*, MSc in Computer Science, Free University of Bozen-Bolzano, on *Ontology-Based Data Access and relational mapping*.

2017 • **Supervisor** of the MSc thesis by *Gianluca Stivan*, MSc in Computer Science, on *Kiki: weak memory models for parallel data processing*.

- **Supervisor** of the MSc thesis by *Aman Sinha*, European Master in Computational Logic, on *Database-centric colored Petri nets.*
- **Co-supervisor** of the MSc thesis by *Simone Tritini*, MSc in Computer Science, on *Object-centric behavioral constraints.*

2019 • **Co-supervisor** of the MSc thesis by *Luca Sabiucciu*, MSc in Computer Science, on *Explorative Mining of Oncology Patient Processes.*

2020 • **Supervisor** of the MSc thesis by *Aurelia Pagano*, MSc in Computer Science, on *Flexibility in Business Process Models: an Application-oriented Comparative Study*
- **Supervisor** of the MSc thesis by *Luca Bellettati*, MSc in Computer Science, on *Encoding dapSL into a running system: DAPHNE.*

6.4.5 Supervision of Bachelor Theses

2015 • **Supervisor** of the BSc Thesis by *Riccardo Steffan*, BSc in Computer Science, on *A Reactive Event Calculus reasoner running in JAVA.*

2017 • **Supervisor** of the BSc Thesis by *Luca Sabiucciu*, BSc in Computer Science, on *A tool for the verification of data-aware business processes.*

Now • **Supervisor** of the BSc Thesis by *Davide Briozzi*, BSc in Computer Science, on *An SMT-based formalization of Petri nets with data.*
- **Supervisor** of the BSc Thesis by *Davide Perez Cuevas*, BSc in Computer Science, on *Simulation of Ant Colonies Walking on Graphs.*
- **Supervisor** of the BSc Thesis by *Marco Briozzi*, BSc in Computer Science, on *An SMT-based formalization of Petri nets with data.*
- **Co-supervisor** of the BSc Thesis by *Alessandro Mattivi*, BSc in Computer Science, on *Implementation of an OpenAI Gym environment for AI education.*

7 Academic Responsibilities

I am involved in the organization of top-tier international conferences and other events. I actively participate to faculty-related activities, and contribute to establish connections and collaborations with the territory. I gained experience in the design and management of study programs covering computer science and data science.

7.1 Institutional Responsibilities

Apr. 2011 – now
Member of the *PhD Committee in Computer Science*, Free University of Bozen-Bolzano.

Jan. 2013 – Dec. 2015
Elected member of the *Board of Directors of the Italian Association for Logic Programming* (GULP).

Feb. 2014 – Aug. 2017
Member of the *Degree Committee of the Master in Computer Science*, Free University of Bozen-Bolzano.

Jun. 2015 – May 2019
Academic Erasmus contact point for the *Master in Computer Science*, Free University of Bozen-Bolzano.

2017 – now
Director of the *Master Degree Course in Computational Data Science* at the Faculty of Computer Science, Free University of Bozen-Bolzano.

Coordinator of the *PRISM (PRocess-aware Information Systems Management* research group at the Faculty of Computer Science, Free University of Bozen-Bolzano.

Jan. 2019 – Now

Elected member of the *Board of Directors of the Italian Association for Logic Programming* (GULP).

Oct. 2019 – Now

Vice-dean of teaching for the Faculty of Computer Science, Free University of Bozen-Bolzano.

Nov. 2019 – Now

Member of the steering committee of the *IEEE Task Force on Process Mining*.

7.2 Organizational Responsibilities

2011
- **Demo co-chair** of the *5th International Symposium on Rules (RuleML@BRF 2011)*, Fort Lauderdale, Florida, USA.
- **Chair of the Doctoral Program** at the *Third International Spring School on Computational Logic (ISCL 2011)*, Bertinoro, Italy.

2012
- **Organization co-chair** of the *Joint Workshop on Security in Business Processes (SPB'12)*, in conjunction with BPM 2012, Tallin, Estonia.
- **Co-organizer** of the *Workshop on Popularize Artificial Intelligence (PAI-2012)*, in conjunction with AI*IA 2012, Rome, Italy.

2013
- **Demo co-chair** of the *11th International Conference on Service Oriented Computing (ICSOC 2013)*, Berlin, Germany.
- **Co-chair** of the *2nd International Workshop on Knowledge-Intensive Business Processes (KiBP 2013)*, Kauai, Hawaii.
- **Co-organizer** of the *2nd Workshop on Popularize Artificial Intelligence (PAI-2013)*, in conjunction with AI*IA 2013, Turin, Italy.

2014
- **Co-chair** of the special session on *Action Languages: Theory & Practice*, in the context of the *8th Hellenic Conference on Artificial Intelligence (SETN 2014)*, Ioannina, Greece.

2015
- **Proceedings and Publicity Chair** of the *34th ACM Symposium on Principles of Database Systems (PODS)*, Melbourne, Australia.
- **Co-chair** of the *Enterprise Engineering track* at the *30th ACM Symposium On Applied Computing (SAC)*, Salamanca, Spain.
- **Chair** of the *Doctoral Consortium* at the *9th International Conference on Web Reasoning and Rule Systems (RR)*, Berlin, Germany.
- **Co-chair** of the *4th Workshop on Data- & Artifact-Centric BPM (DAB)*, Innsbruck, Austria.

2016
- **Publicity co-chair** of the *15th International Conference on Business Process Management (BPM)*, Barcelona, Spain.
- **Member of the organization committee** of the *28th European Summer School in Logic, Language and Information (ESSLLI)*, Bolzano, Italy.

2017
- **Co-chair** of the *1st International Workshop on Business Process Innovation with Artificial Intelligence (BPAI)*, co-located with BPM 2017, Barcelona, Spain.

2018
- **Program chair** of the *foundations track* at the *16th International Conference on Business Process Management (BPM)*, Sydney, Australia.
- **Program chair** of the *33rd Italian Conference on Computational Logic (CILC)*, Bolzano, Italy.
- **Organization co-chair** of the *1st International Workshop on Reasoning about Actions and Processes: Highlights of Recent Advances* at KR 2018, Tempe, Arizona.

2019
- **Program co-chair** of the *3rd International Joint Conference on Rules and Reasoning (RuleML+RR2019)*, Bolzano, Italy.

- **Co-chair** of the *1st International Workshop on Methods for Interpretation of Industrial Event Logs (MIEL2019)*, co-located with BPM 2019, Vienna, Austria.
- **Co-chair** of the *1st International Workshop on Strategic Modeling and Reasoning meets Process Mining (SMRPM2019)*, co-located with EDOC 2019, Paris, France.

2020
- **Program co-chair** of the *2nd International Conference on Process Mining (ICPM2020)*, Padua, Italy.
- **Program co-chair** of the *International Conference Modeling and Analysis of Complex Systems and Processes (MACSPro'2020)*, Venice, Italy.

8 Memberships and Review Activity

I am member of national and international associations, and I am constantly invited to become member of the program committee for top-tier international conferences and national events, as well as to act as a reviewer for world-class international journals.

8.1 Membership to Scientific Associations and Working Groups

- *Association for the Advancement of Artificial Intelligence (AAAI).*
- *Institute of Electrical and Electronics Engineers (IEEE).*
- *IEEE Task Force on Process Mining.*
- *International Association for Ontology and its Applications* (IAOA).
- *Associazione Italiana per l'Intelligenza Artificiale* (AI*IA).
- *Associazione Italiana per la Programmazione Logica* (GULP).

8.2 Membership to Editorial Boards

Since 03/2014

Member of the Review Board for *Frontiers in Computational Intelligence*, a section of *Frontiers in Robotics and AI.*

8.3 PC Membership at International Conferences and Workshops

8.3.1 Senior PC Membership

2016
- 19th International Conference on Principles and Practice of Multiagent Systems (PRIMA 2016).

2017
- 15th International Conference on Business Process Management (BPM 2017).

2018
- 17th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2018).

2019
- 28th International Joint Conference on Artificial Intelligence (IJCAI 2019).
- 17th International Conference on Business Process Management (BPM 2019).
- 18th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2019).

2020
- 29th International Joint Conference on Artificial Intelligence (IJCAI 2020).
- 24th European Conference on Artificial Intelligence (ECAI 2020).
- 18th International Conference on Business Process Management (BPM 2020).

2021
- 30th International Joint Conference on Artificial Intelligence (IJCAI 2021).
- 19th International Conference on Business Process Management (BPM 2021).

8.3.2 PC Membership

2008
- AI*IA 2008 WS on Multi-Agent Systems and Bioinformatics (MAS&BIO 2008).

2011
- 22nd Int. Joint Conf. on Artificial Intelligence (IJCAI 2011).
- 10th Int. Conf. on Autonomous Agents and Multiagent Systems (AAMAS 2011).
- 26th Italian Conf. on Computational Logic (CILC 2011).

2012
- 1st Int. WS on Knowledge-intensive Business Processes (KiBP 2012).

2013
- 23nd Int. Joint Conf. on Artificial Intelligence (IJCAI 2013).
- 12th Int. Conf. on Autonomous Agents and Multiagent Systems (AAMAS 2013).
- 28th ACM Symposium on Applied Computing (SAC 2013).
- AI*IA 2013 WS on AI meets Business Processes (AIBP2013).

2014
- 23rd ACM Int. Conf. on Information and Knowledge Management (CIKM 2014).
- 21st Eu. Conf. on Artificial Intelligence (ECAI 2014).
- 12th Int. Conf. on Service Oriented Computing (ICSOC 2014).
- 8th Int. Conf. on Web Reasoning And Rule Systems (RR 2014).
- 29th ACM Symp. on Applied Computing (SAC 2014).
- 4th Int. Symp. on Data-Driven Process Discovery and Analysis (SIMPDA 2014).
- 11th Int. WS on Web Services and Formal Methods (WS-FM:FASOCC 2014).

2015
- 24th Int. Joint Conf. on Artificial Intelligence (IJCAI 2015).
- 29th AAAI Conf. on Artificial Intelligence (AAAI-15).
- 14th Int. Conf. on Autonomous Agents and Multiagent Systems (AAMAS 2015).
- 13th Int. Conf. on Business Process Management (BPM 2015).
- 24th ACM Int. Conf. on Information and Knowledge Management (CIKM 2015).
- 9th Int. Conf. on Web Reasoning and Rule Systems (RR 2015).
- 9th Int. Web Rule Symp. (RuleML 2015).
- 2nd Int. Conf. on Methodologies and Intelligent Systems for Technology Enhanced Learning (MIS4TEL 2015).
- 30th Italian Conf. on Computational Logic (CILC 2015).

2016
- 25th Int. Joint Conf. on Artificial Intelligence (IJCAI 2016).
- 15th Int. Conf. on Knowledge Representation and Reasoning (KR 2016).
- 15th Int. Conf. on Autonomous Agents and Multiagent Systems (AAMAS 2016).
- 22nd Eu. Conf. on Artificial Intelligence (ECAI 2016).
- 14th Int. Conf. on Business Process Management (BPM 2016).
- 31st Italian Conf. on Computational Logic (CILC 2016).

2017
- 26th Int. Joint Conf. on Artificial Intelligence (IJCAI 2017).
- 1st Int. Joint Conf. Conference on Rules and Reasoning (RuleML+RR).
- Int. Conf. on Software and System Processes (ICSSP 2017).
- 5th Int. WS on Strategic Reasoning (SR 2017).
- 5th Int. WS on Declarative/Decision/Hybrid Mining and Modelling for Business Processes (DeHMiMoP'17).
- 32nd Italian Conf. on Computational Logic (CILC 2017).

2018
- 37th ACM SIGMOD-SIGACT-SIGAI Symp. on Principles of Database Systems (PODS 2018).
- 32nd AAAI Conf. on Artificial Intelligence (AAAI-18).
- 16th Int. Conf. on Principles of Knowledge Representation and Reasoning (KR 2018).

2019
- 1st Int. Conf. on Process Mining (ICPM 2019).
- 33rd AAAI Conf. on Artificial Intelligence (AAAI-19).
- 2nd Int. WS on Reasoning about Actions and Processes: Highlights of Recent Advances (ACTIONS@ICAPS 2019).

2020
- 34th AAAI Conf. on Artificial Intelligence (AAAI-20).
- 17th International Conference on Principles of Knowledge Representation and Reasoning (KR 2020).
- 2020's Conference on Prestigious Applications of Intelligent Systems (PAIS 2020).
- 1st Int. WS on Event Data and Behavioral Analytics (EdbA'20).
- 35th Italian Conf. on Computational Logic (CILC 2020).

2021
- 35th AAAI Conf. on Artificial Intelligence (AAAI-21).
- 33rd Int. Conf. on Advanced Information Systems Engineering (CAiSE'21).
- 42nd Int. Conf. on Application and Theory of Petri Nets and Concurrency (PetriNets 2021).
- 3rd Int. Conf. on Process Mining (ICPM 2021).

8.4 Review Activity

Reviewer for the following international journals:
- ACM Transactions on Database Systems (ACM TODS),
- ACM Transactions on Software Engineering and Methodology (ACM TOSEM),
- ACM Transactions on Internet Technology (ACM TOIT),
- Journal of Artificial Intelligence Research (JAIR),
- Journal of Computer and System Science (JCSS),
- IEEE Transactions on Knowledge and Data Engineering (IEEE TKDE),
- IEEE Transactions on Services Computing (IEEE TSC),
- Journal of Autonomous Agents and Multi-Agent Systems (JAAMAS),
- Theoretical Computer Science (TCS),
- Information Systems (IS),
- AI Communications,
- Journal of Intelligent Information Systems (JIIS),
- Data & Knowledge Engineering (DKE),
- SIGMOD Record,
- Springer Computing,
- Fundamenta Informaticae,
- LNCS Transactions on Petri Nets and Other Models of Concurrency (ToPNoC).

9 Dissemination

I enjoy presenting the results of my research activity. I often disseminate my research through invited talks, presentations at top-tier international conferences and workshops and seminars. I am also contributing to the consolidation and enhancement of contacts between the Free University of Bozen-Bolzano and world-leading scientists. For third mission and dissemination to the general public, see Section 10.

9.1 Invited Talks and Keynotes

Dec. 12, 2007

Invited talk at the *PSW thematic day on web services verification*, LORIA – INRIA, Nancy (France). Title: *Declarative Specification and Verification of Service Choreographies.*

Nov. 30, 2010

Keynote speech at the *Annual meeting of the Interdisciplinary Laboratory on Interacting Knowledge Systems (ILIKS)*, LOA–CNR, Trento (Italy). Title: *Monitoring Time-Aware Social Commitments.*

Nov. 1, 2012

Invited talk at the Workshop on Foundations of Biomedical Knowledge Representation, Lorentz Center, Leiden (the Netherlands). Title: *Clinical Guidelines - Conformance Verification when Dealing with Computerized and Human-Enhanced Processes.*

Sep. 6, 2014

Invited talk at the 1st Workshop on Parameterized Verification (Satellite Event of Concur 2014), Rome (Italy). Title: *Verification of Parameterized, Data-Aware Dynamic Systems.*

Sep. 25, 2015

Invited talk at the 14th Conference of the Italian Association for Artificial Intelligence, related to the "Marco Somalvico 2015 award", Ferrara, Italy. Title: *Data and Processes: a Challenging, though Necessary, Marriage.*

June 21, 2016

Keynote speech at the Workshop on Algorithms & Theories for the Analysis of Event Data (ATAED 2016), co-located with Petri Nets 2016, Torun, Poland. Title: *Marrying data and processes: from model to event data analysis.*

Nov 29, 2016

Keynote speech at the General Meeting of the SOAMED PhD School, Zeuthen (Berlin), Germany. Title: *DB-Nets: on the Marriage of Colored Petri Nets and Relational Databases.*

Feb. 22, 2017

Invited talk at the 1st International Workshop on Formal Methods and Artificial Intelligence (FMAI 2017), University of Naples, Italy. Title: *Temporal Logics over Finite Traces for Declarative BPM: a Success Story.*

Apr. 5, 2019

Invited talk at "Ontology makes sense" - A symposium in honour of Nicola Guarino, University of Trento, Italy. Title: *Enriching Data Models with Behavioral Constraints.*

Sep. 2, 2019

Keynote speech at the 7th International Workshop on DEClarative, DECision and Hybrid approaches to processes (DEC2H 2019), co-located with BPM 2019, Vienna, Austria. Title: *Putting decisions in perspective(s).*

9.2 Presentations at International Conferences and Workshops

June 24, 2005

Presentation at the 18th IEEE Symposium on Computer Based Medical Systems (CBMS'05), Dublin (Ireland). Title: *Using Social Integrity Constraints for On-the-fly Compliance Verification of Medical Protocols.*

Aug. 28, 2006

Presentation at the 4th International Workshop on AI for Service Composition (AISC2006), in conjunction with ECAI2006, Riva del Garda (Italy). Title: *Abduction for Specifying and Verifying Web Service Choreographies.*

Sep. 09, 2006

Presentation at the 3rd International Workshop on Web Services and Formal Methods (WS-FM 2006), Vienna (Austria). Title: *Computational Logic for Run-Time Verification of Web Services Choreographies: Exploiting the SOCS-SI Tool.*

Sep. 01, 2008

Presentation at the 4th International Workshop on Business Process Intelligence (BPI2008), in conjunction with BPM2008, Milan (Italy). Title: *Checking Compliance of Execution Traces to Business Rules.*

Sep. 05, 2008

Presentation at the 5th International Workshop on Web Services and Formal Methods (WS-FM2008), Milano (Italy). Title: *Verification of Choreographies During Execution Using the Reactive Event Calculus.*

July 09, 2009

Demo presentation at the 10th Italian Workshop "From Objects to Agents" (WOA 2009), Parma (Italy). Title: *A REC-Based Commitment Tracking Tool.*

June 04, 2010
: Presentation at the 7th International Symposium "From Agent Theory to Agent Implementation" (AT2AI-7), Vienna (Austria). Title: *Monitoring Time-Aware Social Commitments with Reactive Event Calculus*. Best Paper Award.

Aug. 29, 2011
: Presentation at the 4th International Workshop on Process-Oriented Information Systems in Healthcare (ProHealth'11), Clermont-Ferrand (France). Title: *Conformance Checking of Executed Clinical Guidelines in presence of Basic Medical Knowledge*.

May 20, 2013
: presentation at the Dagstuhl Seminar on Automated Reasoning on Conceptual Schemas, Schloss Dagstuhl (Germany). Title: *On the Relationship Between OBDA and Relational Mapping*.

June 23, 2013
: presentation at the 32nd ACM SIGACT SIGMOD SIGART Symposium on Principles of Database Systems (PODS 2013), New York (USA). Title: *Verification of Relational Data-Centric Dynamic Systems with External Services*.

July 27, 2013
: Presentation at the 7th International Conference on Web Reasoning and Rule Systems (RR-2013), Mannheim (Germany). Title: *Verification and Synthesis in Description Logic Based Dynamic Systems*. Best Paper Award.

Aug. 20, 2013
: Presentation at the Dagstuhl Seminar on Verifiably Secure Process-Aware Information Systems, Schloss Dagstuhl (Germany). Title: *Data-Aware Business Processes - Formalization and Reasoning Support*.

May 21, 2014
: Presentation at the 13th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2014). Title: *Verification of Data-Aware Commitment-Based Multiagent System*.

June 17, 2014
: Presentation at the 29th Italian Conference on Computational Logic (CILC 2014). Title: *Specification and Verification of Commitment-Regulated Data-Aware Multiagent Systems*.

July 21, 2014
: Presentation at the 14th International Conference on Principles of Knowledge Representation and Reasoning (KR 2014). Title: *State-Boundedness in Data-Aware Dynamic Systems*.

Sep. 11, 2014
: Presentation at the 12th International Conference on Business Process Management (BPM 2014), Eindhoven (the Netherlands). Title: *Monitoring Business Metaconstraints Based on LTL and LDL for Finite Traces*.

Jan. 27, 2015
: Presentation at the 29th AAAI Conference on Artificial Intelligence (AAAI 2015), Austin (USA). Title: *Verification of Relational Multiagent Systems with Data Types*.

June 10, 2015
: Presentation at the 27th International Conference on Advanced Information Systems Engineering (CAiSE 2015). Title: *Declarative Process Modeling in BPMN*.

July 12, 2017
: Presentation at the 1st International Joint Conference on Rules and Reasoning (RuleML+RR 2017), London (UK). Title: *Semantic DMN: Formalizing Decision Models with Domain Knowledge*.

September 22, 2018
: Presentation at the 33rd Italian Conference on Computational Logic (CILC 2018). Title: *Modeling and Reasoning over Declarative Data-Aware Processes: The Object-Centric Behavioral Constraint Approach*.

Sep. 4, 2019
Presentation at the 17th International Conference on Business Process Management (BPM 2019), Vienna (Austria). Title: *Modeling and Reasoning over Declarative Data-Aware Processes with Object-Centric Behavioral Constraints.*

Sep. 4, 2019
Presentation at the 17th International Conference on Business Process Management (BPM 2019), Vienna (Austria). Title: *Formal Modeling and SMT-Based Parameterized Verification of Data-Aware BPMN.*

Feb. 9, 2020
Presentation at 34th AAAI Conference on Artificial Intelligence (AAAI-20), New York (USA). Title: *Temporal Logics Over Finite Traces with Uncertainty.*

Jun. 11, 2020
Presentation at the *CAiSE Forum 2020*, online conference. Title: *Probabilistic Conformance Checking Based on Declarative Process Models.*

Sep. 15, 2020
Presentation at the 18th International Conference on Business Process Management (BPM 2020), online conference. Title: *Extending Temporal Business Constraints with Uncertainty.*

Sep. 18, 2020
Presentation at the 17th International Conference on Principles of Knowledge Representation and Reasoning (KR 2020), online conference. Title: *Strategy Synthesis for Data-Aware Dynamic Systems with Multiple Actors.*

9.3 Seminars

Jan. 8, 2008
Invited seminar, Eindhoven University of Technology, Eindhoven (the Netherlands). Title: *Verification of Declarative Business Processes and Choreographies.*

Jan. 17, 2008
Presentation at the final meeting of the PRIN 2005 Project "Specification and Verification of Agent Interaction Protocols", Alessandria (Italy). Title: *Verification of Declarative Business Processes and Choreographies.*

July 19, 2010
Tutorial, Eindhoven University of Technology, Eindhoven (the Netherlands). Title: *Reasoning on Execution Traces with the Event Calculus.*

July 29, 2010
Invited seminar, Eindhoven University of Technology, Eindhoven (the Netherlands). Title: *Business Constraints Monitoring and Operational Support.*

Dec. 15, 2010
Invited seminar, KRDB Research Centre for Knowledge and Data, Free Univ. of Bozen-Bolzano. Title: *Specification and Verification of Declarative Open Interaction Models.*

July 06, 2011
Group seminar, KRDB Research Centre, Free Univ. of Bozen-Bolzano, Bolzano (Italy). Title: *Runtime Reasoning with the Event Calculus: from Theory to Practice.*

May 03, 2012
Group seminar, KRDB Research Centre, Free Univ. of Bozen-Bolzano, Bolzano (Italy). Title: *Verification of Relational Data-Centric Dynamic Systems.*

Dec. 20, 2012
Invited seminar, FBK-IRST, Trento (Italy). Title: *Towards Convergence of Data and Processes: the Artifact-Centric Approach.*

Jan. 16, 2015
Invited seminar, University of Luxembourg. Title: *Monitoring Business Constraints and Meta-constraints with LTL and LDL on Finite Traces.*

May 31, 2016
Invited seminar, University of Verona, Verona (Italy). Title: *Data-Aware Business Processes: balancing between expressiveness and verifiability.*

Dec 12, 2016
Invited seminar, University of Seville, Seville (Italy). Title: *Declarative, Constraint-Based Business Process Management.*

Nov. 28, 2018
Invited seminar, Humboldt University of Berlin. Title: *Temporal Logics over Finite Traces for Declarative BPM: a Success Story.*

Feb. 27, 2019
Invited seminar, Eindhoven University of Technology. Title: *Cooking with Data and Processes.*

May 14, 2019
Invited seminar, Eindhoven University of Technology. Title: *10 Years Playing with Declare and Temporal Logics on Finite Traces.*

May 16, 2019
Invited seminar, RWTH Aachen. Title: *10 Years Playing with Declare and Temporal Logics on Finite Traces.*

May 22, 2020
Online seminar as part of the KRDB Summer Online Seminars 2020. Title: *Modeling and Reasoning over Declarative Data-Aware Processes.*

9.4 Invitations at international events and research visits

01/2008 Visiting researcher at the *Architecture for Information Systems Group*, TU/e Eindhoven.

10/2008 Lorentz Center WS *Computer-based Clinical Guidelines and Protocols.*

07/2019 Visiting researcher at the *Architecture for Information Systems Group*, TU/e Eindhoven.

10/2012 Lorentz Center WS *Foundations of Biomedical Knowledge Representation.*

05/2013 Dagstuhl Seminar *Automated Reasoning on Conceptual Schemas.*

08/2013 Dagstuhl Seminar *Verifiably Secure Process-Aware Information Systems.*

02/2015 Visiting researcher at the *Department of Information Technology*, University of Uppsala.

06/2015 Visiting researcher at the *Department of Information Technology*, University of Uppsala.

11/2016 Visiting researcher at the *IDEA Research Group*, University of Seville.

10 Third Mission and Enterpreneurship

I actively participate to third mission in various forms. The most important achievement so far has been the creation of the first spin-off of the Free University of Bozen-Bolzano, which I co-founded (see Section 10.3). In addition, I regularly give high-level speeches tailored to the industry and to the general audience, and I am contributing to strengthen and widen the connection between academia and stakeholders operating in the local territory.

10.1 Industry Talks and Talks to the General Audience

Oct. 11, 2012
Invited presentation at the industrial day on "Cloud Computing and Mobile", jointly organized

by the local company Horizon[10], together with Samsung. Title of the presentation: *Sharing Knowledge - Towards the Convergence of Data, Processes, and Humans*[11].

Dec. 18, 2012
: Faculty representative, at the opening ceremony of a Samsung multimedia classroom in Merano (Italy). Co-presenter of a talk on *Technology at School: Why, How, for Whom*[12].

Oct. 24, 2013
: Presentation at the first Euregio Research Cooperation Day (ERCD), jointly organized by the Free Univ. of Bozen-Bolzano, Univ. of Innsbruck, Univ. of Trento. Title of the presentation: *Management and Verification of Data and Business Processes.*

Nov. 24, 2015
: Invited presentation at the industrial day on "Collavoriamo", organized by Info Easy SRL (Imola). Title of the presentation: *Towards an IT support to organizations based on reality*[13].

Nov. 26, 2015
: Invited presentation at the 5th Workshop "Computer Science Research Meets Business", focused on CRM Systems. Title of the presentation: *Towards a business process management founded on reality*[14].

May 26, 2016
: Invited presentation at the senior high school "Cantore" in Bruneck-Brunico (BZ, Italy). Title of the presentation: *From Leibniz to Turing: the birth of computers and the discovery of the limitations of mathematics*[15].

Nov. 7, 2019
: Presentation at the 1st Industry Day of the Free University of Bozen-Bolzano. Title: *IDEE: Data Integration for Energy Efficiency.*

Oct. 23, 2019
: Invited presentation at "Fit for Digital", the 1st South Tyrolean event on digital transformation for the public administration, EURAC, Bolzano. Title: *Processes and organizations: a look behind the paper wall.*

Oct. 26, 2020
: Invited presentation on *Artificial Intelligence in Today's Society* at the *Accademia di Studi italo-tedesca*, Merano, as part of an event for the general public focussed on Artificial Intelligence.

10.2 Third Mission Activities

Since 10/2012
: **Supporter of activities** with schools in the Province of Bozen-Bolzano, from primary to high schools.

Dec. 18, 2012
: **Faculty representative** (together with Rosella Gennari), at the opening ceremony of a *Samsung multimedia classroom* in Merano (Italy).

Feb. 6, 2013
: **Organizer** of the *Integrated Enterprise Modelling and BPM Meeting*, hosting researchers from the Euregio area (Trento, Bozen-Bolzano, Innsbruck).

2013 – 2014
: **Faculty representative** for the *MINT (Mathematics, Informatics, Natural Sciences, Technology)* high-school initiative[16].

[10] `http://www.horizon.bz.it`
[11] Conoscenza condivisa - verso la convergenza di dati, processi e persone.
[12] Tecnologie a scuola: perché, come, per chi.
[13] Verso un supporto IT alle organizzazioni fondato sulla realtà.
[14] Verso una gestione dei processi aziendali basata sulla realtà.
[15] Da Leibniz a Turing: la nascita dei computer e la scoperta dei limiti della matematica.
[16] `http://www.mint.bz.it`

Apr.–May 2015

Lecturer of an advanced course on *data and process modelling*, delivered to *more than 30 IT experts* working within the Province of Bozen-Bolzano.

Since June 2017

Scientific advisor and **member of the board of directors** of EBITmax[17], a local company focused on business process re-engineering&continuous improvement, digital innovation, and process mining.

July 6, 2017

Faculty representative (together with Barbara Russo) at *Il Comprensorio Bolzano Città incontra la Libera Università di Bolzano*, a meeting to foster joint innovation activities of UNIBZ and local industries.

May 3, 2018

Faculty representative at *10 anni di QuiBolzano*, an event for the general public to celebrate the first 10 years of activity of the local newspaper "QuiBolzano" and to discuss the future development of the city of Bolzano.

Since October 2018

Columnist of a series on *ICT and digital cities* appearing monthly in various newspapers (QuiBolzano, QuiMerano, QuiBassaAtesina) of the QuiMedia group. The column reaches large part of the South Tyrolean territory.

10.3 The Spin-off Ontopic s.r.l.

Together with Diego Calvanese, Benjamin Cogrel, Peter Hopfgartner, and Guohui Xiao, in February 2019 I co-founded *Ontopic s.r.l.*, the first spin-off of the Free University of Bozen-Bolzano. Ontopic focuses on the development of novel technologies for intelligent data access and integration, centred around the notion of *virtual knowledge graph*. I act as scientific advisor for the company, in particular for what concerns the application of the Ontopic foundations and toolchain in the context of process mining and process analytics. Some key facts about Ontopic:

- On 12 December 2018 Ontopic was admitted to the IDM Incubator at the NOI Technology Park in Bolzano, after a selective review process.
- On 11 July 2019 Ontopic signed an agreement with the Free University of Bozen-Bolzano, to officially become a spin-off recognized by the University.
- Starting from November 2019 the company is running an innovative project, financed with $\sim 150\,000$ € by the Autonomous Province of Bozen-Bolzano.
- Currently, Ontopic is involved in several data integration projects, including:
  - a joint project with Siris Academics (Barcelona, Spain) on integration of higher education data for the Sorbonne University in France;
  - a joint project with Siris Academics (Barcelona, Spain) on integration of open research data for the Toscana Region in Italy;
  - a joint project with Werfen (Milano, Italy) and Endian (Bolzano, Italy) on data integration for predictive maintenance.

10.4 Publications About Me

In the press (talking about me and/or containing direct references to me):

- *Automatisierung im Krankenhaus* (Dolomiten, Dec. 19, 2012).
- *Informatica, Montali premiato* (Corriere dell'Alto Adige, Sep. 27, 2015).
- *Intelligenza artificiale made in Südtirol - Montali: "Gruppo di ricerca eccellente"* (Corriere dell'Alto Adige, Sep. 30, 2015).
- *Preis für "Künstliche Intelligenz" errungen* (Dolomiten, Sep. 30, 2015).
- *La ricerca come stile di vita* (QuiMerano, March 2017).

[17] `http://ebitmax.com`

- *La ricerca come stile di vita* (QuiBolzano, April 2017).
- *Der Computer als Unternehmensberater* (academia.bz.it, July 3, 2017).
- *Analisi dei dati per strategie aziendali - Nuovo master all'ateneo bolzanino* (Alto Adige, August 13, 2017).
- *Den Nerv der Zeit treffen* (Dolomiten, February 7, 2018).
- *Impiego delle tecnologie al lavoro: serve un piano strategico* (economyST, June 06, 2018).
- *Appuntamento con la "Bolzano Digitale"* (QuiBolzano, October 30, 2018).
- *Cosa faccio? Risolvo problemi di incomunicabilità tra applicazioni software* (Academia.bz.it, November 5, 2018).
- *L'industria 4.0 nelle Pmi, a Rauch il Premio di ricerca* (Alto Adige, December 20, 2019).
- *Intelligenza artificiale, un seminario affascinante* (Alto Adige, October 8, 2020).
- *L'intelligenza artificiale tra rischi e opportunità* (Alto Adige, October 12, 2020).
- *Enologia, da Unibz una carta d'identità per i vini altoatesini* (Alto Adige, November 6, 2020).
- *Arriva una carta d'identità per i vini dell'Alto Adige* (Alto Adige, November 7, 2020).
- *Otto professori di Unibz nel 2% degli scienziati più citati al mondo* (Alto Adige, November 25, 2020).
- *unibz: Gleich 8 Professoren unter "Top 2 Prozent"* (Dolomiten, November 25, 2020).
- *Die Top-Professoren* (Tageszeitung.it, November 25, 2020).
- *Acht Professoren der unibz unter Top zwei Prozent der Wissenschaftler weltweit* (Suedtirolnews.it, November 25, 2020).

In other media:

- After having being awarded with the Artificial Intelligence "Marco Somalvico" 2015 National Prize, I have been contacted by many local media channels, and had the possibility of disseminating my research to the general audience on the web, television, and radio, In particular:
  - The regional branch of the national TV channel *RAI3* interviewed me. A long version of the interview appeared in the *regional RAI3 show "Bongiorno Regione"*. A short version of the interview appeared in the *regional RAI3 news "TGR3"*.
  - Carmela Marsibilio interviewed me live during "Greenwich", a radio show of the radio station *Radiodue* (regional branch of the national RAI channel), focused on interesting facts and persons from the region.
  - The regional TV channel *RTTR* interviewed me. The interview appeared on the *RTTR social media page*, as well as in the *RTTR TV news*.
  - My interviews and other news related to the prize appeared in a plethora of *social media*.
- On March 15, 2018 I participated to the live radio show *Zeppelin*, broadcasted from the regional radio station *Radiodue* (regional branch of the national RAI channel). The topic of discussion was the new master in computational data science offered at the Free University of Bozen-Bolzano under my coordination.
- *Brain 2019: l'intelligenza artificiale a Bolzano* (RAI3 Regione, September 23, 2019).

11 Publications

Authored Books

[BA-1] M. Montali. *Specification and Verification of Declarative Open Interaction Models: a Logic-Based Approach*, volume 56 of *Lecture Notes in Business Information Processing*. Springer, 2010. ISBN: 978-3-642-14537-7.

Edited Books

[BE-2] S. Bragaglia, C. V. Damasio, M. Montali, A. Preece, C. Petrie, M. Proctor, and U. Straccia, editors. *Proceedings of the 5th International RuleML2011@BRF Challenge*, volume 799. CEUR Electronic Workshop Proceedings, 2011.

[BE-3] M. Baldoni, F. Chesani, B. Magnini, P. Mello, and M. Montali, editors. *Proceedings of the AI*IA Workshop and Prize for Celebrating 100th Anniversary of Alan Turing's Birth*, volume 860. CEUR Electronic Workshop Proceedings, 2012.

[BE-4] M. Baldoni, F. Chesani, P. Mello, and M. Montali, editors. *Proceedings of the Workshop Popularize Artificial Intelligence, co-located with the 13th Conference of the Italian Association for Artificial Intelligence (AI*IA 2013)*, volume 1107. CEUR Electronic Workshop Proceedings, 2013.

[BE-5] P. Felli and M. Montali, editors. *Proceedings of the 33rd Italian Conference on Computational Logic (CILC 2018)*, volume 2214 of *Lecture Notes in Computer Science*. CEUR Electronic Workshop Proceedings, 2018.

[BE-6] M. Weske, M. Montali, I. Weber, and J. vom Brocke, editors. *Proceedings of the 16th International Conference on Business Process Management (BPM 2018)*, volume 11080 of *Lecture Notes in Computer Science*. Springer, 2018. ISBN: 978-3-319-98647-0.

[BE-7] M. Weske, M. Montali, I. Weber, and J. vom Brocke, editors. *Proceedings of the Business Process Management Forum 2018*, volume 329 of *Lecture Notes in Business Information Processing*. Springer, 2018. ISBN: 978-3-319-98650-0.

[BE-8] P. Fodor, M. Montali, D. Calvanese, and D. Roman, editors. *Proceedings of the 3rd International Joint Conference on Rules and Reasoning (RuleML+RR)*, volume 11784 of *Lecture Notes in Computer Science*. Springer, 2019. ISBN: 978-3-030-31094-3.

[BE-9] B. van Dongen, M. Montali, and M. Thandar Wynn, editors. *Proceedings of the 2nd International Conference on Process Mining (ICPM 2020)*. IEEE Computer Society Press, 2020. ISBN: 978-1-7281-9832-3.

Papers in Refereed International Journals

[JI-10] M. Alberti, F. Chesani, M. Gavanelli, E. Lamma, P. Mello, M. Montali, and P. Torroni. Expressing and verifying contracts with abductive logic programming. *International Journal of Electronic Commerce*, 12(4), 2008. DOI: 10.2753/JEC1086-4415120401.

[JI-11] F. Chesani, E. Lamma, P. Mello, M. Montali, F. Riguzzi, and S. Storari. Exploiting inductive logic programming techniques for declarative process mining. *Transactions on Petri Nets and Other Models of Concurrency*, 5460:278–295, 2009. DOI: 10.1007/978-3-642-00899-3_16.

[JI-12] F. Chesani, P. Mello, M. Montali, S. Storari, and P. Torroni. On the integration of declarative choreographies and commitment-based agent societies into the SCIFF logic programming framework. *Multiagent and Grid Systems*, 6(10):165–190, 2010. DOI: 10.3233/MGS-2010-0147.

[JI-13] F. Chesani, P. Mello, M. Montali, and P. Torroni. A logic-based, reactive calculus of events. *Fundamenta Informaticae*, 105(1-2):135–161, 2010. DOI: 10.3233/FI-2010-361.

[JI-14] L. Luccarini, G. L. Bragadin, G. Colombini, M. Mancini, P. Mello, M. Montali, and D. Sottara. Formal verification of wastewater treatment processes using events detected from continuous signals by means of artificial neural networks. case study: SBR plant. *Environmental Modelling and Software*, 25(5):648–660, 2010. DOI: 10.1016/j.envsoft.2009.05.013.

[JI-15] M. Montali, M. Pesic, W. M. P. van der Aalst, F. Chesani, P. Mello, and S. Storari. Declarative specification and verification of service choreographiess. *ACM Transactions on the Web*, 4(1), 2010. DOI: 10.1145/1658373.1658376.

[JI-16] M. Montali, P. Torroni, F. Chesani, P. Mello, M. Alberti, and E. Lamma. Abductive logic programming as an effective technology for the static verification of declarative business processes. *Fundamenta Informaticae*, 102(3-4):325–361, 2010. DOI: 10.3233/FI-2010-310.

[JI-17] M. Alberti, M. Cattafi, F. Chesani, M. Gavanelli, E. Lamma, P. Mello, M. Montali, and P. Torroni. A computational logic application framework for service discovery and contracting. *International Journal of Web Service Research*, 8(3):1–25, 2011. DOI: 10.4018/JWSR.2011070101.

[JI-18] F. Chesani, P. Mello, M. Montali, and P. Torroni. Modeling and verifying business processes and choreographies through the abductive proof procedure SCIFF and its extensions. *Intelligenza Artificiale*, 5(1):101–105, 2011. DOI: 10.3233/IA-2011-0011.

[JI-19] F. Chesani, P. Mello, M. Montali, and P. Torroni. Monitoring time-aware commitments within agent-based simulation environments. *Cybernetics and Systems*, 42(7):546–566, 2011. DOI: 10.1080/01969722.2011.610711.

[JI-20] M. Montali, P. Torroni, N. Zannone, P. Mello, and V. Bryl. Engineering and verifying agent-oriented requirements augmented by business constraints with b-tropos. *Autonomous Agents and Multi-Agent Systems*, 23(2):193–223, 2011. DOI: 10.1007/s10458-010-9135-4.

[JI-21] B. Bagheri Hariri, D. Calvanese, G. De Giacomo, R. De Masellis, P. Felli, and M. Montali. Description logic knowledge and action bases. *Journal of Artificial Intelligence Research*, 46:651–686, 2013. DOI: 10.1613/jair.3826.

[JI-22] F. Chesani, P. Mello, M. Montali, and P. Torroni. Representing and monitoring social commitments using the event calculus. *Autonomous Agents and Multi-Agent Systems*, 27(1):85–130, 2013. DOI: 10.1007/s10458-012-9202-0.

[JI-23] M. Montali, F. M. Maggi, F. Chesani, P. Mello, and W. M. P. van der Aalst. Monitoring business constraints with the event calculus. *ACM Transactions on Intelligent Systems and Technology*, 5(1), 2013. DOI: 10.1145/2542182.2542199.

[JI-24] R. De Masellis, D. Lembo, M. Montali, and D. Solomakhin. Semantic enrichment of GSM-based artifact-centric models. *Journal on Data Semantics*, 4(1):3–27, 2015. DOI: 10.1007/s13740-014-0036-6.

[JI-25] L. T. Ly, F. M. Maggi, M. Montali, S. Rinderle-Ma, and W. M. P. Aalst. Compliance monitoring in business processes: Functionalities, application, and tool-support. *Information Systems*, 54:209–234, 2015. DOI: 10.1016/j.is.2015.02.007.

[JI-26] M. Montali and D. Calvanese. Soundness of data-aware, case-centric processes. *International Journal on Software Tools for Technology Transfer*, pages 1–24, 2016. DOI: 10.1007/s10009-016-0417-2.

[JI-27] M. Montali and A. Rivkin. Model checking petri nets with names using data-centric dynamic systems. *Formal Aspects of Computing*, pages 1–27, 2016. DOI: 10.1007/s00165-016-0370-6.

[JI-28] C. Di Ciccio, F. M. Maggi, M. Montali, and J. Mendling. Resolving inconsistencies and redundancies in declarative process models. *Information Systems*, 64:425–446, 2017. DOI: 10.1016/j.is.2016.09.005.

[JI-29] M. Montali and A. Rivkin. DB-nets: on the marriage of colored petri nets and relational databases. *Transactions on Petri Nets and Other Models of Concurrency*, 12:91–118, 2017. DOI: 10.1007/978-3-662-55862-1_5.

[JI-30] D. Calvanese, G. De Giacomo, M. Montali, and F. Patrizi. First-order mu-calculus over generic transition systems and applications to the situation calculus. *Information and Computation*, 259:328–347, 2018. DOI: 10.1016/j.ic.2017.08.007.

[JI-31] D. Calvanese, M. Dumas, Ü. Laurson, F. M. Maggi, M. Montali, and I. Teinemaa. Semantics, analysis and simplification of DMN decision tables. *Information Systems*, 78:112–125, 2018. DOI: 10.1016/j.is.2018.01.010.

[JI-32] F. Chesani, M. Gavanelli, E. Lamma, P. Mello, and M. Montali. Evaluating compliance: From LTL to abductive logic programming. *Fundamenta Informaticae*, 159(1-2):35–63, 2018. DOI: 10.3233/FI-2018-1657.

[JI-33] F. Chesani, P. Mello, R. De Masellis, C. D. Francescomarino, C. Ghidini, M. Montali, and S. Tessaris. Compliance in business processes with incomplete information and time constraints: a general framework based on abductive reasoning. *Fundamenta Informaticae*, 161(1-2):75–111, 2018. DOI: 10.3233/FI-2018-1696.

[JI-34] C. Di Ciccio, F. M. Maggi, M. Montali, and J. Mendling. On the relevance of a business constraint to an event log. *Information Systems*, 78:144–161, 2018. DOI: 10.1016/j.is.2018.01.011.

[JI-35] G. Meroni, L. Baresi, M. Montali, and P. Plebani. Multi-party business process compliance monitoring through iot-enabled artifacts. *Information Systems*, 73:61–78, 2018. DOI: 10.1016/j.is.2017.12.009.

[JI-36] D. Calvanese, M. Dumas, F. M. Maggi, and M. Montali. Semantic dmn: Formalizing and reasoning about decisions in the presence of background knowledge. *Theory and Practice of Logic Programming*, 19(4):536–573, 2019. DOI: 10.1017/S1471068418000479.

[JI-37] D. Calvanese, P. Fodor, and M. Montali. Report on the 3rd international joint conference on rules and reasoning (ruleml+rr 2019). *ACM SIGLOG News*, 7(2):16–18, 2020. DOI: 10.1145/3397619.3397623.

[JI-38] D. Calvanese, S. Ghilardi, A. Gianola, M. Montali, and A. Rivkin. Smt-based verification of data-aware processes: a model-theoretic approach. *Mathematical Structures in Computer Science*, 30(3):271–313, 2020. DOI: 10.1017/S0960129520000067.

[JI-39] M. de Leoni, P. Felli, and M. Montali. Soundness verification of data-aware process models with variable-to-variable conditions. *Fundamenta Informaticae*, 2020.

[JI-40] J. M. Pérez-Álvarez, M. T. Gómez López, R. Eshuis, M. Montali, and R. M. Gasca. Verifying the manipulation of data objects according to business process and data models. *Knowledge and Information Systems*, 62(7):2653–2683, 2020. DOI: 10.1007/s10115-019-01431-5.

[JI-41] D. Ritter, S. Rinderle-Ma, M. Montali, and A. Rivkin. Formal foundations for responsible application integration. *Information Systems*, 2020. DOI: 10.1016/j.is.2019.101439.

[JI-42] D. Calvanese, S. Ghilardi, A. Gianola, M. Montali, and A. Rivkin. Model completeness, covers and superposition (with applications to verification of data-aware processes). *Journal of Automated Reasoning*, 2021.

Book Chapters

[BC-43] F. Chesani, E. Lamma, P. Mello, M. Montali, S. Storari, P. Baldazzi, and M. Manfredi. *Computer-Based Medical Guidelines and Protocols: a Primer and Current Trends*, volume 139 of *Studies in Health Technology and Informatics*, chapter Compliance Checking of Cancer-Screening Careflows: an Approach Based on Computational Logic, pages 183–192. IOS Press, 2008. ISBN: 978-1-58603-873-1.

[BC-44] S. Bragaglia, F. Chesani, P. Mello, M. Montali, and P. Torroni. *Logic Programs, Norms and Action*, volume 7360 of *Lecture Notes in Computer Science*, chapter Reactive Event Calculus for Monitoring Global Computing Applications, pages 123–146. Springer, 2012. ISBN: 978-3-642-29413-6.

[BC-45] S. Bragaglia, F. Chesani, P. Mello, and M. Montali. *Foundations of Biomedical Knowledge Representation*, volume 9521 of *Lecture Notes in Computer Science*, chapter Conformance Verification of Clinical Guidelines in Presence of Computerized and Human-Enhanced Processes, pages 81–106. Springer, 2015. ISBN: 978-3-319-28006-6.

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