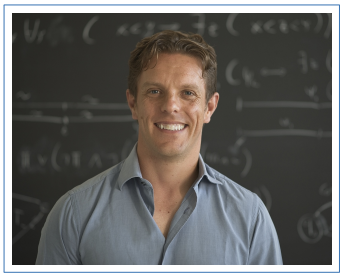

Pietro Sala

Associate Professor

National Scientific Qualifications

15/06/2023 **09/H1 – Information Processing Systems**
Qualified as Full Professor

05/06/2023 **01/A1 – Mathematical Logic and Complementary Mathematics**
Qualified as Full Professor

19/04/2019 **01/A1 – Mathematical Logic and Complementary Mathematics**
Qualified as Associate Professor

07/08/2018 **01/B1 – Computer Science**
Qualified as Associate Professor

Work Experience

12/2022 – Present **Associate Professor**
Department of Computer Science - University of Verona
Responsibilities: Research, Teaching, Third Mission.

11/2019 – 11/2022 **Senior Researcher (RTD-B)**
Department of Computer Science - University of Verona
Responsibilities: Research, Teaching, Third Mission.

07/2016 – 10/2019 **Junior Researcher (RTD-A)**
Department of Computer Science - University of Verona
Responsibilities: Research, Teaching, Third Mission.

03/2013 – 06/2016 **Postdoctoral Research Fellow**
Department of Computer Science - University of Verona
Project Title: An interval-based approach for data analysis and workflow modeling in the pharmacological-medical domain.
Supervisor: Prof. Carlo Combi, Department of Computer Science, University of Verona
Responsibilities: Research.

03/2012 – 02/2013 **Postdoctoral Research Fellow**
Department of Diagnostics and Public Health - University of Verona
Project Title: Collection and analysis of vaccine surveillance data from the web.
Supervisors: Prof. Giampaolo Velo and Prof. Ugo Moretti, Department of Diagnostics and Public Health, University of Verona
Responsibilities: Research.

Department of Computer Science, University of Verona, Room 1.61, Ca Vignal 2, Strada Le Grazie 15, 37134 – Verona (VR), Italy
✱ *8 May 1981*
(+39) 045 802 7850 • *pietro.sala@univr.it*
http://profs.scienze.univr.it/~sala • *ORCID 0000-0002-2612-1519*

03/2010 – 02/2012 **Postdoctoral Research Fellow**
Department of Computer Science - University of Verona
Project Title: Study of OLAP and data mining techniques for the management of temporal information.
Supervisor: Prof. Carlo Combi, Department of Computer Science, University of Verona
Responsibilities: Research.

Education

2006–2010 **Ph.D. in Computer Science**
Department of Mathematical, Computer, and Physical Sciences - University of Udine
Thesis Title: "Decidability of Interval Temporal Logics"
Supervisor: Prof. Angelo Montanari, Department of Mathematical, Computer, and Physical Sciences, University of Udine

2003–2006 **Master's Degree in Computer Science**
Faculty of Mathematical, Computer, and Physical Sciences - University of Udine
Thesis Title: "An Optimal Decision Procedure for Propositional Neighbourhood Logic"
Supervisor: Prof. Angelo Montanari, Department of Mathematical, Computer, and Physical Sciences, University of Udine
Grade: 110/110 cum laude

2000–2003 **Bachelor's Degree in Computer Science**
Faculty of Mathematical, Computer, and Physical Sciences - University of Udine
Thesis Title: "Tableau Methods for Interval Temporal Logics"
Supervisor: Prof. Angelo Montanari, Department of Mathematical, Computer, and Physical Sciences, University of Udine
Grade: 110/110 cum laude

Teaching Activities

At the Department of Computer Science, **University of Verona**:

2024/2025
- *Course:* Biomedical Decision Support Systems - 42 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Prof. Pietro Sala
- *Course:* Data Mining and Knowledge Discovery - 42 hours
  Master's Degree in Computer Science and in Engineering
  Coordinator: Prof. Pietro Sala
- *Course:* Healthcare Information Systems - 24 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Prof. Carlo Combi
- *Course:* Software Engineering (Laboratory) - 12 hours
  Bachelor's Degree in Computer Science and Bioinformatics
  Coordinator: Prof. Carlo Combi

2023/2024
- *Course:* Biomedical Decision Support Systems - 42 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Prof. Pietro Sala
- *Course:* Data Mining and Knowledge Discovery - 42 hours
  Master's Degree in Computer Science and Engineering
  Coordinator: Prof. Pietro Sala

- *Course:* Healthcare Information Systems - 24 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Prof. Carlo Combi
- *Course:* Software Engineering (Laboratory) - 12 hours
  Bachelor's Degree in Computer Science and in Bioinformatics
  Coordinator: Prof. Carlo Combi

2022/2023
- *Course:* Software Engineering (Laboratory) - 12 hours
  Bachelor's Degree in Computer Science
  Coordinator: Prof. Carlo Combi
- *Course:* Data Mining and Knowledge Discovery - 42 hours
  Master's Degree in Computer Science and Engineering
  Coordinator: Prof. Pietro Sala
- *Course:* Healthcare Information Systems - 24 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Prof. Carlo Combi
- *Course:* Biomedical Decision Support Systems - 42 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Prof. Pietro Sala

2021/2022
- *Course:* Software Engineering (Laboratory) - 12 hours
  Bachelor's Degree in Computer Science
  Coordinator: Prof. Carlo Combi
- *Course:* Data Mining and Knowledge Discovery - 42 hours
  Master's Degree in Computer Science and Engineering
  Coordinator: Dr. Pietro Sala Ph.D.
- *Course:* Healthcare Information Systems - 24 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Prof. Carlo Combi
- *Course:* Biomedical Decision Support Systems - 42 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Dr. Pietro Sala Ph.D.

2020/2021
- *Course:* C Programming Language - 12 hours
  Bachelor's Degree in Applied Mathematics
  Coordinator: Dr. Pietro Sala Ph.D.
- *Course:* Data Mining and Knowledge Discovery - 48 hours
  Master's Degree in Computer Science and Engineering
  Coordinator: Dr. Pietro Sala Ph.D.
- *Course:* Healthcare Information Systems - 24 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Prof. Carlo Combi
- *Course:* Biomedical Decision Support Systems - 48 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Dr. Pietro Sala Ph.D.

2019/2020
- *Course:* Logic, Automata and Games at the Edge of Decidability - 20 hours
  Ph.D. Program in Computer Science
  Coordinator: Dr. Pietro Sala Ph.D.
- *Course:* Biomedical Decision Support Systems - 52 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Dr. Pietro Sala Ph.D.

2018/2019
- *Course:* Biomedical Decision Support Systems - 52 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Dr. Pietro Sala Ph.D.

2017/2018
- *Course:* Biomedical Decision Support Systems - 52 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Dr. Pietro Sala Ph.D.

2016/2017
- *Course:* Biomedical Decision Support Systems - 52 hours
  Master's Degree in Medical Bioinformatics
  Coordinator: Dr. Pietro Sala Ph.D.

2014/2015
- *Course:* Database systems for bioinformatics - 12 hours
  Bachelor's Degree in Bioinformatics
  Coordinator: Prof. Carlo Combi

2013/2014
- *Course:* Software Engineering (Laboratory) - 12 hours
  Bachelor's Degree in Computer Science
  Coordinators: Dr. Marco Volpe Ph.D. and Dr. Pietro Sala Ph.D.

2011/2012
- *Course:* Languages and Algorithms for Bioinformatics (Lab) - 12 hours
  Master's Degree in Bioinformatics
  Coordinators: Dr. Alberto Castellini Ph.D. and Dr. Pietro Sala Ph.D.

At the Department of Foreign Languages and Literatures, **University of Verona**:

2019/2020
- *Course:* Web Design Laboratory - 36 hours
  Bachelor's Degree in Languages and Literatures for Publishing and Digital Media
  Coordinator: Dr. Pietro Sala Ph.D.

At the Department of Mathematics and Computer Science, **University of Trieste**:

2010/2011
- *Course:* Artificial Intelligence II - 48 hours
  Master's Degree in Computer Science
  Coordinator: Dr. Pietro Sala Ph.D.

At the Department of Mathematics and Computer Science, **University of Udine**:

2009/2010
- *Course:* Computer Architecture - 12 hours
  Bachelor's Degree in Computer Science
  Coordinator: Prof. Pietro di Gianantonio

2008/2009
- *Course:* Computer Architecture (Laboratory) - 24 hours
  Bachelor's Degree in Computer Science
  Coordinator: Prof. Pietro di Gianantonio

2007/2008
- *Course:* Computer Architecture (Laboratory) - 24 hours
  Bachelor's Degree in Computer Science
  Coordinator: Prof. Pietro di Gianantonio

Supervision of **PhD Students**

I am currently supervising the following PhD students as supervisor:

2024/2025 - 2027/2028
PhD Student: Dr. Cesare Montresor
Affiliation: Department of Computer Science - University of Verona
Topic: Neural Modularity Search
Cycle: 40° - *Year:* 1°

2024/2025 - 2027/2028
PhD Student: Dr. Sidra Nasir Rajput
Affiliation: Department of Computer Science - University of Verona
Topic: Large Language Models Integration
Cycle: 40° - *Year:* 1°

2023/2024 - 2026/2027
PhD Student: Dr. Emanuele Chini
Affiliation: "La Sapienza" University of Rome (National PhD in AI)
Topic: Time-series analysis for HVAC systems
Cycle: 39° - *Year:* 2°

2022/2023 - 2025/2026
PhD Student: Dr. Alberto Azzari
Affiliation: Polytechnic University of Turin (National PhD in AI)
Topic: Symbolic and Sub-symbolic methods for mission-critical tasks
Cycle: 38° - *Year:* 3°

2022/2023 - 2025/2026
PhD Student: Dr. Omid Zare
Affiliation: Department of Computer Science - University of Verona
Topic: Interpretable and explainable methods for time-critical tasks
Cycle: 37° - *Year:* 3°

Scientific Responsibility of **Research Grants**

- *Researcher:* Dr. Sandro Bernardinello
  Project Title: "Application of AI Algorithms for Modeling the Spray Drying Process for Drug Synthesis"
  01/06/2024 - 31/05/2027

- *Researcher:* Dr. Beatrice Amico
  Project Title: "Design and Implementation of a Data Warehouse System and Data and Process Analysis for the Integrated Management of Chemical, Biological, and Genetic Data to Support Biodiversity Research"
  01/11/2022 - 31/05/2025

Scientific Responsibility of **Research Fellowships**

- *Research Fellow:* Dr. Sandro Bernardinello
  Project Title: "Application of AI Algorithms for Modeling the Spray Drying Process for Drug Synthesis"
  08/05/2023 - 31/12/2023 (8 months)
- *Research Fellow:* Dr. Emanuele Chini
  Project Title: "Application of AI Algorithms for Modeling the Spray Drying Process for Drug Synthesis"
  08/05/2023 - 31/10/2023 (6 months)
- *Research Fellow:* Dr. Sandro Bernardinello
  Project Title: "Heterogeneous Data Integration for Structured Natural Language Processing"
  18/04/2022 - 18/10/2022 (6 months)
- *Research Fellow:* Dr. Federico Gozzi
  Project Title: "Detection, Classification, and Integration of User Data from Heterogeneous Sources in CRM Systems"
  20/12/2021 - 31/05/2022 (5 months)
- *Research Fellow:* Dr. Sandro Bernardinello
  Project Title: "Semantic Classification of Short Texts"
  03/08/2020 - 31/10/2020 (3 months)
- *Research Fellow:* Davide De Toffol
  Project Title: "A Distributed Docker/Kubernetes Architecture for Data Mining and Machine Learning Tasks"
  04/05/2020 - 31/08/2020 (4 months)
- *Research Fellow:* Dr. Sandro Bernardinello
  Project Title: "Text Classification of Complex Texts"
  15/01/2020 - 15/04/2020 (3 months)
- *Research Fellow:* Dr. Marco Colognese
  Project Title: "Behavior-Based Classification and Prediction of CRM Customers"
  01/12/2019 - 30/04/2020 (5 months)
- *Research Fellow:* Dr. Mattia Rossini
  Project Title: "Temporal Analysis for Predictive CRM Customer Behavior"
  01/12/2019 - 30/04/2020 (5 months)
- *Research Fellow:* Dr. Federico Andreoli
  Project Title: "Text Mining for Ticket Routing in CRM Software"
  01/08/2019 - 31/10/2019 (3 months)

Supervision of **Bachelor's Theses**

As **Supervisor**:

2023/2024
- *Student:* Lorenzo Antonio Mendo
  Title: Making sense of Polluted Environments via Custom Association Rules.
  Master's Degree in Medical Bioinformatics - University of Verona

- *Student:* Andrea Simonetti
  Title: Reactive Synthesis for Expected Impacts.
  Bachelor's Degree in Computer Science - University of Verona

2022/2023
- *Student:* Alberto Carli
  Title: An A-Priori Algorithm for Extracting Timeline-based Patterns.
  Bachelor's Degree in Computer Science - University of Verona

2021/2022
- *Student:* Federico Gozzi
  Title: OLAP and Data Mining Techniques for Analyzing Wearable-related Data
  Bachelor's Degree in Computer Science - University of Verona

2020/2021
- *Student:* Manuel Medina
  Title: Conformal Prediction of Sepsis Scores in the MIMIC-III Database
  Master's Degree in Medical Bioinformatics - University of Verona

2019/2020
- *Student:* Davide de Toffol
  Title: Reduced Distributed Decision Diagrams for Querying Solution Spaces
  Master's Degree in Medical Bioinformatics - University of Verona

- *Student:* Dr. Lara Scarpari
  Title: Ensemble Methods for Classifying Short Texts
  Master's Degree in Computer Science and Engineering - University of Verona

2018/2019
- *Student:* Marco Colognese
  Title: From Data to Processes: Behavior-based Classification of CRM Customers
  Master's Degree in Computer Science and Engineering - University of Verona

As **Co-Supervisor**:

2014/2015
- *Student:* Matteo Cuccato
  Title: A Framework for Extracting Approximate Temporal Functional Dependencies: Architecture and Application in the Clinical Domain
  Master's Degree in Computer Science and Engineering - University of Verona
  Supervisor: Prof. Carlo Combi

2013/2014
- *Student:* Marco Pazzaglia
  Title: Metric Propositional Neighborhood Logic with an Equivalence Relation
  Master's Degree in Computer Science - University of Udine
  Supervisor: Prof. Angelo Montanari

- *Student:* Andrea Galvani
  Title: Mining Algorithms for Approximate Temporal Functional Dependencies: Pure temporally evolving ATFDs applied to healthcare data
  Master's Degree in Computer Science and Engineering - University of Verona
  Supervisor: Prof. Carlo Combi

- *Student:* Marco Pagliarini
  Title: Algorithms for Mining Interval-Based Temporal Functional Dependencies - The Case of Relation During
  Master's Degree in Computer Science and Engineering - University of Verona
  Supervisor: Prof. Carlo Combi

- *Student:* Matteo Mantovani
  Title: Temporal Data Mining Techniques: Discovering approximate temporal functional dependencies based on sliding windows in healthcare data warehouses
  Master's Degree in Computer Science and Engineering - University of Verona
  Supervisor: Prof. Carlo Combi

2012/2013
- *Student:* Marco Baciga
  Title: Design and Implementation of a Data Mart to support the analysis of drug expenditure within the healthcare Veneto regional system
  Master's Degree in Computer Science and Engineering - University of Verona
  Supervisor: Prof. Carlo Combi

2011/2012
- *Student:* Paolo Parise
  Title: Approximate Temporal Functional Dependencies Based on Temporal Grouping: Modeling, derivation, and initial evaluations on psychiatric data
  Master's Degree in Computer Science - University of Verona
  Supervisor: Prof. Carlo Combi

2008/2009
- *Student:* Tommaso D'Odorico
  Title: Modal Logics for Spatial Reasoning
  Master's Degree in Computer Science - University of Udine
  Supervisor: Prof. Angelo Montanari

Participation in Department Councils, Teaching Committees, and Doctoral Committees

As **Member of the Examining Committee**:

06-07/2022 Selection for the 38th cycle of the Ph.D. Program in Computer Science, Department of Computer Science, University of Verona

07-09/2022 Selection for the 37th cycle of the Ph.D. Program in Artificial Intelligence for Industry 4.0, Politecnico di Torino

As **Member of the Council**:

- **Teaching Committee of the National Ph.D. Program in Artificial Intelligence** - Industry 4.0 Area
  Institution: Politecnico di Torino
  Academic Years: from 2021/2022 to present

- **Teaching Committee of Computer Science** University of Verona
  Institution: Department of Computer Science, University of Verona
  Academic Years: from 2016/2017 to present

- **Council of the Department of Computer Science** University of Verona
  Institution: Department of Computer Science, University of Verona
  Academic Years: from 2016/2017 to present

- **Teaching Committee of the Ph.D. Program in Computer Science** University of Verona
  Institution: Department of Computer Science, University of Verona
  Academic Years:

- from 2022/2023 to present, Cycles: 38-40
- from 2018/2019 to 2020/2021, Cycles: 34-36

Responsibility Roles within Teaching Committees, Departments, and the University

- **Member of the Academic Senate**
  Role: Representative of Associate Professors - Macroarea of Science and Engineering
  Institution: University of Verona
  Academic Years: from 2024/2025 to present
- **Student Affairs Coordinator** for the Master's Degree in Artificial Intelligence
  Institution: Department of Computer Science, University of Verona
  Academic Years: from 2022/2023 to 2024/2025
- **Erasmus Coordinator** for the Jena's campus
  Institution: Department of Computer Science, University of Verona
  Academic Years: from 2022/2023 to 2024/2025
- QA Commission for the Master's Degree in Medical Bioinformatics
  Role: Member
  Institution: Department of Computer Science, University of Verona
  Academic Years: from 2019/2020 to 2024/2025

Commissioned Research

2023-2024
- **Development of an algorithm for OCR data integration with NLP pipeline**
  Role: Scientific Coordinator
  Type: Research contract
  Funding Entity/Entities: Klondike srl Company
  ***Funded Amount:* 45,000 Euros**
- **Development of algorithms to speed up the execution of digital process tasks (BPMN) through automation of individual tasks considered repetitive and/or low-value in terms of operator intervention**
  Role: Scientific Coordinator
  Type: Research contract
  Funding Entity/Entities: Klondike srl Company
  ***Funded Amount:* 33,500 Euros**

2021 **Heterogeneous Data Integration for Structured Natural Language Processing**
Role: Scientific Coordinator
Type: Research contract
Funding Entity/Entities: VTENEXT Company
***Funded Amount:* 10,000 Euros**

2019 – 2020 **Machine Learning Techniques for Customer Behaviour Prediction**
Role: Scientific Coordinator
Type: Research contract
Funding Entity/Entities: CRM Village Company
***Funded Amount:* 36,000 Euros**

National and International Projects

As **Scientific Coordinator**:

2019 – 2021 Data Mining Techniques and Model Checking for Customer Behavior Prediction
Funding Entity/Entities: European Regional Development Fund (POR-FESR) and CRM Village
***Funded Amount:* 76,500 Euros (POR-FESR) + 93,500 Euros (CRM Village)**

2018 – 2019 Data Mining Techniques and Model Checking for Predicting Customer Behavior in Process-Driven CRM Systems
Type: Joint Project
Funding Entity/Entities: University of Verona and CRM Village
***Funded Amount:* 10,000 Euros (University of Verona) + 27,000 Euros (CRM Village)**

As **Project Member**:

2024 – 2027 "DigiSprayDrying"
(Call ID F/350073/04/X60 - CUP B39J24000490005 - Innovation Agreements – MiSE Decree 31/12/2021)
Funding Entity/Entities: Ministry of Enterprises and Made in Italy
Relevance: National

2022 – 2025 "National Biodiversity Future Center"
(Call for "Public notice for submitting proposals for enhancing research structures and creating national R&D 'samples' on some Key Enabling Technologies to be financed under the National Recovery and Resilience Plan, Mission 4 Component 2 Investment 1.4 "Enhancing research structures and creating national R&D 'samples' on some Key Enabling Technologies")
Spoke: 6
Coordinator: Prof. Flavia Guzzo
Funding Entity/Entities: European Union (NextGenerationEU)
Relevance: National

2020 Strategic Reasoning and Automatic Synthesis of Multi-Agent Systems
Funding Entity/Entities: GNCS National Group for Scientific Computing (INDAM)
Relevance: National

2019 Formal Methods for Combined Verification Techniques
Funding Entity/Entities: GNCS National Group for Scientific Computing (INDAM)
Relevance: National

2019 Formal Methods for Synthesis and Verification of Discrete and Hybrid Systems
Funding Entity/Entities: GNCS National Group for Scientific Computing (INDAM)
Relevance: National

2017 High Performing Computational Models for Biomedical Information Extraction and Integration
Funding Entity/Entities: GNCS National Group for Scientific Computing (INDAM)
Relevance: National

2016 Logic, Automata, and Games for Self-Adaptive Systems
Funding Entity/Entities: GNCS National Group for Scientific Computing (INDAM)
Relevance: National

2015 Algorithms for Model Checking and Synthesis of Safety-Critical Systems
Funding Entity/Entities: GNCS National Group for Scientific Computing (INDAM)
Relevance: National

2014 Automata, Games, and Temporal Logics for Verification and Synthesis of Controllers in Safety-Critical Systems
Funding Entity/Entities: GNCS National Group for Scientific Computing (INDAM)
Relevance: National

2013 Extended Game Logics
Funding Entity/Entities: GNCS National Group for Scientific Computing (INDAM)
Relevance: National

2008 – 2012 Games for Design and Verification (GAMES)
Funding Entity/Entities: European Science Foundation
Relevance: International

2010 Logics, Automata, and Games for Formal Verification of Complex Systems
Funding Entity/Entities: GNCS National Group for Scientific Computing (INDAM)
Relevance: National

Patents

30/07/2020 **Platform and Method for Pluggable AI and Machine Learning Cataloguing and Prediction**
Patent Number: PCT/IT2020/000055
International Publication Number: WO 2022/003737 A1
Personal Role: Inventor
Brief Description: The patent describes a method and a CRM (Customer Relationship Management) system capable of automatically discovering established and hidden business processes by analyzing event flows within a company. The aim is to improve both internal business processes and customer-facing processes, for example, through the generation of BPMN format representations. The system is equipped with automatic classification tools to speed up the initiation of flows, categorization of objects, and decision support via AI modules for classification and, optionally, prediction. The solution is designed to reduce interpretive and human errors without requiring the intervention of a data scientist, providing a technical implementation that simplifies the comparison of AI systems without costly experimental processes.
Applications: The patent is applicable to the optimization of internal business processes and customer relationship management, improving operational efficiency and reducing analysis and decision-making times. With AI-supported automation, the system offers a significant advantage in selecting the most suitable AI system for CRM needs, enabling rapid and reliable implementations in diverse business contexts.

Spin-off

Since March 2018, Co-founder and Board Member of the Limited Liability Company "Innovative Start-up" **MedBrains Srl** (`https://www.medbrains.it/`).
The company primarily focuses, although not exclusively, on the development, production, and commercialization of innovative products and services with high technological value in the field of computer science, mainly but not limited to information systems in the medical and pharmaceutical sectors.

During its time as a university spin-off, the company's sales and service revenue were:

- 2018: 6.667 €
- 2019: 37.069 €
- 2020: 38.355 €
- 2021: 52.172 €
- 2022: 135.797 €

In 2023, MedBrains transitioned from a university spin-off to a fully-fledged company, with significant revenue growth and a consolidation of its market activities:

- 2023: 121.843 €

Recognition and Awards

2020 **Best Italian Researcher in Theoretical Computer Science of the Year 2020**
Judging Commission: Giorgio Delzanno (University of Genoa), Emanuela Merelli (University of Camerino), Giuseppe Persiano (University of Salerno)
Association: Italian Chapter of the EATCS (European Association for Theoretical Computer Science)

2010 **Best Italian PhD Thesis in Theoretical Computer Science of the Year 2010**
Judging Commission: Paola Giannini (University of Eastern Piedmont), Giuseppe Persiano (University of Salerno), Alberto Policriti (University of Udine)
Association: Italian Chapter of the EATCS (European Association for Theoretical Computer Science)

Research Activities

Interval Temporal Logic - Expressiveness, Decidability, and Complexity:

I worked on problems of expressiveness, decidability, and complexity for interval temporal logics, particularly for the Halpern and Shoham logic. A significant first result was the complete characterization of all decidable fragments of HS logic with respect to various linear orders (finite, discrete, N). This work allowed for the precise identification of the boundary between decidable and undecidable fragments, leading to a complete classification of the computational complexity of the decidable fragments, which ranged from NP-complete to non-primitive recursive. A second line of research focused on analyzing the impact of adding equivalence relations to the ABB logic. In this context, we demonstrated that with a single equivalence relation, the satisfiability problem remains decidable for finite linear orders, although it becomes non-primitive recursive, while it is undecidable for N. The addition of two or more equivalence relations makes satisfiability undecidable even for finite cases. On the expressiveness side, we showed that the L modality is definable in terms of A and that there are no other inter-definability equations between the considered modalities. This result led to a complete classification of the fragments based on their expressive power. The obtained results contributed to a better understanding of interval temporal logics and their applications in the specification and verification of reactive systems and in qualitative temporal reasoning.

Reactive Synthesis from Interval Temporal Logic Specifications:

In the paper *Reactive synthesis from interval temporal logic specifications* (Angelo Montanari, Pietro Sala, Theoretical Computer Science, 899:48-79, 2022), the formal foundations and semantics for the synthesis of systems based on intervals are defined. The synthesis problem is much more general than the problems of satisfiability and validity (which can be encoded as special cases of the synthesis problem) and, as demonstrated, the decidability problem turns out to be of higher complexity, if not undecidable, for logics that have a decidable satisfiability problem. The paper traces the boundary between decidability and undecidability of the synthesis problem for specifications based on interval logics (i.e., specifications involving durations), demonstrating, for a set of languages, first that the synthesis problem is decidable, and then that any extension that increases its expressiveness leads to the undecidability of such an extension. This work is the beginning of a research line aimed at classifying the tractability (from the synthesis point of view) of temporal specification languages based on durations, which are more suitable/expressive for many applications in medical and industrial fields compared to the more common state-based/point-based formalisms. Continuing along this line of research aims to build, in addition to solid theoretical foundations, software tools for their application.

Complexity Problems for Regular Languages on Finite/Infinite Words and Their Extensions:

Quantitative extensions (i.e., bounded, unbounded, and infinitely recurring occurrences) of infinite regular languages were studied, and their characterization was proposed through automata classes and regular expressions. For finite words, an interesting connection was established between satisfiability/model checking problems for fragments of interval logics under the assumption of homogeneity and the emptiness problem for -free generalized regular expressions (i.e., regular expressions without Kleene's "" but with the negation operator). This emptiness problem was shown to be non-elementarily decidable by Stockmeyer in 1972. The discovered correspondence allows proposing a fragment of such expressions that replace the concatenation operator with prefix/suffix/infix operators while preserving the free use of negation. We demonstrated, using techniques similar to those developed in the last decade for obtaining decidability of interval logics, that such fragments have elementary complexity ranging from PSPACE-complete to EXPSPACE-complete depending on the subset of operators selected. As future development for the research line on extensions of regular languages on infinite words, the extension and study of the proposed semantics and the related reactive synthesis problem will be explored. For the research line concerning regular languages on finite words, the completion of complexity results is planned, along with the proposal of a class of counter-automata that naturally captures such classes of expressions. Additionally, an implementation of a tool for compiling such regular expressions/formulas into this class of automata is expected, enabling their use in common programming languages.

Strategy Synthesis and Verification for Planning Problems:

My research has focused on the development of formal methods for strategy synthesis and verification of planning problems, with significant contributions both in timeline-based planning and in the extension of Business Process Model and Notation (BPMN). A significant initial result was the identification of a large fragment of qualitative timeline-based planning, where the plan existence problem can be directly mapped to the non-emptiness problem of deterministic finite automata. This innovative approach avoids the need for costly determinization procedures, allowing for the direct synthesis of planning strategies.

I also characterized a maximal subset of Allen's relations that fits this deterministic fragment, providing a complete characterization of its expressiveness.
In the context of business processes, I developed BPMN+CPI, a formal extension of BPMN that incorporates choices, probabilities, and impacts. This extension allows modeling realistic scenarios where decisions affect resources and expected costs. I demonstrated that the problem of determining the existence of a winning strategy for BPMN+CPI belongs to the PSPACE complexity class, developing an automata-based approach that translates planning problems into reachability games on graphs.
On the computational complexity front, I contributed to the theoretical study of k-cost games, proving their NP-completeness for $k \geq 3$, thus establishing a lower complexity bound for the general strategy synthesis problem in BPMN+CPI. Regarding timeline-based planning, I developed efficient algorithms that leverage the structure of the deterministic fragment to avoid the combinatorial explosion typically associated with automata determinization.
The theoretical results were complemented by practical implementations. I developed PACO, a software tool that implements synthesis techniques for BPMN+CPI, enabling the analysis of processes and synthesis of strategies that ensure the expected impact remains within predefined thresholds. The techniques developed were validated through real case studies, demonstrating their practical applicability in real-world business process management and complex system planning scenarios.
This research line has produced significant theoretical and practical advancements in the field of automatic strategy synthesis and planning, providing new tools and techniques for managing complex systems with temporal and resource constraints.

Applications of Data Mining and Machine Learning in the Biomedical Field:

My research also includes the application of data mining and machine learning techniques in the biomedical field. I developed algorithms for extracting temporal functional dependencies and association rules for the analysis of psychiatric and pharmacovigilance data. I proposed an adaptive temporal method for detecting adverse drug reactions (ADR) in collaboration with the Regional Pharmacovigilance Center of the Veneto Region. Additionally, I developed a framework based on Convolutional Networks and Calibrated Prediction for early sepsis prediction in intensive care, tested on the MIMIC-III database. These works stand out for their emphasis on model explainability and optimization of search strategies.

Direction of International Conferences and Symposia

As **Chair**:

2024 TIME 2024 - 31st International Symposium on Temporal Representation and Reasoning
`https://www.lirmm.fr/time2024/`
Programme Committee Chairs: Prof. Pietro Sala, Prof. Michael Sioutis, and Prof. Fusheng Wang
Montpellier, France
28/10/2024 - 30/10/2024

As **Organizational Chair**:

2013 GandALF 2013 - Fourth International Symposium on Games, Automata, Logics, and Formal Verification
Borca di Cadore, Dolomites, Italy
29/08/2013 - 31/08/2013

Relazioni Invitate

16/09/2020 ICTCS 2020 - 21st Italian Conference on Theoretical Computer Science
14-16 September 2020, Ischia, Italy
Title: Interval-based Problems: Decidability and Complexity

12/09/2017 The 1st Summer School on formal methods for Cyber-Physical Systems.
12-16 September 2017, Verona, Italy
Title: Interval-based synthesis (invited lecture)

18/08/2014 ECAI 2014 - 21st European Conference on Artificial Intelligence
18-22 August 2014, Prague, Czech Republic
Title: Temporal Representation and Reasoning in Interval Temporal Logics (invited tutorial)

18/12/2010 SAKT 2010: colloquium on logic for temporal databases
18 December 2010, Bozen, Italy
Title: Temporal Functional Dependencies

16/09/2010 ICTCS 2010, 12th Italian Conference on Theoretical Computer Science
15-17 September 2010, Camerino, Italy
Title: Decidability of Interval Temporal logic

Program Committees of National and International Conferences and Symposia

2025
- AAAI 2025 - 39th Annual AAAI Conference on Artificial Intelligence
  Philadelphia, USA
  25/02/2025 - 04/03/2025

2024
- AAAI 2024 - 38th Annual AAAI Conference on Artificial Intelligence
  Vancouver, Canada
  20/02/2024 - 27/02/2024

2023
- AAAI 2023 - 37th Annual AAAI Conference on Artificial Intelligence
  Washington, USA
  07/02/2023 - 14/02/2023

2021
- IJCAI 2020 - Twenty-Ninth International Joint Conference on Artificial Intelligence
  Yokohama, Japan
  07/01/2021 - 15/01/2021

2020
- ECAI 2020 - 24th European Conference on Artificial Intelligence
  Santiago de Compostela, Spain
  29/08/2020 - 08/09/2020
- OVERLAY @ BOSK 2020 - 2nd Workshop on Artificial Intelligence and fOrmal VERification, Logic, Automata, and sYnthesis
  Bozen-Bolzano (Italy)
  25/09/2020

2019
- IJCAI 2019 - Twenty-Eighth International Joint Conference on Artificial Intelligence
  Macao, China
  10/08/2019 - 16/08/2019

- GandALF 2019 - Tenth International Symposium on Games, Automata, Logics, and Formal Verification
  Bordeaux, France
  02/09/2019 - 03/09/2019
- OVERLAY @ AIxIA 2019 - 1st Workshop on Artificial Intelligence and fOrmal VERification, Logic, Automata, and sYnthesis
  Rende, Italy
  19/11/2019 - 20/11/2019
- CILC 2019 - 34 esimo Convegno Italiano di Logica Computazionale
  Trieste, Italy
  19/06/2019 - 20/06/2019

2018
- CILC 2018 - 33 esimo Convegno Italiano di Logica Computazionale
  Bolzano, Italy
  20/09/2018 – 22/09/2018
- GandALF 2018 - Ninth International Symposium on Games, Automata, Logics, and Formal Verification
  Saarbrücken, Germany
  26/09/2018 – 28/09/2018

2017
- ACM-BCB 2017 - The 8th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics, MA
  Boston, USA
  20/08/2017 – 23/08/2017

2016
- CILC 2016 - 31 esimo Convegno Italiano di Logica Computazionale
  Milano, Italy
  20/06/2016 – 22/06/2016

2014
- CILC 2014 - 29 esimo Convegno Italiano di Logica Computazionale
  Torino, Italy
  16/06/2014 – 18/06/2014

Organization Committees of National and International Conferences and Symposia

2017
- CPS 2017 - The 1st Summer School on formal methods for Cyber-Physical Systems
  Verona, Italy
  12/09/2017 – 16/09/2017

2014
- ICHI 2014 - 2014 IEEE International Conference on Healthcare Informatics
  Verona, Italy
  15/09/2014 – 17/09/2014
- GandALF 2014 - Fifth International Symposium on Games, Automata, Logics and Formal Verification
  Verona, Italy
  10/09/2014 – 12/09/2014

- TIME 2014 - 21st International Symposium on Temporal Representation and Reasoning
  Verona, Italy
  08/09/2014 – 10/09/2014

2009
- GAMES 2009 - Annual Workshop of the ESF Networking Programme on Games for Design and Verification
  Udine, Italy
  14/09/2009 – 17/09/2009

Contributed Talks at National and International Conferences

03/06/2024 12th IEEE International Conference on Healthcare Informatics, ICHI 2024, 3-6 June 2024, Orlando, USA.
Title: Sequence-Walking Decision Tree for Multivariate Healthcare Data.
Relevance: International

29/09/2021 28th International Symposium on Temporal Representation and Reasoning, TIME 2021, September 27-29, 2021, Klagenfurt, Austria.
Title: Pspace-Completeness of the Temporal Logic of Sub-Intervals and Suffixes
Relevance: International

21/09/2021 12th International Symposium on Games, Automata, Logics, and Formal Verification, GandALF 2021, Padua, Italy, 20-22 September 2021.
Title: Adding the Relation Meets to the Temporal Logic of Prefixes and Infixes makes it EXPSPACE-Complete.
Relevance: International

13/09/2021 22nd Italian Conference on Theoretical Computer Science, September 13-15, 2021, Bologna, Italy.
Title: Extended ω-Regular Languages and Interval Temporal Logic.
Relevance: National

11/08/2021 9th IEEE International Conference on Healthcare Informatics, ICHI 2021, August 9-12 2021, Victoria, BC, Canada.
Title: On the early detection of Sepsis in MIMIC-III.
Relevance: International

26/08/2020 45th International Symposium on Mathematical Foundations of Computer Science, MFCS 2020, August 24-28, 2020, Prague, Czech Republic.
Title: On a Temporal Logic of Prefixes and Infixes.
Relevance: International

18/10/2019 26th International Symposium on Temporal Representation and Reasoning, TIME 2019, 16-19 October 2019, Malaga, Spain.
Title: Customizing BPMN Diagrams Using Timelines.
Relevance: International

30/10/2018 16th International Conference on Principles of Knowledge Representation and Reasoning, KR 2018, 30 October - 2 November 2018, Tempe, Arizona.
Title: A Novel Automata-theoretic Approach to Timeline-based Planning
Relevance: International

11/09/2018 16th International Conference on Business Process Management, BPM 2018, 9-14 September 2018, Sydney, Australia.
Title: A Logical Formalization of Time-Critical Processes with Resources.
Relevance: International

04/04/2017 The 32nd ACM SIGAPP Symposium On Applied Computing, SAC 2017, 4-6 April 2017, Marrakech, Morocco
Title: Driving time-dependent paths in clinical BPMN processes.
Relevance: International

24/09/2015 22nd International Symposium on Temporal Representation and Reasoning, TIME 2015, 23-25 September 2015, Kassel, Germany.
Title: The Price of Evolution in Temporal Databases.
Relevance: International

11/09/2014 5th International Symposium on Games, Automata, Logics, and Formal Verification, GandALF 2014, 10-12 September 2014, Verona, Italy.
Title: Interval-based Synthesis
Relevance: International

09/09/2014 21st International Symposium on Temporal Representation and Reasoning, TIME 2014, 8-10 September 2014, Verona, Italy.
Title: Metric Propositional Neighborhood Logic with an Equivalence Relation
Relevance: International

08/09/2014 21st International Symposium on Temporal Representation and Reasoning, TIME 2014, 8-10 September 2014, Verona, Italy.
Title: Approximate Interval-Based Temporal Dependencies: The Complexity Landscape
Relevance: International

26/08/2014 39th International Symposium on Mathematical Foundations of Computer Science, MFCS 2014, 25-29 August 2014, Budapest.
Title: Decidability of the Interval Temporal Logic $A\bar{A}B\bar{B}$ over the Rationals.
Relevance: International

09/12/2013 13th International Conference on Data Mining Workshops, ICDM Workshops 2013, 7-10 December 2013, Dallas, USA.
Title: Mining Approximate Temporal Functional Dependencies Based on Pure Temporal Grouping.
Relevance: International

27/06/2013 28th Annual IEEE Symposium on LOGIC IN COMPUTER SCIENCE, LICS 2013, 25-28 June 2013, New Orleans, USA.
Title: Adding an Equivalence Relation to the Interval Logic ABB: Complexity and Expressiveness
Relevance: International

04/04/2013 7th International Conference on Language and Automata Theory and Applications, LATA 2013, April 2-5, 2013, Bilbao, Spain
Title: Interval Logics and ωB-Regular Languages
Relevance: International

12/09/2012 19th International Symposium on Temporal Representation and Reasoning, TIME 2012, 12-14 September 2012, Leicester, United Kingdom.
Title: An Optimal Tableau System for the Logic of Temporal Neighborhood over the Reals
Relevance: International

07/09/2012 3nd International Symposium on Games, Automata, Logics, and Formal Verification, GandALF 2012, 6-8 September 2012, Napoli, Italy
Title: Interval Temporal Logics over Strongly Discrete Linear Orders: the Complete Picture.
Relevance: International

30/08/2012 20th European Conference on Artificial Intelligence, ECAI 2012, 27-31 August 2012, Montpellier, France.
Title: Interval Temporal Logics over Finite Linear Orders: the Complete Picture
Relevance: International

12/09/2011 18th International Symposium on Temporal Representation and Reasoning, TIME 2011, 12 - 14 September 2011, Lübeck, Germany
Title: Temporal Functional Dependencies Based on Interval Relations.
Relevance: International

24/08/2011 12th International Symposium on Spatial and Temporal Databases, SSTD 2011, 24 - 26 Aug 2011, Minneapolis, USA
Title: A Uniform Framework for Temporal Functional Dependencies with Multiple Granularities.
Relevance: International

07/07/2011 20th International Conference on Automated Reasoning with Analytic Tableaux and Related Methods, Tableaux 2011, 4-8 July 2011, Bern, Switzerland
Title: Optimal Tableau Systems for Propositional Neighborhood Logic over All, Dense, and Discrete Linear Orders
Relevance: International

21/06/2011 26th Annual IEEE Symposium on LOGIC IN COMPUTER SCIENCE, LICS 2011, 21-24 June 2011, Toronto, Canada.
Title: What's Decidable about Halpern and Shoham's Interval Logic? The Maximal Fragment ABBL.
Relevance: International

16/06/2011 2nd International Symposium on Games, Automata, Logics, and Formal Verification, GandALF 2011, 15-17 June 2011, Minori, Italy
Title: An Optimal Decision Procedure for MPNL over the Integers.
Relevance: International

07/09/2010 17th International Symposium on Temporal Representation and Reasoning, TIME 2010, 6-8 September 2010, Paris, France
Title: Decidability of the Logics of the Reflexive Sub-interval and Super-interval Relations over Finite Linear Orders
Relevance: International

07/07/2010 International Colloquium on Automata, Languages and Programming, ICALP 2010, 5 - 12 July 2010, Bordeaux, France
Title: Maximal Decidable Fragments of Halpern and Shoham's Modal Logic of Intervals
Relevance: International

17/06/2010 First International Symposium on Games, Automata, Logics, and Formal Verification, GandALF 2010, 17-18 June 2010, Minori, Italy
Title: Begin, After, and Later: a Maximal Decidable Interval Temporal Logic
Relevance: International

04/03/2010 27th International Symposium on Theoretical Aspects of Computer Science, STACS 2010, 4-6 March 2010, Nancy, France.
Title: Decidability of the Interval Temporal Logic ABB over the Natural Numbers.
Relevance: International

18/06/2008 15th International Symposium on Temporal Representation and Reasoning, TIME 2008, 16 - 18 June 2008, Montréal, Canada
Title: An optimal tableau for Right Propositional Neighborhood Logic over Trees
Relevance: International

29/11/2007 Methods 4 modalities, 29-30 November 2007, Cachan, France
Title: Complete and Terminating Tableau for the Logic of Proper Subinterval Structures Over Dense Orderings.
Relevance: International

Reviewing Activities

Below are the main reviewing activities as an anonymous expert for International Conferences and Journals.

National and International Conferences:

- CSL 2025
- CiE 2018
- CONCUR 2018
- IJCAI 2018
- ACM BCB 2017
- PPDP 2016
- HSCC 2015
- LICS 2015
- GandALF 2013
- TIME 2013
- TIME 2012
- TIME 2010
- JELIA 2008

International Journals:

- Annals of Mathematics and Artificial Intelligence (AMAI)
- Artificial Intelligence in Medicine
- Distributed and Parallel Databases (DAPD)
- Fundamenta Informaticae
- Information and Computation
- Information Sciences
- Information Systems
- Journal of Applied Logic (JAL)
- Journal of Artificial Intelligence Research (JAIR)
- Journal of Biomedical Informatics (JBI)
- Journal of Healthcare Informatics Research (JHIR)
- Journal Of Logic And Computation (JLC)
- Mobile Information Systems (MIS)
- Robotics and Autonomous Systems
- Science of Computer Programming (SCICO)

Publications

The publications are divided by type, and within each type, listed from the most recent to the oldest chronologically.

International Journals with Peer Review

[j27] Tewabe Chekole Workneh, Pietro Sala, Romeo Rizzi, Matteo Cristani. Business Process Compliance with impact constraints (to appear). Information Systems.

[j26] Beatrice Amico, Carlo Combi, Romeo Rizzi, Pietro Sala: Predictive mining of multi-temporal relations. Information and Computation. 301: 105228 (2024)

[j25] Laura Bozzelli, Angelo Montanari, Adriano Peron, Pietro Sala. The addition of temporal neighborhood makes the logic of prefixes and sub-intervals EXPSPACE-complete. Logical Methods in Computer Science. 20(1) (2024)

[j24] Laura Bozzelli, Angelo Montanari, Adriano Peron, Pietro Sala. Pspace-completeness of the temporal logic of sub-intervals and suffixes. Information and Computation. 294: 105083 (2023)

[j23] Dario Della Monica, Angelo Montanari, Pietro Sala. An interval temporal logic characterization of extended ω-regular languages. Theoretical Computer Science 962: 113929 (2023)

[j22] Laura Bozzelli, Alberto Molinari, Angelo Montanari, Adriano Peron, Pietro Sala. Satisfiability and Model Checking for the Logic of Sub-Intervals under the Homogeneity Assumption. Logical Methods in Computer Science 18(1) (2022)

[j21] Angelo Montanari, Pietro Sala. Reactive synthesis from interval temporal logic specifications. Theoretical Computer Science 899: 48-79 (2022)

[j20] Antonino Aparo, Pietro Sala, Vincenzo Bonnici, Rosalba Giugno. TEDAR: Temporal dynamic signal detection of adverse reactions. Artificial Intelligence in Medicine. 122: 102212 (2021).

[j19] Carlo Combi, Romeo Rizzi, and Pietro Sala. Checking Sets of Pure Evolving Association Rules Fundamenta Informaticae. 178(4): 283-313 (2021).

[j18] Pietro Sala, Carlo Combi, Matteo Mantovani and Romeo Rizzi. Discovering Evolving Temporal Information: Theory and Application to Clinical Databases SN Computer Science volume 1, Article number: 153 (2020).

[j17] David Barozzini, David de Frutos-Escrig, Dario Della Monica, Angelo Montanari and Pietro Sala. Beyond omega-regular languages: omegaT-regular expressions and their automata and logic counterparts Theoretical Computer Science. 813: 270-304 (2020).

[j16] Davide Bresolin, Dario Della Monica, Angelo Montanari, Pietro Sala, Guido Sciavicco. Decidability and Complexity of the Fragments of the Modal Logic of Allen's Relations over the Rationals Information and Computation. 266: 97-125 (2019).

[j15] Laura Bozzelli, Alberto Molinari, Angelo Montanari, Adriano Peron, Pietro Sala. Interval vs. Point Temporal Logic Model Checking: An Expressiveness Comparison ACM Transactions on Computational Logic. 20(1): 4:1-4:31 (2019).

[j14] Emilio Muñoz-Velasco, Mercedes Pelegrín, Pietro Sala, Guido Sciavicco, Ionel Eduard Stan. On Coarser Interval Temporal Logics Artificial Intelligence. 266: 1-26 (2019).

[j13] Laura Bozzelli, Alberto Molinari, Angelo Montanari, Adriano Peron, Pietro Sala. Which Fragments of the Interval Temporal Logic HS are Tractable in Model Checking? Theoretical Computer Science. 764: 125-144 (2019).

[j12] Laura Bozzelli, Alberto Molinari, Angelo Montanari, Adriano Peron, Pietro Sala. Model Checking for Fragments of the Interval Temporal Logic HS at the Low Levels of the Polynomial Time Hierarchy. Information and Computation. 262(Part): 241-264 (2018)

[j11] Carlo Combi, Pietro Sala. Mining approximate interval-based temporal dependencies. Acta Inf. 53(6-8). 547-585 (2016)

[j10] Angelo Montanari, Marco Pazzaglia, Pietro Sala. Metric propositional neighborhood logic with an equivalence relation. Acta Inf. 53(6-8). 621-648 (2016)

[j9] Angelo Montanari, Marco Pazzaglia, Pietro Sala. Adding one or more equivalence relations to the interval temporal logic. Theor. Comput. Sci. 629. 116-134 (2016)

[j8] Carlo Combi, Matteo Mantovani, Alberto Sabaini, Pietro Sala, Francesco Amaddeo, Ugo Moretti, Giuseppe Pozzi. Mining approximate temporal functional dependencies with pure temporal grouping in clinical databases. Comp. in Bio. and Med. 62. 306-324 (2015)

[j7] Angelo Montanari, Gabriele Puppis, Pietro Sala. A decidable weakening of Compass Logic based on cone-shaped cardinal directions. Logical Methods in Computer Science 11(4) (2015)

[j6] Carlo Combi, Pietro Sala. Interval-based temporal functional dependencies: specification and verification. Ann. Math. Artif. Intell. 71(1-3). 85-130 (2014)

[j5] Davide Bresolin, Dario Della Monica, Angelo Montanari, Pietro Sala, Guido Sciavicco. Interval temporal logics over strongly discrete linear orders: Expressiveness and complexity. Theor. Comput. Sci. 560. 269-291 (2014)

[j4] Davide Bresolin, Angelo Montanari, Pietro Sala, Guido Sciavicco. Optimal decision procedures for MPNL over finite structures, the natural numbers, and the integers. Theor. Comput. Sci. 493. 98-115 (2013)

[j3] Davide Bresolin, Pietro Sala, Guido Sciavicco. On Begins, Meets and before. Int. J. Found. Comput. Sci. 23(3). 559-583 (2012)

[j2] Davide Bresolin, Valentin Goranko, Angelo Montanari, Pietro Sala. Tableaux for Logics of Subinterval Structures over Dense Orderings. J. Log. Comput. 20(1). 133-166 (2010)

[j1] Valentin Goranko, Angelo Montanari, Pietro Sala, Guido Sciavicco. A general tableau method for propositional interval temporal logics: Theory and implementation. J. Applied Logic 4(3). 305-330 (2006)

International Conferences with Peer Review

[c54] Emanuele Chini, Pietro Sala, Andrea Simonetti, Omid Zare. Reactive Synthesis for Expected Impacts. GandALF 2024. 35–52

[c53] Renato Acampora, Dario Della Monica, Luca Geatti, Nicola Gigante, Angelo Montanari, Pietro Sala. Synthesis of Timeline-Based Planning Strategies Avoiding Determinization. GandALF 2024. 5–18

[c52] Pietro Sala, Omid Zare: Sequence-Walking Decision Tree for Multivariate Healthcare Data. ICHI 2024: 21-30

[c51] Dario Della Monica, Angelo Montanari, Gabriele Puppis, Pietro Sala. The Logic of Prefixes and Suffixes is Elementary under Homogeneity. LICS 2023.

[c50] Beatrice Amico, Carlo Combi, Romeo Rizzi, Pietro Sala. Discovering Predictive Dependencies on Multi-Temporal Relations. TIME 2023. 4:1-4:19

[c49] Manuel Medina, Pietro Sala. On the early detection of Sepsis in MIMIC-III. ICHI 2021. 171-180

[c48] Laura Bozzelli, Angelo Montanari, Adriano Peron, Pietro Sala. Pspace-Completeness of the Temporal Logic of Sub-Intervals and Suffixes. TIME 2021. 9:1-9:19

[c47] Laura Bozzelli, Angelo Montanari, Adriano Peron, Pietro Sala. Adding the Relation Meets to the Temporal Logic of Prefixes and Infixes makes it EXPSPACE-Complete. GandALF 2021. 179-194

[c46] Laura Bozzelli, Angelo Montanari, Adriano Peron, Pietro Sala. On a Temporal Logic of Prefixes and Infixes. MFCS 2020. 21:1-21:14

[c45] Carlo Combi, Barbara Oliboni, Pietro Sala. Customizing BPMN Diagrams Using Timelines. TIME 2019. 5:1-5:17

[c44] Nicola Gigante, Dario Della Monica, Angelo Montanari, Pietro Sala. A Novel Automata-theoretic Approach to Timeline-based Planning. KR 2018. 541-550

[c43] Carlo Combi, Pietro Sala, Francesca Zerbato. A Logical Formalization of Time-Critical Processes with Resources. BPM (Forum) 2018. 20-36.

[c42] Laura Bozzelli, Alberto Molinari, Angelo Montanari, Adriano Peron, Pietro Sala. Satisfiability and Model Checking for the Logic of Sub-Intervals under the Homogeneity Assumption. ICALP 2017. 120:1-120:14

[c41] Carlo Combi, Matteo Mantovani, Pietro Sala. Discovering Quantitative Temporal Functional Dependencies on Clinical Data. ICHI 2017. 248-257

[c40] Dario Della Monica, Nicola Gigante, Angelo Montanari, Pietro Sala, Guido Sciavicco. Bounded Timed Propositional Temporal Logic with Past Captures Timeline-based Planning with Bounded Constraints. IJCAI 2017. 1008-1014

[c39] Carlo Combi, Pietro Sala, Francesca Zerbato. Driving time-dependent paths in clinical BPMN processes. SAC 2017. 743-750

[c38] Dario Della Monica, Angelo Montanari, Pietro Sala. Beyond ωBS-regular Languages: ωT-regular Expressions and Counter-Check Automata. GandALF 2017. 223-237

[c37] Laura Bozzelli, Alberto Molinari, Angelo Montanari, Adriano Peron, Pietro Sala. Interval Temporal Logic Model Checking: The Border Between Good and Bad HS Fragments. IJCAR 2016. 389-405

[c36] Laura Bozzelli, Alberto Molinari, Angelo Montanari, Adriano Peron, Pietro Sala. Interval vs. Point Temporal Logic Model Checking. an Expressiveness Comparison. FSTTCS 2016: 26:1-26:14

[c35] Dario Della Monica, Angelo Montanari, Aniello Murano, Pietro Sala. Prompt Interval Temporal Logic. JELIA 2016. 207-222

[c34] Alberto Molinari, Angelo Montanari, Adriano Peron, Pietro Sala. Model Checking Well-Behaved Fragments of HS: The (Almost) Final Picture. KR 2016. 473-483

[c33] Laura Bozzelli, Alberto Molinari, Angelo Montanari, Adriano Peron, Pietro Sala. Model Checking the Logic of Allen's Relations Meets and Started-by is PNP-Complete. GandALF 2016. 76-90

[c32] Emilio Munoz-Velasco, Mercedes Pelegrin-Garcia, Pietro Sala, Guido Sciavicco. On Coarser Interval Temporal Logics and their Satisfiability Problem. CAEPIA 2015. 105-115

[c31] Pietro Sala, Carlo Combi, Matteo Cuccato, Andrea Galvani, Alberto Sabaini. A Framework for Mining Evolution Rules and Its Application to the Clinical Domain. ICHI 2015. 293-302

[c30] Davide Bresolin, Dario Della Monica, Angelo Montanari, Pietro Sala, Guido Sciavicco. On the Complexity of Fragments of the Modal Logic of Allen's Relations over Dense Structures. LATA 2015. 511-523

[c29] Carlo Combi, Romeo Rizzi, Pietro Sala. The Price of Evolution in Temporal Databases. TIME 2015. 47-58

[c28] Angelo Montanari, Gabriele Puppis, Pietro Sala. Decidability of the Interval Temporal Logic A$\bar{A}$B$\bar{B}$ over the Rationals. MFCS (1) 2014. 451-463

[c27] Angelo Montanari, Marco Pazzaglia, Pietro Sala. Metric Propositional Neighborhood Logic with an Equivalence Relation. TIME 2014. 49-58

[c26] Pietro Sala. Approximate Interval-Based Temporal Dependencies: The Complexity Landscape. TIME 2014. 69-78

[c25] Angelo Montanari, Pietro Sala. Interval-based Synthesis. GandALF 2014. 102-115

[c24] Carlo Combi, Paolo Parise, Pietro Sala, Giuseppe Pozzi. Mining Approximate Temporal Functional Dependencies Based on Pure Temporal Grouping. ICDM Workshops 2013. 258-265

[c23] Angelo Montanari, Pietro Sala. Interval Logics and ωB-Regular Languages. LATA 2013. 431-443

[c22] Angelo Montanari, Pietro Sala. Adding an Equivalence Relation to the Interval Logic ABB: Complexity and Expressiveness. LICS 2013. 193-202

[c21] Dario Della Monica, Angelo Montanari, Pietro Sala. The Importance of the Past in Interval Temporal Logics: The Case of Propositional Neighborhood Logic. Logic Programs, Norms and Action 2012. 79-102

[c20] Davide Bresolin, Dario Della Monica, Angelo Montanari, Pietro Sala, Guido Sciavicco. Interval Temporal Logics over Finite Linear Orders: the Complete Picture. ECAI 2012. 199-204

[c19] Angelo Montanari, Pietro Sala. An Optimal Tableau System for the Logic of Temporal Neighborhood over the Reals. TIME 2012. 39-46

[c18] Davide Bresolin, Dario Della Monica, Angelo Montanari, Pietro Sala, Guido Sciavicco. Interval Temporal Logics over Strongly Discrete Linear Orders: the Complete Picture. GandALF 2012. 155-168

[c17] Davide Bresolin, Angelo Montanari, Pietro Sala, Guido Sciavicco. What's Decidable about Halpern and Shoham's Interval Logic? The Maximal Fragment ABBL. LICS 2011. 387-396

[c16] Carlo Combi, Angelo Montanari, Pietro Sala. A Uniform Framework for Temporal Functional Dependencies with Multiple Granularities. SSTD 2011. 404-421

[c15] Davide Bresolin, Angelo Montanari, Pietro Sala, Guido Sciavicco. Optimal Tableau Systems for Propositional Neighborhood Logic over All, Dense, and Discrete Linear Orders. TABLEAUX 2011. 73-87

[c14] Carlo Combi, Pietro Sala. Temporal Functional Dependencies Based on Interval Relations. TIME 2011. 23-30

[c13] Davide Bresolin, Angelo Montanari, Pietro Sala, Guido Sciavicco. An Optimal Decision Procedure for MPNL over the Integers. GandALF 2011. 192-206

[c12] Angelo Montanari, Gabriele Puppis, Pietro Sala. Maximal Decidable Fragments of Halpern and Shoham's Modal Logic of Intervals. ICALP (2) 2010. 345-356

[c11] Angelo Montanari, Gabriele Puppis, Pietro Sala, Guido Sciavicco. Decidability of the Interval Temporal Logic ABB over the Natural Numbers. STACS 2010. 597-608

[c10] Angelo Montanari, Ian Pratt-Hartmann, Pietro Sala. Decidability of the Logics of the Reflexive Sub-interval and Super-interval Relations over Finite Linear Orders. TIME 2010. 27-34

[c9] Davide Bresolin, Pietro Sala, Dario Della Monica, Angelo Montanari, Guido Sciavicco. A Decidable Spatial Generalization of Metric Interval Temporal Logic. TIME 2010. 95-102

[c8] Davide Bresolin, Pietro Sala, Guido Sciavicco. Begin, After, and Later: a Maximal Decidable Interval Temporal Logic. GANDALF 2010. 72-88

[c7] Davide Bresolin, Valentin Goranko, Angelo Montanari, Pietro Sala. Complete and Terminating Tableau for the Logic of Proper Subinterval Structures Over Dense Orderings. Electr. Notes Theor. Comput. Sci. 231. 131-151 (2009)

[c6] Angelo Montanari, Gabriele Puppis, Pietro Sala. A Decidable Spatial Logic with Cone-Shaped Cardinal Directions. CSL 2009. 394-408

[c5] Davide Bresolin, Angelo Montanari, Pietro Sala, Guido Sciavicco. A Tableau-Based System for Spatial Reasoning about Directional Relations. TABLEAUX 2009. 123-137

[c4] Davide Bresolin, Angelo Montanari, Pietro Sala, Guido Sciavicco. Optimal Tableaux for Right Propositional Neighborhood Logic over Linear Orders. JELIA 2008. 62-75

[c3] Davide Bresolin, Angelo Montanari, Pietro Sala. An optimal tableau for Right Propositional Neighborhood Logic over Trees. TIME 2008. 110-117

[c2] Davide Bresolin, Angelo Montanari, Pietro Sala. An Optimal Tableau-Based Decision Algorithm for Propositional Neighborhood Logic. STACS 2007. 549-560

[c1] Davide Bresolin, Valentin Goranko, Angelo Montanari, Pietro Sala. Tableau Systems for Logics of Subinterval Structures over Dense Orderings. TABLEAUX 2007. 73-89

Public Engagement

20/05/2022 FAMILY HACK! Open Innovation Hackathon to improve processes in family services
Location: Leonardo da Vinci State Institute of Education - Cerea
Duration: 9 hours
Organizing Entity: Municipality of Legnago through a framework agreement with the Department of Computer Science of the University of Verona
Role: Mentor