
UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II
**DOTTORATO DI RICERCA / PhD PROGRAM IN
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING**

Activities and Publications Report

PhD Student: Simona Fioretto

Student DR number: DR996638

PhD Cycle: XXXVIII

PhD Chairman: Prof. Stefano Russo

PhD program student's start date: 01/11/2022

PhD program student's end date: 31/10/2025

Supervisor: Elio Masciari

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PhD scholarship funding entity:

PNRR - DM 351 Mis.: I.4.1 Dottorati Pubblica Amministrazione

Activities and Publications – Final Report

UNINA PhD in Information Technology and Electrical Engineering – XXXVIII Cycle

PhD candidate: **Simona Fioretto**

General information

Simona Fioretto received in year 2022 the Master Science degree in Management Engineering from the University of Napoli Federico II. She attended a curriculum in Information Systems within the PhD program in Information Technology and Electrical Engineering. She received a grant from PNR - DM 351 Mis.: I.4.1 Dottorati Pubblica Amministrazione.

Study activities

Attended Courses

Year	Course Title	Type	Credits	Lecturer	Organization
1 st	On the challenges and impact of Artificial Intelligence in Insurance domain	Ad hoc course	3	Ing. Lorenzo Ricciardi Celsi	ITEE
1 st	Using Deep Learning Properly	Ad hoc course	4	Prof. Andrea Apicella	ITEE
1 st	How to Boost Your PhD	Ad hoc course	4	Prof. Antigone Marino	ITEE -ICTH –CQB
1 st	Statistical Data Analysis for science and engineering research	Ad hoc course	4	Prof. Roberto Pietrantuono	ITEE
1 st	I pilastri della trasformazione digitale	Ad hoc course	3	Prof. Francesco Tortorelli	ITEE
1 st	Academic Entrepreneurship	Ad hoc course	4	Prof. Pierluigi Rippa	Polytechnic School
1 st	Scienza moderna e disciplina giuridica dell'intelligenza artificiale	Ad hoc course	6	Prof. Lucio Franzese	ITEE
2 nd	Strategic Orientation for STEM Research & Writing	Ad hoc course	5	Dr Chie Shin Fraser	ITEE
2 nd	Machine Learning for Science and Engineering Research	Ad hoc course	5	Proff. Anna Corazza, Roberto Prevete, Carlo Sansone, Antonio Lieto	ITEE

Attended PhD Schools

Year	School title	Location	Credits	Dates	Organization
1 st	Software Engineering @Salerno Week	Salerno, Italy	3	12-13-14-15/06/2023	University of Salerno, Italy

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Attended Seminars

Year	Seminar Title	Credits	Lecturer	Lecturer affiliation	Organization
1 st	Donne e stem: il mio impegno in WIE	0.2	Prof.ssa Dajana Cassioli	University of Roma Tre	
1 st	Game Theory for Information Engineering	0.6	Prof. Leonardo Badia	University of Padua - Italy	Prof. Marcello Caleffi, DIETI - Unina
1 st	From Cyber Situational Awareness to Adaptive Cyber Defense: Leveling the Cyber Playing Field	0.4	Prof. Massimiliano Albanese	George Mason University - USA	Prof. Giancarlo Sperli, DIETI - Unina
1 st	Industry 4.0 Fundamentals in Bosch Applications	2			Bosch –Centro Studi Componenti per Veicoli and the Decision and Control Laboratory Of Politecnico di Bari
1 st	Embracing Data Imperfections Via Domain Enriched Visual Task Learning	0.2	Prof. Vishal Monga	Pennsylvania State University, USA	Prof. Antonio De Maio (DIETI)
1 st	Algorithm Unrolling: Efficient, Interpretable Deep Learning for signal and image processing	0.2	Prof. Vishal Monga	Pennsylvania State University, USA	Prof. Antonio De Maio (DIETI)
1 st	Non-Destructive Testing (NDT) in contesto aeronautico	0.2	Cap. G.A.r.n. Ing Giovanni Gravina, PhD	10° Reparto Manutenzione Velivoli	Prof. Carlo Forestiere (DIETI)
1 st	MLOps: Achieving Operational Velocity with Faster Delivery and Collaboration	0.2	Prof. Tarry Singh	Prof. Tarry Singh CEO @ Real.A	Prof. Carlo Sansone
1 st	Unleashing the Power of LLMs: a Historical perspective on Generative AI	0.2	Prof. Tarry Singh	Prof. Tarry Singh CEO @ Real.A	Prof. Carlo Sansone
1 st	Enhancing qubit readout with Bayesian Learning	0.2	Dr. Nicola Lo Gullo	Università della Calabria	Prof. Vincenzo D'ambrosio (Dipartimento di Fisica)

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1 st	How to Publish Under the CARE-CRUI Open Access Agreement with IEEE	0.3	Dr. Nino Grizzuti, Eszter Lukacs, Stefano Bianco	CARE-CRUI and Unina, IEEE, CARE-CRUI and INFN	CARE-CRUI and IEEE
1 st	2nd Generation of Mobile EEG Systems: Hands-on Experience	0.2	dr. Andrija Dakovic	Manager of mBrainTrain	Prof. Pasquale Arpaia (DIETI)
1 st	Migration of legacy IT infrastructures into the cloud	0.4	Ing. Claudio Perrotta	CTO Epsilon S.r.l.	Prof. Roberto Canonico (DIETI, Unina)
1 st	Ricerca e formazione nella società della transizione digitale	1			CINI
1 st	Come scrivere un articolo scientifico?	0.3			Account Development Europe
1 st	Come funzionano le riviste?	0.3			Account Development Europe
2 nd	Multi-agent autonomous flight at Leonardo Labs	0,2	Dr. Fabrizio Schiano		Prof. Vincenzo Lippiello
2 nd	Energy-Efficient Data Science	0,2	Prof. Carlos Ordenez	University of Houston	Prof. Elio Masciari
2 nd	The Generative Power of Deep Learning: Variational Auto-Encoders and Generative Adversarial Networks for scenario generation	0,5	Prof. Enza Messina	Università di Milano Bicocca	Beniamino Di Martino (Università della Campania Luigi Vanvitelli)
2 nd	Fair Spoke Workshop 2024 – Spoke 3: Resilient AI	1,2		FAIR – Future Artificial Intelligence Research	Prof. Carlo Sansone (DIETI)
2 nd	Analytic center selection of optimization – based controllers for robot biology	0,2	Prof. Gennaro Notomista	University of Waterloo, Waterloo, Canada	Prof Bruno Siciliano (DIETI)
2 nd	Exploring the frontiers of modern cryptography	0,3	Prof. Antonis Michalas	Tampere University, Finland	Prof Simon Pietro Romano (DIETI)

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2 nd	Regolazione in tema di intelligenza artificiale alla luce dell'AI act	1	Dr. Elvira Raviele	Dirigente Ufficio di Gabinetto MIMIT	5g Academy's / Prof. Antonia Tulino (DIETI)
2 nd	Verso una Gestione Smart Della Risorsa Idrica con il supporto della Digital Innovation	0,2	Enrica Menduni De Rossi		5g Academy's / Prof. Antonia Tulino (DIETI)
2 nd	Intelligenza Artificiale E Regole Del Mercato	0,4	Massimo Rubino De Ritis		5g Academy's / Prof. Antonia Tulino (DIETI)
2 nd	Sustainable IT: Strategies and Best practices for A green engineering future	1	Annalisa Di Leva, Dimitri Cuomo, Benedetta Ramazzotti, Tiziano Marcozzi	Capgemini	5g Academy's / Prof. Antonia Tulino (DIETI)
2 nd	Generative AI for Software Engineering: Strategies, Impacts, and Practical Applications	1	Annalisa Di Leva, Cynthia Cuvi, Giulia Favale, Alessio Zoccoli		5g Academy's / Prof. Antonia Tulino (DIETI)
2 nd	Social Network Analysis: Methods and Applications	0,4	Prof. Tanmoy Chakraborty	IIT-Delhi, Delhi, India	Prof. Giancarlo Sperli (DIETI)
2 nd	Introduction to Large Language Models: Evolution and the current state	0,4	Prof. Tanmoy Chakraborty	IIT-Delhi, Delhi, India	Prof. Giancarlo Sperli (DIETI)
2 nd	From ACE Technologies to Sustainable, Accessible and Equitable Urban Mobility: An Optimization Journey	0.4	Prof. Mauro Salazar	Eindhoven University of Technology, Eindhoven, Netherland	Prof. Stefania Santini (DIETI)
3 rd	Emergent behaviors and collective decisions in cyber-physical-human systems	0.2	Prof. Karl H. Johansson		SSM Scientific Colloquium

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3 rd	Can we rely on AI? Reliability issues in Artificial Neural Networks and potential solutions for autonomous vehicles	0.2	Prof. Paolo Rech		Dr. Edoardo Giusto
3 rd	5G & DIGITAL TRANSFORMATION: A VIEW FROM AN UNCONVENTIONAL PERSPECTIVE	0.8	Prof. Maurizio Irlando		5G Academy
3 rd	Dynamic Risk Assessment in Industrial Applications: Leveraging Bayesian Inference for Enhanced Decision-Making	0.2	Dr. Simone Guarino	University Campus Bio-Medico of Rome, Rome, Italy, Department of Engineering	Dr. Francesco Vitale
3 rd	On the Security of Semantic Watermarking to Detect AI Generated Content	0.2	Dr. Erwin Quiring		Prof. Verdoliva
3 rd	Sovranità digitale cos'è e quali sono le principali minacce al cyberspazio nazionale	0.4	Prof. Roberto Baldoni		Prof. Marcello Cinque (DIETI, Unina)

Research activities

Simona Fioretto conducted research on the digital transformation of public administrations through a process-aware approach. Her studies can be grouped into three main areas. First, she focused on the analysis of the public administration domain, spending a research period at the Court of Appeal of Naples to understand, through Business Process Management (BPM) methodologies, the existing process models and the inefficiencies embedded within them. Subsequently, she investigated the role of Predictive Process Monitoring (PPM), a research area within Process Mining, with a focus on predicting process outcomes. To support this investigation, she carried out a Systematic Literature Review on the application of PPM to emerging types of data, particularly object-centric event logs, identifying current challenges and research gaps. Finally, during her research stay abroad at CIRAD Montpellier, she derived event log data from tabular datasets and applied both Process Mining and Predictive Process Monitoring techniques to the domain of land deal acquisitions, to assess the applicability and potential of these methods in a novel and data-intensive context. Her research contributes to bridging methodological advances in process mining with practical applications aimed at supporting digital transformation in complex organizational settings.

Tutoring and supplementary teaching activities

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Credits summary

PhD Year	Courses	Seminars	Research	Tutoring / Supplementary Teaching
1 st	31	6.9	22.1	-
2 nd	10	7,4	42,6	-
3 rd	-	2	58	-

Research periods in institutions abroad and/or in companies

PhD Year	Institution / Company	Hosting tutor	Period	Activities
1 st	Corte d'Appello di Napoli	Eugenio Forgillo	3 months	The activities in the Public Administration were structured in several phases aimed at identifying criticalities and improvement areas. During this initial period, data were collected to map the current situation. Meetings with responsible personnel allowed the identification of critical business processes, related activities, and involved resources. Finally, future steps were planned to analyze the main issues and critical points.
2 nd	Corte d'Appello di Napoli	Eugenio Forgillo	3 months	The activities in the Public Administration focused on identifying key criticalities related to data and human resource management. The analysis revealed fragmented databases, limited digitalization, and manual HR processes causing inefficiencies. Document management remains complex and lacks full traceability. Overall, these issues stem from low process digitalization and poor interoperability of existing IT systems.
2 nd	Centre de coopération internationale en recherche agronomique pour le développement, Montpellier (France)	Roberto Interdonato	5 months	Raw tabular data were pre-processed and modeled as event logs, in order to obtain a process-aware representation of the activities involved. This modeling enabled the implementation of various analytical tasks, including PM for process discovery, Event Log Clustering for trace clustering and process model complexity reduction, Trace Classification and Predictive Analysis for outcome prediction of process models. These activities were conducted to identify recurrent behavioral patterns and

				assessing process variability across different acquisition cases.
3	Centre de coopération internationale en recherche agronomique pour le développement, Montpellier (France)	Roberto Interdonato	1 month	Preparation of scientific papers derived from the results obtained through PM analyses. The study provided a detailed characterization of the behavioral dynamics underlying land acquisition processes, allowing the identification of several recurrent process patterns. These findings revealed different types of procedural behaviors and highlighted how PM techniques can be effectively applied to detect, classify, and interpret variations in process execution.

PhD Thesis

In the PhD Thesis, Simona Fioretto focused on the digital transformation of public administrations, applying process-oriented and data-driven approaches to bridge the gap between strategic goals and operational inefficiencies that still characterize many public institutions. Over recent years, the modernization of the public sector has become a major challenge for European countries, as fragmented data, outdated procedures, and weak integration between processes and information systems continue to limit transparency and efficiency. To address these issues, three main research directions were explored. The first involved an on-site analysis at the Court of Appeal of Naples, where Business Process Management (BPM) techniques were used to identify bottlenecks and propose digital optimization strategies. The second consisted of a Systematic Literature Review on Predictive Process Monitoring (PPM), aimed at mapping its evolution and assessing its applicability to object-centric event data. The third focused on the experimental application of Process Mining and PPM to land acquisition processes, during a research period at CIRAD Montpellier, exploring their potential in complex and data-intensive domains. The results demonstrated how combining BPM and PPM enhances process transparency, supports data integration, and provides practical insights to guide future digital transformation initiatives within the public sector.

Research products

Research results appear in 1 paper published in international journals, 14 contributions to international conferences.

List of scientific publications

International journal papers

S. Fioretto, E. Masciari,

A comparative analysis of predictive process monitoring: object-centric versus classical event logs,
International Journal of Knowledge and Information Systems,
vol. 67, pp. 7355-7398, 2025, DOI: 10.1007/s10115-025-02461-y.

International conference papers

A. Anniciello, S. Fioretto, E. Masciari, E.V. Napolitano

Covid-19 impact on health information technology: the rapid rise of e-Health and Big Data driven innovation of healthcare processes,

International Conference on IEEE International Conference on Bioinformatics and Biomedicine (BIBM),
Las Vegas, NV, USA, Dec. 2022, pp. 2759-2764, IEEE, DOI: 10.1109/BIBM55620.2022.9995515

F. Amato, S. Fioretto, E. Forgillo, E. Masciari, N. Mazzocca, S. Merola, E. V. Napolitano

Introducing AI-Based Techniques in the Justice Sector: A Proposal for Digital Transformation of Court Offices,

31st Symposium on Advanced Database System,

Padua, Italy, Jul. 2023, vol. 3478, pp. 497-504, CEUR-WS, EID: 2-s2.0-85173489342

S. Fioretto

Business Process Extraction from Documents with AI,

31st Symposium on Advanced Database System,

Padua, Italy, Jul. 2023, vol. 3478, pp. 697-702, CEUR-WS, EID: 2-s2.0-85173553023

S. Fioretto, E. Masciari, E.V. Napolitano

Can the Study of Trajectories Help to Extract Information from Business Processes?

2nd International Workshop on Process Management in the AI era,

Macao, SAR, Sep. 2023, vol. 3569, pp. 13-24, CEUR-WS, EID: 2-s2.0-85180158158

A. Anniciello, S. Fioretto, E. Masciari, E.V. Napolitano

Digital Twins for Traffic Congestion in Smart Cities: a novel solution using Data Mining techniques,

Proceedings of the 15th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management (IC3K 2023),

Rome, Italy, Nov. 2023, vol. 3, pp. 241-248, DOI: 10.5220/0012208100003598

A. Anniciello, S. Fioretto, E. Masciari, E.V. Napolitano

How Pandemic Affected the Adoption of e-Health Systems,

IDEAS '23: Proceedings of the 27th International Database Engineered Applications Symposium

Heraklion, Crete, Greece, May 2023, pp. 94-98, DOI: 10.1145/3589462.3589496

S. Fioretto, E. Masciari, E.V. Napolitano

Dossier classification to support workflow management optimization,

The 4th International Conference and Summer School “Numerical Computations: Theory and Algorithms” (NUMTA 2023)

Pizzo Calabro, Italy, Jun. 2023, vol. 14478, pp. 286-292, DOI: 10.1007/978-3-031-81247-7_25

F. Amato, S. Fioretto, E. Forgillo, E. Masciari, N. Mazzocca, S. Merola, E. V. Napolitano
Evolving Justice Sector: An Innovative Proposal for Introducing AI-Based Techniques in Court Offices,
12th International Conference on Electronic Government and the Information Systems Perspective (EGOVIS
2023)

Penang, Malaysia, Aug. 2023, pp. 75-88, DOI: 10.1007/978-3-031-39841-4_6

S. Fioretto

Process Mining Solutions for Public Administration,

European Conference on Advances in Databases and Information Systems (ADBIS 2023),

Barcelona, Spain, Sep. 2023, vol. New Trends in Database and Information Systems, pp. 668-675, DOI:
10.1007/978-3-031-42941-5_60

S. Fioretto, E. Masciari, E.V. Napolitano

A Joint Analysis of Trajectory Mining and Process Mining for Smartphone User Behaviour,

Joint European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in
Databases. ECML PKDD 2023,

Turin, Italy, Sep. 2023, vol. CCIS, 2135, Springer, Cham, DOI: 10.1007/978-3-031-74633-8_43

S. Fioretto, E. Masciari, E.V. Napolitano

Machine Learning for KPI Development in Public Administration,

Proceedings of the 13th International Conference on Data Science, Technology and Applications, DATA 2024

Dijon, France, Jul. 2024, pp. 522-527, SciTePress, DOI: 10.5220/0012820300003756

S. Fioretto, D. Ienco, R. Interdonato, E. Masciari

Integrating predictive process monitoring techniques in smart agriculture,

2024 International Symposium on Methodologies for Intelligent Systems (ISMIS 2024)

Poitiers, France, Jun. 2024, LNAI, vol. 14670 pp. 306-313, Springer, Cham, DOI: 10.1007/978-3-031-62700-
2_27

S. Fioretto, E. Masciari

A Conceptual Framework for Predictive Process Monitoring in Public Administration,

2024 International Conference on Complex, Intelligent, and Software Intensive Systems (CISIS 2024)

Taichung, Taiwan, Sep. 2024, LNDECT, vol. 87, pp. 423-431, Springer, Cham, DOI: 10.1007/978-3-031-70011-
8_40

M.L. Conza, S. Fioretto, E. Masciari, E.V. Napolitano

Enhancing Employee Health Through an Experimental Diet: Insights from Machine Learning Analysis,

33rd Euromicro international Conference on Parallel, Distributed, and Network-Based Processing (PDP)

Turin, Italy, Mar. 2025, pp. 283-290, IEEE, DOI: 10.1109/PDP66500.2025.00046

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Date 28/10/2025

PhD student signature

Simona Fioretto

Supervisor signature

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