Mattia Salnitri

Curriculum Vitae – Summary

1. *GENERAL INFORMATION*

DATE OF BIRTH 26/04/1986

EDUCATION

2016 **Ph.D. Degree** in Information and Communication Technology, University of Trento, Italy.

2011 **Master of Science Degree** in Computer Science, University of Trento, Italy (Final Grade 103/110).

2009 **Bachelor of Science Degree** in Computer Science, University of Trento, Italy (Final Grade 99/110).

CAREER

2022 – now **Assistant Professor** (RTD-A) at Politecnico di Milano, Italy

2020 – 2026 **Visiting Researcher** at the University of Bournemouth, UK

2017 – 2021 **Post-Doc Researcher** (Assegnista di Ricerca) at Politecnico di Milano, Italy

2016 – 2017 **Post-Doc Researcher** (Assegnista di Ricerca) at the University of Trento, Italy

2011 – 2016 **Ph.D. Student,** University of Trento, Italy

I am eligible for RTT positions reserved for researchers external to Politecnico di Milano since I attended a Ph.D. course and carried out research activities, on the basis of a formal assignment (excluding free activities), at universities or research institutes, Italian or foreign, other than the Polytechnic of Milan, for more than 36 months.

ITALIAN NATIONAL SCIENTIFIC QUALIFICATION (ABILITAZIONE SCIENTIFICA NAZIONALE)

Type of habilitation	Country	SSD (if Italian habilitation) or topic area	Date of achievement
Associate Professor	Italy	ING-INF/05 (Sett. Conc.:09/H1)	07/07/2023
Associate Professor	Italy	INF/01 (Sett. Conc.:01/B1)	21/07/2023

RESEARCH INTERESTS

- **Secure Socio-technical systems:** cybersecurity, privacy, socio-technical systems, social engineering, business processes modelling, goal modelling.
- **Design of secure systems**: (security) requirement engineering, blockchain.
- **Fog computing:** data movement, computation movement, reinforcement learning, decision systems, adaptive systems.

2. *QUALITY OF SCIENTIFIC AND/OR PROJECT PRODUCTION*

PRODUCTIVITY AND IMPACT METRICS

- **Scientific Productivity: 42** publications (**43** documents on Scopus, **80** co-authors according to Scopus):
  - Author/Co-author of **3** top-ranked **Q1** journal papers based on SCIMAGO
  - Author/Co-author of **14** scientific publications on peer-reviewed conferences (including **2** Top Conference publications);
- **Publication Impact:** Based on Google Scholar: h-index **14** citations **804**

  Based on Scopus: h-index **12** citations **464**

AWARDS AND RECOGNITIONS

2014 Best Paper Award at RCIS Conference

TALKS AND SEMINARS AT NATIONAL AND INTERNATIONAL EVENTS

2021-2023	Moderator at ESPRE
2023	Moderator at SAPD
2023	Invited Talk at Bournemouth University (UK)
2023	Talk at ITADATA (Naples)
2020-2021	Moderator at NeGIS
2020-2021	Moderator at RCIS
2020	Invited Talk at Bournemouth University (UK)
2019	Tutorial at RE (Jeju – South Korea)
2016	Tutorial at RE (Beijing- China)
2018	Talk at RE (Tallin)
2016	Talk at RE (Beijing)
2016	Talk at ISACA (Trento)
2014	Talk at BPMDS (Stockholm)
2015	Talk at CAiSE Forum (Stockholm)
2014	Talk at BPMDS (Thessaloniki)
2014	Talk at IStar (Thessaloniki)
2014	Talk at SHCPS (Bologna)
2012	Talk at CoopIS (Rome)

INSTITUTIONAL RESPONSIBILITIES

2023 – now	**Task Leader** of EU Horizon funded project TEADAL
2021 – now	**Work package leader** of Italian founded project Health Big Data
2016 – 2017	**Co-PI and Work package leader** of EU 2020 funded project PACAS

ORGANIZATION OF SCIENTIFIC MEETINGS

2022	Publicity chair of International Conference on Evaluation and Assessment in Software Engineering (EASE)
2022	Workshop chair, BigDataService Conference
2020-2023	Co-Organizing Chair, International Workshop on Evolving Security & Privacy Requirements Engineering [ESPRE]
2023	Co-Organizing Chair of the first international workshop on Secure, Accountable and Privacy-Preserving Data-Driven Service- Oriented Computing (SAPD). Workshop co-located with ICSOC.
2020-2021	Co-Organizing Chair, NeGIS workshop
2022-2023	Associate Editor, European Conference on Information Systems (ECIS)
2019-2023	Program Committee Member, BPM demo
2021-2022	Program Committee Member, International Conference on Behavioral and Social Computing [BESC]
2020-2021	Program Committee Member, International conference on Research Challenges in Information Science [RCIS]

2020-2021	Program Committee Member, International working conference on Exploring Modeling Methods for Systems Analysis and Development [EMMSAD]
2020-2021	Program Committee Member, International Workshop on Artificial Intelligence and Requirements Engineering [AIRE]
2019	Program Committee Member, Strategic Modeling and Reasoning meets Process Mining Workshop [SMRPM]
2019	Program Committee Member, DAMove-2019 workshop
2018	Program Committee Member, International Workshop on Petri Nets and Software Engineering [PNSE]
2017-2019	Program Committee Member, SECurity and Privacy Requirements Engineering [SECPRE]
2017	Program Committee Member, International Workshop on Requirements Prioritization and Enactment [Priore]
2016 - 2020	Program Committee Member, Federated Conference on Computer science and Information Systems [FedCSIS]
2015	Program Committee Member, Workshop on Methodologies for Robustness Injection into Business Processes [MRI-BP]

PARTICIPATION IN EDITORIAL BOARDS

2019-2022 **Member of review board** of Sensor international journal [SENSOR]

2019-2021 **Associate Editor** of International Journal of Information Security and Privacy [IJISP]

2019-2021 **Member of review board** of International Journal of Information System Modeling and Design [IJISMD]

More details in Section Organization and participations to international conferences

3. TEACHING ACTIVITIES

COURSES WITH A PRIMARY RESPONSIBILITY

Institution name	Course name	Credits	No. of students	Reference Study Course	Time period	Students Evaluation
University of Trento	Security and Privacy in Socio-Technical Systems	3	~10	CSE – PhD Level	AA 2020/2021 2021/2022	High
Politecnico di Milano	Digital technologies 1	5	~250	CSE – Bachelor Level	AA 2019/2020 2020/2021 2021/2022 2022/2023 2023/2024	Medium/High
Politecnico di Milano	Software engineering – final exam - Online	3	~120	CSE – Bachelor Level	AA 2021/2022 2022/2023 2023/2024	N/A

OTHER TEACHING ACTIVITY

Institution name	Course name	Credits	Role	Reference Study Course	Time period	Students Evaluation
Politecnico di Milano	Software Engineering (28 hours/year)	5	Teaching assistant	CSE – Bachelor Level	AA 2018/2019 2019/2020 2020/2021 2021/2022	High
Politecnico di	Software	5	Teaching	CSE – Bachelor	AA	High

Milano	Engineering – prova finale (12 hours/year)		assistant	Level	2018/2019 2019/2020 2020/2021 2021/2022	
Politecnico di Milano	Service and Process Design (8 hours/year)	5	Teaching assistant	CSE – Master Level	AA 2018/2019	High
Politecnico di Milano	Information Systems (Leonardo) (20 hours/year)	5	Teaching assistant	CSE – Bachelor Level	AA 2017/2018, 2018/2019, 2019/2020	High
Politecnico di Milano	Information Systems (Como) (10 hours/year)	5	Teaching assistant	CSE – Bachelor Level	AA 2017/2018, 2018/2019, 2019/2020	High
University of Trento	Organizational Information Systems (42 hours/year)	6	Teaching assistant	CSE – Master Level	AA 2016/2017	High
University of Trento	Software Engineering II (30 hours/year)	12	Teaching assistant	CSE – Bachelor Level	AA 2016/2017	High
University of Trento	Agent Oriented Software Engineering (10 hours/year)	6	Teaching assistant	CSE – Master Level	AA 2012/2013	High

SUPERVISION OF MASTER, DOCTORAL STUDENTS

2022 – present **Advisor** of **6** Master Students in Computer Science, Politecnico di Milano, Italy
2017 – present **Co-advisor** of **6** Master Students in Computer Science, Politecnico di Milano, Italy
2015 – 2017 **Co-advisor** of **3** Master Students in Computer Science, University of Trento, Italy
2015 – 2017 **Co-advisor** of **9** Bachelor Students in Computer Science, University of Trento, Italy

More Details in Section Teaching activities

4. PARTICIPATION/RESPONSIBILITY FOR FUNDED PROJECTS

PARTICIPATION IN COMPETITIVE RESEARCH PROJECTS

Project Acronym	**Time Period**	**Funding Institution**	**Funding Scheme**	**Role of the applicant**	**Budget for the applicant's institution**
TEADAL	2022-2025	EU	Horizon	**Task Leader**	€ 657 500,00
Heath Big Data (HBD)	2021-2031	Ministero della Salute - IT		**Working Group leader** – WG7 Privacy, Cybersecurity and Ethics	Overall funding for 2024: € 300.000
DITAS	2017-2020	EU	H2020	Participant	€ 542 500
PACAS	2016-2017	EU	H2020	**Working Package leader**/Responsible Local Unit	€ 283 950
VisiOn	2016-2017	EU	H2020	Participant	€ 289 375
Aniketos	2011-2014	EU	FP7	Participant	€ 483 546

More Details in Section Research activities

5. TECHNOLOGY TRANSFER

PARTICIPATION OR LEADERSHIP IN INDUSTRY-RELEVANT EXPLOITATION OR STANDARDIZATION INITIATIVES

I have been collaborating with companies from the beginning of my research career. Many of the collaborations of companies resulted in publications. My current position in Politecnico di Milano has a formal collaboration with Almaviva (Italy), which resulted in a publication on a method for the design of green security policies [30] and another paper that is closed to submission.

The collaboration with **ATOS** (Spain) resulted in an extension of a framework I created for the definition of security policies [2], while a collaboration with **Business-E** (now **Maticmind**) (Italy) resulted in multiple publications: (i) about the extension of SecBPMN, a framework I created [2]; (ii) on a requirement engineering methodology [3], (ii) a contribution on an article collection that I edited, on privacy management [1]. A collaboration with DAEM (Greece) and Bambino Gesu' (Hospital, Italy) led to a publication on the empirical evaluation of a privacy platform [7]. I have been also collaborating with the SAP research center (Germany) and wrote collaborative a paper on the automatic enforcement of security properties [26].

DEVELOPMENT OF PRODUCTS / OPEN-SOURCE TOOLS / APPLICATIONS / SYSTEMS / SERVICES

STS-tool: I coordinated a team of two developers for the design and development of STS-Tool (www.sts-tool.eu), a software tool that supports SEBE, the method I designed in my Ph.D. thesis. The software, and the method, have been used in industrial case studies, and extended by other researchers. For further information, please refer to my Ph.D. thesis and papers [35, 28][1].

Security requirement Composition Module (SRCM): I developed a module of a software platform designed for the European project Aniketos[2]. The module has been used as part of the platform and as a standalone service for the secure composition of web services using an extension of BPMN with security requirements. For further information, please refer to papers [2, 37].

Decision System for data and computation Movement (DSM): I developed a module that was integrated in a platform designed for the European project DITAS (https://github.com/DITAS-Project/decision-system-for-data-and-computation-movement). The module has been used as part of the platform, and as a standalone service for the decision of the best data and computation movement in Fog computing. For further information, please refer to papers [15, 17, 19].

6. TWELVE MOST RELEVANT PUBLICATIONS

- Julius Kopke, Giovanni Meroni, *Mattia Salnitri* **Designing Secure Business Processes for Blockchains with SecBPMN2BC**. Future Generation Computer Systems. Vol141, 382-398 (2023) DOI: https://doi.org/10.1016/j.future.2022.11.013
  - Classification of the journal: Q1
  - 18 pages
  - I contributed on the paper with SecBPMN2, that is the language I developed. I define the research method, defined and performed the evaluation of the method. I am the corresponding author.
- Giulia Mangiaracina, Pierluigi Plebani, *Mattia Salnitri*, Monica Vitali. **Efficient Data as a Service in Fog Computing: an Adaptive Multi-agent Based Approach.** IEEE Transactions on Cloud Computing (2022). DOI: https://doi.org/10.1109/TCC.2022.3220811
  - Classification of the journal: Q1
  - 18 pages
  - I contributed on the paper with the formalization of the framework, part of the implementation and the validation. I am the corresponding author.
- Jennifer Horkoff, Fatma Başak Aydemir, Evellin Cardoso, Tong Li, Alejandro Maté, Elda Paja, *Mattia Salnitri*, Luca Piras, John Mylopoulos, Paolo Giorgini. **Goal-Oriented Requirements Engineering An Extended Systematic**

[1] Numbers refer to the full list of my publications that can be found later in the CV
[2] https://cordis.europa.eu/project/id/257930

Mapping Study. Requirement Engineering Journal Vol. 24, 133–160 (2019). DOI: https://doi.org/10.1007/s00766-017-0280-z

- Classification of the journal: Q1
- 28 pages
- I created the data structure for the mapping study. I contributed to the definition of the mapping study process and the definition of the classification method. I also contributed to the classification (mapping) of the selected papers. This publication is relevant since it reports the method and results of an extensive work that is well received by the research community.

- Cinzia Cappiello, Giovanni Meroni, Barbara Pernici, Pierluigi Plebani, *Mattia Salnitri*, Monica Vitali, Diana Trojaniello, Ilio Catallo, Alberto Sanna. **Improving health monitoring with adaptive data movement in Fog Computing.** Frontiers in Robotics and AI, section Sensor Fusion and Machine Perception. Vol 7:96, 2020 DOI: https://doi.org/10.3389/frobt.2020.00096
  - Classification of the journal: Q2
  - 19 pages
  - This paper is based on paper [16]. For this paper, I contributed to the framework sections (sect 5,6) and to the evaluation sections (Sect 7). This publication is relevant since it describes the extension and application of one of my research lines on data and computation movement in Fog computing.
- Qusai Ramadan, Daniel Strüber, *Mattia Salnitri*, Jan Jürjens, Volker Riediger, Steffen Staab. **A Semi-Automated BPMN-based Framework for Detecting Conflicts between Security, Data-Minimization and Fairness Requirements.** Software and Systems Modeling., 2020 DOI: https://doi.org/10.1007/s10270-020-00781-x.
  - Classification of the journal: Q2
  - 37 Pages
  - I was the main contributor to the definition of the modelling language proposed in this paper. I contributed to the identification of privacy concepts and the heuristics for conflict detection, in terms of SecBPMN2-Q patterns. I contributed to the mapping of patterns in Datalog programs. This publication is relevant since it addresses a relevant issue on information systems and privacy management.
- *Mattia Salnitri*, Konstantinos Angelopoulos, Michalis Pavlidis, Vasiliki Diamantopoulou, Haralambos Mouratidis, Paolo Giorgini. **Modeling the Interplay of Security, Privacy and Trust in Sociotechnical Systems: A Computer-Aided Design Approach**. Software and System Modeling, vol. 19, 467–491 (2019). https://doi.org/10.1007/s10270-019-00744-x
  - Classification of the journal: Q2
  - 25 pages
  - I was the creator of the framework, in particular I defined the method and coordinated its application within the case study for its evaluation. I was the main author. This publication is relevant since it presents the integration of one of the modelling languages I defined in my research work, with other security and trust-related modelling languages, for the creation of a comprehensive design method.
- *Mattia Salnitri*, Fabiano Dalpiaz and Paolo Giorgini. **Designing secure business processes with SecBPMN**. Software and Systems Modeling. Vol. 16, 737–757 (2017). DOI: https://doi.org/10.1007/s10270-015-0499-4
  - Classification of the journal: Q2
  - 21 pages
  - I was the creator of the modelling language (SecBPMN), I developed the software tool that supports the language, I evaluated the modelling language and the software tool. I was the main author. This publication is relevant since it depicts a modelling language I created and was used as central contribution in my Ph.D. thesis and as starting point for numerous publications of other researchers.
- Pierluigi Plebani, *Mattia Salnitri*, Monica Vitali. **Fog Computing and Data as a Service: A Goal-Based Modeling Approach to Enable Effective Data Movements**. In Advanced Information Systems Engineering. CAiSE 2018. Lecture Notes in Computer Science, vol 10816, 203-219. Springer, Cham. DOI: https://doi.org/10.1007/978-3-319-91563-0_13 ISBN: 978-3-319-91562-3
  - Class 2
  - 17 pages
  - I contributed to the definition of the framework, especially on the goal-model part. I developed the software tool used to support the framework, I was responsible for the evaluation of the framework. This publication is relevant since it depicts the basis for a “smart” decision system applicable to distributed and highly dynamic environment as Fog computing.

- Mohamad Gharib, *Mattia Salnitri*, Elda Paja, Paolo Giorgini, Haralambos Mouratidis, Michalis Pavlidis, Jose F. Ruiz, Sandra Fernandez, Andrea Della Siria. **Privacy Requirements: Findings and Lessons Learned in Developing a Privacy Platform.** IEEE International Requirements Engineering Conference. RE 256-265 (2016). DOI: https://doi.org/10.1109/RE.2016.13 ISBN: 978-1-5090-4122-0
    - Class 2
    - 10 pages
    - I contributed at the definition of the method, the design of the goal-based diagram and the classification of requirements. This publication is relevant since it lays the basis for future development of privacy-aware design of socio-technical systems.
- Jennifer Horkoff, Fatma Basak Aydemir, Evellin Cardoso, Tong Li, Alejandro Mate, Elda Paja, *Mattia Salnitri*, John Mylopoulos, Paolo Giorgini. **Goal-Oriented Requirements Engineering: A Systematic Literature Map.** IEEE International Requirements Engineering Conference. RE 106-115 (2016). DOI: https://doi.org/10.1109/RE.2016.41 ISBN: 978-1-5090-4122-0
    - Class 2
    - 10 pages
    - I contributed to the definition of the method, and the definition of classifications of publications. I also reviewed part of selected papers and contributed to the application of alignment tests between reviewers. This publication is relevant since it delivers a systematic method for the classification of publications collected and analysed during surveys.
- Michele Cantarutti, Pierluigi Plebani, *Mattia Salnitri*. **Fast Replica of Polyglot Persistence in Microservice Architectures for Fog Computing**. International Conference on Service Oriented Computing. ICSOC 2020. pp 45-55 DOI: https://doi.org/10.1007/978-3-030-65310-1_4 ISBN: 978-3-030-65309-5
    - Class 2
    - 11 pages
    - I contributed to the definition of the framework, I coordinated the development of the software tool used for the evaluation. This publication is relevant since it proposes a framework with a realistic and implementable solution for data movement and alignment for Fog computing.
- Qusai Ramadan, *Mattia Salnitri*, Daniel Strüber, Jan Jürjens and Paolo Giorgini. **From Secure Business Process Modeling to Design-Level Security Verification.** In ACM/IEEE 20th International Conference on Model Driven Engineering Languages and Systems. MODELS. 123-133 (2017). DOI: https://doi.org/10.1109/MODELS.2017.10 ISBN: 978-1-5386-3493-6
    - Class 2
    - 11 pages
    - I was the creator of the modelling language used for the extension proposed in this paper, I contributed at the definition the mapping relations between the procedural language and the UML-based language. This publication is relevant since it reports the details and evaluation of a framework that allows the definition of the architecture of secure Socio-Technical Systems, one of my main research lines.

More Details in Section Full list of publications

7. LIST OF THREE PEERS WHO COULD PROVIDE A REFERENCE LETTER

- Paolo Giorgini, Professor at University of Trento (IT), paolo.giorgini@unitn.it
- Achim Brucker, Professor at University of Exeter (UK), achim@brucker.ch
- Haralambos Mouratidis, Professor at University of Essex (UK), h.mouratidis@essex.ac.uk

RESEARCH STATEMENTs

ON-GOING RESEARCH AND RECENT ACHIEVEMENTS

My research work focuses on the design of Socio-Technical Systems (STSs), i.e., decentralized systems that are composed of autonomous actors, such as people, organizations and technical components, that interact with each other to achieve common objectives. Examples of STSs are smart cities, hospitals and airports. In particular, my research is centered on cybersecurity and privacy and how to deliver secure and privacy preserving Socio-Technical Systems with methods that support experts from the early design stages until the implementation of these systems. This not only includes the analysis of technical aspects, but also human aspects and how cybersecurity and privacy behaviors can be considered in the design of STSs and nudged in the human part of these systems.

For what concerns strictly the technical part of STSs, their architecture can be considered composed by Cloud and IoT resources (also called Edge resources, since they lie at the edge of the network), and a substantial set of resources between these two far ends. These three layers form a continuous of resources, called Fog computing, that can be used to increment the performance of the overall system by moving data near where it is processed or by moving computation near the data it uses. This can improve drastically performances of STSs components, for example by reducing the response time. My research work focuses on the creation of methods that allow to take advantage of the continuous of resources considered in Fog computing by defining and using methods that dynamically allocate, move, duplicate data or computation while keeping them aligned and conflict-free. Below you will find more details on my on-going research work and recent achievements.

Secure Business process engineering

Business processes are an integral part of the design of Socio-Technical Systems since they are used to specify the expected behaviors of people, technical components and organizations in terms of sequences of activities that are executed to achieve shared objectives. Their central role in the design of STSs calls for an additional level of attention when security and privacy aspects are considered. My research work consists in creating methods that support security experts in the design of secure and privacy-compliant business processes, from the early design phases, where the objective of actors involved in the system are defined, through the actual definition of business processes, until their implementation.

In particular, I have proposed in my Ph.D. thesis, a comprehensive framework for the engineering of secure business processes that supports security experts from the specification security requirements from a social point of view, using a goal-based modelling language I contributed to survey [13, 14, 25] and develop. The information specified is then used to automatically generate the structure of a secure business process that can be extended by experts [34]. Such generated processes are defined using a modelling language I created that allows to specify security properties on business processes, called SecBPMN2 [15, 28, 29]. Such business processes are used to generate a skeleton of the implementation that implements security mechanisms that enforce security properties specified at the procedural level [26, 37]. This method, therefore, ensures the enforcement of security requirements in technical components of Socio-Technical Systems.

Business processes can be used to define several aspects of STSs, including contracts (that can be seen as a sequence of mandatory actions to be executed, along with penalties or rewards) between different entities of STSs. I focused on electronic contracts, i.e., contracts human and machine-readable, frequently used in many aspects of STS, called smart contracts. Smart contracts are an extremely relevant asset of STSs and must be designed considering security and privacy aspects. A not secure smart contract may lead to unauthorized access to sensitive information or to security breaches. With this perspective in mind, I created an extension of SecBPMN2, called SecBPMN2BC, that allows the definition of secure smart contracts, leveraging blockchain technology as a security mechanism to enforce part of its security and privacy requirements [9]. The objective of the defined method is twofold: it allows to design of secure smart contracts and it maximises the security and privacy requirements that can be enforced using different blockchain technologies.

Privacy in Socio-technical systems

Privacy is a critical factor for any system that manages data, and Socio-Technical Systems are no exception. Their design is highly influenced by any privacy-related issues since the amount of personal, sensitive and particular data exchanged and stored is very relevant. The definition of methods and frameworks for privacy-aware design and implementation of STSs is, therefore, a priority that became even more urgent with the new global trend of privacy laws, starting with the General Data Privacy Regulation (DGPR). My research work focuses on the privacy-by-design approach of STSs.

I tacked the privacy issue in STSs by extending the framework I created for secure business process engineering, with privacy concepts [1]. The framework was created as the output of the H2020 European project VISION[3], where it was extended by industrial and academic partners and applied to several case studies of large STSs [2, 7, 12, 24].

In my research work, I also faced compliance issues on privacy laws for STSs, in particular, I collaborated on the creation of a framework for the specification and compliance management of consent, as defined by the GDPR. The research work builds on top of the SecBPMN2 language and method I defined, by adding compliance specific concepts and analysis [18, 21]. On a similar line, I also worked on a more ethical perspective of security by addressing a topic that is becoming more and more relevant with new data mining and artificial intelligence techniques: data minimization and fairness. In particular, I focused on the detection of conflicts between these two properties and other common privacy requirements [10, 20].

Data movement in fog computing

Considering Fog computing as the backbone of resources of STSs opens new possibilities to improve the performance of technical components. The continuous of resources between Edge and Cloud computing allows for the movement of data and/or computation, to move closer to the data needed by data consumers or vice-versa. The decision of where and which part of data to move depends on the status and configuration of the Fog computing, which is highly dynamic, and on the requirements of all data consumers that need the data. “Wrong” movements may clog the STSs network and/or prevent many data consumers from accessing data with reasonable performance. My research work consists in enabling data and computation movement in fog computing [16] and creating “smart” decision systems. Such systems monitor Fog computing, detect violations of performance requirements of data consumers and react by moving data in the “best” fog computing resource. Currently, I defined a centralized [17] and distributed [8] decision systems.

SHORT-TO-MID-TERM RESEARCH DIRECTIONS (UP TO 5 YEARS)

Socio-technical systems and the needs of their stakeholders are rapidly evolving: their design process needs to include aspects that were not considered a few years ago. In particular, the inclusion of people, as active components that form STSs, from the early design phases of STSs brings several security and privacy strategic advantages in terms of design choices.

When considering the security and privacy of Socio-Technical Systems, impacts on different design aspects must be considered. Many security requirements have a considerable impact on the amount of energy used and, therefore, a cost in terms of environmental impacts. Every cyber security measure, starting from encryption, adds a layer of computation that, inevitably adds energy consumption and, therefore, increases the carbon footprint of the system. The environment is, today, a very precious resource that we cannot waste, and it needs to be considered and preserved reducing the carbon footprint of every technology. The fast spread of STSs and security-related issues calls for immediate action to design systems that minimize environmental impact while preserving their security and privacy.

Below you will find more details on my short-term research directions.

Socio-technical engineering: behavioral requirements in socio-technical systems

Unlike technical systems, people are considered in Socio-Technical Systems as active components that contribute to the services used and offered by these systems. The human part has always been considered during the latest phases of the design, or even later, after the system had been deployed. This is especially critical when considering security since people, unfortunately, are the weak part of the security chain: too many security breaches happen because of human errors. Approaches, such as serious games and gamification, are used to correct the security-critical behaviors of people (e.g., from writing passwords in post-its, to falling into social engineering attacks). Yet, their efficacy is limited because bad habits are frequently already established in deployed STSs, and the characteristics of people and (organizational) culture are not specified by design.

My research line, on this topic, consists of exploring and defining how to include human characteristics in the design of socio-technical systems, reshaping system engineering processes into socio-technical engineering one. In particular, I am collaborating with the Engineering and Social Informatics Research Group (ESOTICS) at Bournemouth University (UK) to consider cultural dimensions as factors that impact security critical behaviors,

[3] https://cordis.europa.eu/project/id/653642

and how to include them right from the design of STSs. This is the first step towards methods that will include human characteristics for the design of more secure STSs.

Energy efficiency and security

Energy efficiency is a change driver and the focus of many communities such as the European Union and the USA. The reduction of energy used is, therefore, a priority for all systems, including STSs where there is a considerable margin of improvement. This is particularly true when considering security enforcement mechanisms, that add outstanding computational complexity and therefore heavily impact the amount of overall energy used by STSs. This issue is magnified by the size of STSs that may comprehend thousands of autonomous components, in systems such as airports or hospitals, to hundreds of thousands of components and even more, in systems such as smart cities. For example, the selection of the type of blockchain technology has a huge energy-consumption impact. The decision of which security mechanisms to implement and the analyses of the tradeoff between security and energy consumption are critical and extremely complex. It must consider factors such as security requirements, security strategies, risk management, the context of deployment of STSs, and so on.

My research line consists of creating innovative solutions and methods to design secure and energy-efficient socio-technical systems. The collaboration with the industry is a key factor for the success and adoption of these solutions, therefore, especially for this research line, I keep close ties with the enterprise world, which generates frequent research collaborations on this topic. Currently, I'm collaborating with a relevant Italian industrial player, to define a method for the definition of energy-aware security policies. The objective of the method consists in defining security policies that minimize the energy consumption of the security strategy of a STS, while maintaining the level of security and risk desired.

TEACHING STATEMENT

SHORT-TO-MID-TERM TEACHING PLAN (UP TO 5 YEARS)

During my academy career, I taught university and master courses, as a primary lecturer and as a Teaching Assistant (TA). I have been involved mainly in information systems, software engineering and security-related courses.

I am the primary lecturer of a Ph.D. level course I called "Security and Privacy in Socio-Technical Systems" organized at the University of Trento, where I introduce to students, security and privacy approaches to Socio-Technical Systems (STSs), both from the technical and social (human) perspectives. The course covers the design of STSs facing different aspects and design problems of security and privacy, including socio-organizational and procedural analyses and examples of security mechanisms such as blockchain. Being this a Ph.D. course, I am focused on giving students an introduction to the security and privacy field using a research perspective, providing them with a conceptual map of the most important concepts. The objective of the course is twofold: it aims to introduce privacy and security, and it aims to guide students in cross-disciplinarity research work. Indeed, the assessment of the course consists of writing a research proposal that considers one of the arguments explored during the course and applying research arguments/fields of the students. The exam consists of one round of a peer review process where I review the research proposals and give feedback to the students. This type of assessment triggers Ph.D. students to think laterally and view possible collaborations out of their research comfort zone. Indeed, I have received very positive evaluations from the students both for the teaching approach and the type of assessment. Given the positive feedback, I am planning to continue giving this course at the University of Trento and proposing it at Politecnico di Milano.

I am the primary lecturer of "Digital Technology 1" course, taught at BSc students at Politecnico di Milano. This course introduces students to information systems approach, lifecycle, and technologies. During the course, I introduce students to database theory with exercises on the design of logical and conceptual modelling and on SQL language. The objective of this course is to give students a conceptual map they can use to easily retrieve notions on information systems after they graduate. I also give students contextual information on the history and the rationale behind the most important concepts to avoid giving them dry notions. The course received positive evaluations, and I plan to continue giving the course for the years to come. The content of the course is not static and every year, along with my colleagues we adapt the content of the course based on the feedback of the students and the new available technologies and solutions.

In general, I avoid giving a course based on factual knowledge, but I rather structure my course to give students conceptual tools and methods that they will use in the context of the course or for other disciplines. My courses give students a conceptual map of the research filed/sector, which is necessary, in the era of the internet, search engines and generative AI, to find the right piece of knowledge. Depending on the level of the course, I push students to a critical thinking of the information they receive. My lessons, where possible, are highly interactive: I stimulate the discussion with short exercises or controversial arguments.

During my career, I was a TA for courses similar to “Digital Technologies 1” both at the University of Trento and Politecnico di Milano, where I focused on teaching information systems and BPMN, BOAT and ArchiMate modelling languages. In these courses, especially the ones where I taught modelling languages, I focused on stimulating the critical thinking of students, where I encouraged students to discuss solutions proposed and evaluate their positive and negative aspects.

I was a TA of “Software Engineering”, a BSc course at Politecnico di Milano, where I taught students the basics of object-oriented coding, developing patterns and contract programming. The programming language used was Java. This is a key course for bachelor students since it delivers concepts and methods fundamental for the career of developers. In this course, I explained how to apply the theoretical concepts in practical cases, from the basic Java instructions to the application of object-oriented approaches to follow the most known design patterns.

In the next years, I would like to teach courses on software engineering, security, privacy, and information systems. For MSc students, I would like to give courses for the design of socio-technical systems, that include human-related aspects, as described in the research statement. This is to increase the awareness of future designers and developers on security and privacy and how they can be faced considering non-technical aspects and using technical aspects to support them. For BSc students, I would like to teach courses on security and privacy in information systems. Recently, I proposed a course on data and information security by design, for the MSc of computer science at Politecnico di Milano. The proposal for the course is under revision.

Mattia Salnitri

Curriculum Vitae

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ACADEMIC POSITIONS

Research Fellow

Politecnico di Milano – Milan (Italy) January 2022 - Current

I collaborate with the Information System group of the Department of Electronic, Computer Science and Bioengineering (DEIB). My research work is on security and privacy, in particular my current research focuses on how to reduce energy consumption of security measures and how to use blockchain as a security mechanism. I am participating in a European founded project called Health Big Data (https://www.alleanzacontroilcancro.it/en/progetti/health-big-data/) as a work package leader for security, privacy and ethics.

Postdoctoral Research Fellow

Politecnico di Milano – Milan (Italy) September 2017 - 2021

I collaborated with the Information System group of the department of Electronic, Computer science and Bioengineering (DEIB). I focused my research work on the definition of methods for the automated decision of data movement strategies in fog computing. I participated in a European founded project called DITAS (https://cordis.europa.eu/project/id/731945).

Visiting Research Fellow

University of Bournemouth – Bournemouth (United Kingdom) June 2020 - June 2023

I collaborate with the Engineering and Social Informatics Research Group (ESOTICS) of the Department of Computing & Informatics. The research work consists in defining a new paradigm for the design of socio-technical systems that encompasses people as main actors and not as mere users, shifting from a classical software engineering approach to socio-technical engineering.

Postdoctoral Research Fellow

University of Trento – Trento (Italy) May 2016 – September 2017

I collaborated with researchers, both from industries and academia, on research topics related to privacy and security in complex socio-technical systems. In particular, I was focused on the assessment of privacy and security requirement in business processes.

Ph.D. Candidate

University of Trento – Trento (Italy) September 2011 – April 2016

I focused my research on the engineering of secure business processes. In particular, I worked on the automated generation of business processes from goal-based modelling languages and how to enforce security requirements in the business processes and in the implementation that can be derived from them.

RESEARCH ACTIVITIES

Participation in founded projects

- **TEADAL**(https://cordis.europa.eu/project/id/101070186). The ambition of TEADAL is to provide key cornerstone technologies to create stretched data lakes spanning the cloud-edge continuum and multi-cloud, providing privacy, confidentiality, and energy-efficient data management. The TEADAL data lake technologies will enable trusted, verifiable and energy-efficient data flows, both in a stretched data lake and across a trustworthy mediatorless federation of them, based on a shared approach for defining,

enforcing, and tracking privacy/confidentiality requirements balanced with the need for energy reduction.

- **Health Big Data** (https://www.alleanzacontroilcancro.it/en/progetti/health-big-data/). A ten-year project (2019-2029), funded by the Ministry of Economic and Finance (MEF) and coordinated by the Ministry of Health. It involves 51 IRCCS belonging to the Networks Alliance Against Cancer, Neuroscience and Neurorehabilitation and Cardiology managed by the three Networks in collaboration with the Politecnico of Milan. Its objective consists in creating a federated data lake that allows the sharing of clinical data trials, for evidence-based medicine.
- **DITAS** (https://cordis.europa.eu/project/id/731945). **Data-intensive** application improvement by moving data and computation in mixed cloud/fog environment (2017- 2020). I collaborated with the consortium to define an automated framework for the decision of the adaptation mechanism to enact to maximize the requirements of users.
- **PACAS** (https://cordis.europa.eu/project/id/699306). Participatory Architectural Change Management in ATM Systems (2016 - 2017). I coordinated a work package to create a platform for helping decision makers to understand the impact of changes from different perspectives in Air Traffic Management (ATM) systems.
- **VisiOn** (https://cordis.europa.eu/project/id/653642). Increase citizen awareness of privacy (2016 - 2017). I coordinated a work package to create a framework for the design of complex socio-technical systems aligned with privacy requirements define by their stakeholders.
- **Aniketos** (https://cordis.europa.eu/project/id/257930). Ensuring trustworthiness and security in service compositions (2011- 2014). I collaborated with the partners of the Aniketos consortium to create a framework for the automated verification of security policies in business processes.
- **Lucretius** (https://cordis.europa.eu/project/id/267856). Foundation for software evolution (2011- 2015). I collaborated with other researchers of the Software Engineering group at the University of Trento, to define a framework for designing secure business processes for socio-technical systems.

Research collaborations

- Prof Julius Köpke of **University of Klagenfurt**, Austria, Dr. Giovanni Meroni of **Politecnico di Milano**, Italy: joint research work on enforcement of security requirements specified in business processes using blockchain technology. [9]
- Prof, John McAlaney, Amanda Brockinton of **University of Bournemouth**, United Kingdom: joint research work for the enforcement of security and privacy requirements using psychology.
- Pierluigi Plebani, Monica Vitali of **Politecnico di Milano**, Italy: joint research work in the field of data and computation movement in fog computing [8,16,17,19].
- Chiara Criscuolo, Tommaso Dolci: joint research work on assessing bias in machine learning techniques [31].
- Prof. Jennifer Horkoff **University of Gothenburg Chalmers**, Sweden, Prof. Fatma Başak Aydemir **Bogazici University**, Turkey, Dr. Evellin Cardoso, **Free University of Bozen-Bolzano**, Italy, Prof. Tong Li **Beijing University of Technology**, China, Prof. Alejandro Maté **University of Alicante**, Spain, Prof Elda Paja **IT University of Copenhagen**, Denmark, Luca Piras **University of Brighton**, United Kingdom, John Mylopoulos, **University of Ottawa**, Canada, Paolo Giorgini **University of Trento**, Italy: joint research work on systematic literature review of goal models. [13,14, 25, 27].
- Prof. Nicola Zannone, Mahdi Alizadeh **Eindhoven University of Technology**, Netherlands: joint research work in the field of identification of security-critical execution of business processes [32].
- Prof Haralambos Mouratidis, Prof Michalis Pavlidis, **University of Brighton**, United Kingdom and Vasiliki Diamantopoulou of **University of the Aegean,** Greece: joint research on the field of privacy assessment in large socio-technical systems [1,3,12,23].
- Prof. Jan Jürjens, Qusai Ramadan **University of Koblenz-Landau**, Germany and Daniel Strüber of **Chalmers University of technology**, Sweden: joint research in the field of privacy [1,5,6,11,20,21].
- Prof. Achim Bruker – **The University of Sheffield**, UK: joint research in the field of enforcement of security and privacy requirements [24].
- Prof. Paolo Giorgini, Elda Paja, Marco Robol **University of Trento**, Italy: joint research work in the field of privacy and security assessment of business processes and goal models [1,4,15,18,21,24,29,34,35,36,37,38].

ORGANIZATION AND PARTICIPATIONS TO INTERNATIONAL CONFERENCES

Events organized (Organizing committee)

- **Workshop chair** of the Eight IEEE international conference on big data computing service and machine learning applications (BigDataService) 2022
- **Publicity chair** of International Conference on Evaluation and Assessment in Software Engineering (EASE) 2022
- **Associate editor** for the Track Data Management and Data sharing in ecosystems of the 31st (2023) and 32nd (2024) European Conference on Information Systems (ECIS)
- **Co-chair** of the First (2023) international workshop on Secure, Accountable and Privacy-Preserving Data-Driven Service- Oriented Computing (SAPD). Workshop co-located with ICSOC.
- **Co-chair** of IEEE Eighth (2021), Ninth (2022) and Tenth (2023) International Workshop on Evolving Security & Privacy Requirements Engineering (ESPRE). Workshop co-located with RE.
- **Co-chair** of first (2020) and Second (2021) workshop on Next Generation Information Systems: Modeling, Monitoring and Management in Cloud and Fog Computing (NeGIS[4]). Workshop co-located with CAiSE.

Invited talks

- **Bournemouth University** 2023 (Bournemouth – United Kingdom) (Seminar). Title: Socio-technical security: a security-by-design approach to socio-technical systems.
- **Bournemouth University** 2020 (Bournemouth – United Kingdom) (Seminar). Title: Secure Business Process Engineering: a Socio-technical Approach.

Tutorial organized in international conferences

- **RE 2019** (Jeju – South Korea). Title: Strategies for data and computation movements in fog computing
- **RE 2016** (Beijing- China). Title: Security Requirement Engineering

Talks in international conferences

- **ITADATA 2023** (Naples) Title: Data Management in Information Systems: Experience and Challenges from Preparing and Sharing Large Datasets.
- **CAiSE 2023** (Zaragoza) Title: Towards Designing Energy-Aware Cybersecurity Policies.
- **CAiSE 2018** (Tallin) Title: Fog Computing and Data as a Service: A Goal-Based Modeling Approach to Enable Effective Data Movements.
- **RE 2016** (Beijing). Title: Privacy Requirements: Findings and Lessons Learned in Developing a Privacy Platform.
- **ISACA 2016** (Trento). Title: Security and Privacy: a Risk Management Tool
- **BPMDS 2015** (Stockholm). Title: From Secure Business Process Models to Secure Artifact-Centric Specifications
- **CAISE Forum 2015** (Stockholm). Title: STS-Tool 3.0: Maintaining Security in Socio-Technical Systems
- **BPMDS 2014** (Thessaloniki). Title: Modeling and Verifying Security Policies in Business Processes
- **IStar 2014** (Thessaloniki). Title: Transforming Socio-Technical Security Requirements in SecBPMN Security Policies
- **SHCPS 2014** (Bologna). Title: Modeling and Verification of ATM Security Policies with SecBPMN
- **CooPIS 2012** (Rome). Title: Aligning Service- Oriented Architectures with Security Requirements

Associate Editor

- 2019-2023 International Journal of Information Security and Privacy [IJISP]

Member of review board

- 2019-2023 Sensor international journal [SENSOR]
- 2019-2023 International Journal of Information System Modeling and Design [IJISMD]

Session Chair Service

[4] https://www.negis.polimi.it

- 2020-2021 International Conference on Research Challenges in Information Science [RCIS]

Program Committee Service

- 2023 European Conference on Information Systems (ECIS)
- 2022 International BCS Human-Computer Interaction conference (BCS HCI)
- 2023 International Conference on Evaluation and Assessment in Software Engineering [EASE]
- 2019-2023 International Conference on Business Process Management [BPM] Demo session
- 2021-2023 IEEE international Requirements Engineering Conference [RE] – RE Workshop
- 2022 IEEE International Conference on JointCloud Computing [IEEE JCC]
- 2022 International Conference on Behavioral and Social Computing [BESC]
- 2020-2021 International conference on Research Challenges in Information Science [RCIS]
- 2020-2021 International working conference on Exploring Modeling Methods for Systems Analysis and Development [EMMSAD]
- 2020-2021 International Workshop on Artificial Intelligence and Requirements Engineering [AIRE]
- 2020-2021 International Workshop on Evolving Security & Privacy Requirements Engineering [ESPRE]
- 2019 Strategic Modeling and Reasoning meets Process Mining Workshop [SMRPM]
- 2019 DAMove-2019 workshop
- 2018 International Workshop on Petri Nets and Software Engineering [PNSE]
- 2017-2019 SECurity and Privacy Requirements Engineering [SECPRE]
- 2017 International Workshop on Requirements Prioritization and Enactment [Priore]
- 2016 - 2019 Federated Conference on Computer science and Information Systems [FedCSIS]
- 2015 Workshop on Methodologies for Robustness Injection into Business Processes [MRI-BP]

Reviewer service for international journal and conferences

- 2017-2024 Business & Information Systems Engineering [BISE] Journal
- 2023 Data & Knowledge Engineering [DKE] (Elsevier)
- 2023 Communication magazine (IEEE)
- 2023 Connection science (Taylor and Francis AS)
- 2023 International Journal on Applied Science
- 2022 Information Sciences (Elsevier)
- 2021-2023 Transaction on Service computing [TSC] (IEEE)
- 2017-2023 International Journal of Information Security and Privacy [IJISP] Journal
- 2017-2022 Journal of Systems and Software [JSS] Journal (Elsevier)
- 2021-2022 International conference on conceptual modeling [ER] – Poster and demo
- 2020-2022 Requirements Engineering Journal [REJ] (Springer)
- 2020-2022 Sensors International Journal
- 2021 Security and Privacy Journal (IEEE)
- 2021 European Conference on Information Systems [ECIS]
- 2021 International Conference on Extending Database Technology [EDBT]
- 2021 International Journal of Cooperative Information Systems [IJCIS] (World Scientific)
- 2021 International Journal on Software and System Modeling [SoSyM] (Springer)
- 2021 Journal on Data Semantic [JODS] (SPringer)
- 2021 European Conference in Information Systems [ECIS]
- 2020 international Requirements Engineering Conference [RE] – RE Artifact (IEEE)
- 2019-2020 Technology in Society Journal [TIS]
- 2019 IEEE Access Journal
- 2019 IEEE Computer Journal [Comp.J.]
- 2019 Journal of Web Engineering [JWE]
- 2019 Sustainability Journal
- 2019 Social and New Technology Challenges of Sustainable Business
- 2018-2021 International Conference on Lean and Agile Software Development [LASD]
- 2018 Journal of Software: Evolution and Process [JSME]
- 2018 International Conference on Sensor Networks and Signal Processing [SNSP]
- 2015-2016 International Conference on Advanced Information Systems Engineering [CAiSE]
- 2016 Conference on Cooperative Information Systems [CoopIS]
- 2016 International Conference on Conceptual Modelling [ER]
- 2014-2016 International Conference on Research Challenges in Information Science [RCIS]

- 2016 International Conference On Trust, Security And Privacy In Computing And Communications [TrustCom]
- 2015 International Workshop on Requirements Engineering and Law [RELAW]
- 2015 Security and Privacy (IEEE magazine)
- 2015 International conference on Service Oriented Computing and Applications [SOCA]
- 2014 International Conference on Service-Oriented Computing [ICSOC]
- 2014 Transaction on software engineering
- 2013-2014 IStar workshop

VISITING PERIODS

Bournemouth University, Bournemouth (UK) — June 2023 (1 Week)

I visited the Department of Computing and Informatics where I gave seminars on my research work. I focused on continuing the collaboration with researchers in the department I visited, with particular attention on the research work for the design of secure socio-technical systems using cultural and organizational aspects.

Bournemouth University, Bournemouth (UK) — February 2020 (2 Weeks)

I visited the Department of Computing and Informatics where I gave seminars and bootstrap a collaboration on the enforcement of security and privacy requirements using psychology. The period led to a position of a visiting research fellow.

SAP Research Center, Karlsruhe (DE) — October 2014 (1 month)

I collaborated with security experts for the creation of a framework for the generation of part of the implementation code from secure business process diagrams. With this experience, I increased my knowledge of business processes and script languages for business artefacts.

Imperial College London, London (UK) — September – October 2013 (2 months)

I worked with researchers and other Ph.D. students for the automated generation of policies for a policy enforcement point (PEP). The collaboration with researchers of the Imperial College allowed me to learn other research methods and to study formal frameworks and PEP languages.

Bournemouth University, Bournemouth (UK) — August 2012 (1 month)

I collaborated with researchers on the definition of the generation of business processes from social and organizational aspects of complex socio-technical systems. With this experience, I deepen my knowledge on goal-based modelling languages and research methods.

TEACHING ACTIVITIES

Ph.D. Courses

- **Security and Privacy in Socio-Technical Systems** (University of Trento - Italy, 2020/2021-2021/2022). I organized and I gave all lectures of a Ph.D. course of 20 hours at the ICT Doctoral School of University of Trento.

Tutorials

- **Strategies for data and computation movements in fog computing** (Jeju-Republic of South Korea, 24/06/2019). I co-organized and presented a 3 hours tutorial during RE19 conference.
- **Security Requirement engineering** (Beijing-China, 13/09/2016). I co-organized and co-presented a 6 hours tutorial during RE16 conference.

Lecturer at Politecnico di Milano

- **Digital Technologies** (5 CFU), 2019/2020, 2020/2021, 2021/2022, 2022/2023
- **Software engineering – Final exam – Online** (3 CFU), 2021/2022, 2022/2023

Teaching for professional audience

- **IT solution Architect** CEFRIEL (2nd level master), 2023
  - "Virtualization, Containers, Serverless technologies" module
- **Infrastructure Enterprise** CEFRIEL (2nd level master), 2023
  - "Virtualization, Containers, Serverless technologies" module

- **Cloud data architecture** CEFRIEL (2nd level master), 2020, 2021, 2022, 2023, 2024
    - "Cloud and service provider" module
    - "Cloud technologies" module
- **Digital platform technologies** CEFRIEL (2nd level master), 2021, 2023
    - "Requirement engineering" module

Teaching assistant at Politecnico di Milano

- **Software Engineering – prova finale** 12 hours, Prof. Pierluigi San Pietro (2018/2019, 2019/2020, 2020/2021).
- **Software Engineering** 28 hours, Prof. Pierluigi San Pietro (2018/2019, 2019/2020, 2020/2021).
- **Service and Process Design** 8 hours, Prof. Pierluigi Plebani (2018/2019)
- **Information Systems** 20 hours, Prof. Pierluigi Plebani (2017/2018, 2018/2019, 2019/2020).
- **Information Systems** 20 hours, Monica Vitali (2017/2018, 2018/2019, 2019/2020).

Teaching assistant at University of Trento

- **Organizational Information Systems** 42 hours, Prof. Paolo Giorgini (2016/2017).
- **Software Engineering II** 30 hours, Prof. Fabio Casati (2016/2017).
- **Organizational Information Systems** 8 hours, Prof. Elda Paja (2014/2015, 2015/2016).
- **Agent Oriented Software Engineering** 10 hours, Prof. Paolo Giorgini (2012/2013).

Thesis supervision

- Giacomo Maria Guarneri (2023) MSc computer science – Energy and risk-aware design of security policies
- Alessandro di Renzo (2023) MSc computer science – From business process to Corda R3: enforcing privity and security of smart contracts
- Fabiana Iuliano (2023) MSc computer science – A model-driven approach for secure smart contracts in Corda R3
- Tecla Perenze (2023) MSc computer science – Enforcing Security Requirements in Smart Contracts: A Decision-Making Framework
- Marco Antonioli (2023) BSc computer science – Metodologia MDE per sviluppo di estensioni Business Central
- Federico Migliosi (2022) MSc computer science – Security analyses of information management in business processes

Thesis co-supervision

- Giacomo Gumiero (2024, expected) MSc computer science - TBD
- Diego Caronni (2023) MSc computer science – A framework to manage access control policies in federated Data Mesh
- Antonio castronuovo (2022) MSc computer science - A Data Value Driven Framework to Reduce the Data Storage Energy Consumption
- Giulia Mangiarcina (2020) MSc computer science - An Adaptive Multi-Agent Based Approach to Improve DaaS in Fog Computing
- Michele Cantarutti (2019) MSc computer science – Politecnico di Milano. *Improving relational database replication with GlusterFS in fog environments.*
- Alessandro Mandelli (2019) MSc computer science – Politecnico di Milano. *Analysis of data movement and computation movement with Spark for fog environments*
- Michele Grisafi (2018) BSc computer science – University of Trento. *Predizione di errori in Business Processes – Utilizzo della history log e del machine learning per una predizione efficace.*
- Roberto Passatempi (2017) BSc computer science – University of Trento. *Analisi del rischio: il passaggio da un modello socio-organizzativo ad un modello tecnico-procedurale*
- Luca Rospocher (2017) BsC computer science – University of Trento. *Risk Analysis of Socio-Technical Systems*
- Giovanni Rafael Vuolo (2017) BSc computer science – University of Trento. *Security and Risk Analysis in Business Processes: an extension of the SecBPMN2 Tool with CORAS methodology*
- Giovanni Maria Riva (2017) BSc computer science – University of Trento. *Definizione e analisi di meta-policy per la verifica automatizzata della compliance di business process*

- Daniele Giovanella (2017) BSc computer science – University of Trento. *Verifica della gestione del consenso: identificazione delle deviazioni di esecuzione di processi tramite log*
- Nicola Gilberti (2017) BSc computer science – University of Trento. *Il trattamento dei dati personali nei social network: applicazione del metodo STS al caso Facebook*
- Enrico Testori (2016) BSc computer science – University of Trento. *Scaling dinamico di microservizi*
- Marco Robol (2016) MSc computer science – University of Trento. *An Implicit Negotiation Approach for a Multi-Agent Simulation of Human-Like Coordination Mechanisms*
- Andrea Cristiano (2016) BsC computer science – University of Trento. *Privacy and Social Networks*
- Muluken Demis Ashagrie (2015) MSc computer science – University of Trento. *Enforcement of social/organizational security requirements: an air traffic management case study*
- Brian Kimose (2015) MSc computer science – University of Trento. *Modeling and analyzing ISO/IEC 27002 Standard with STS and SecBPMN2 frameworks*

FULL LIST OF PUBLICATIONS

Book

1. *Salnitri Mattia*, Jan Jürjens, Haralambos Mouratidis, Loredana Mancini, Paolo Giorgini. **Visual Privacy Management: Design and Applications of a Privacy-Enabling Platform**. Springer. 2020 https://doi.org/10.1007/978-3-030-59944-7

Book chapters

2. Erkuden Rios, Francesco Malmignati, Eider Iturbe, Michela D'Errico and *Mattia Salnitri* **From Consumer Requirements to Policies in Secure Services**. In Secure and Trustworthy Service Composition: The Aniketos approach. Pages 79 - 94, 2014. DOI: https://doi.org/10.1007/978-3-319-13518-2_6 ISBN: 978-3-319-13517-5
3. Praitano Andrea, Giovannetti Luca, Diamantopoulou Vasiliki, *Salnitri Mattia* **An introduction to privacy.** In Visual Privacy Management: Design and Applications of a Privacy-Enabling Platform. Pages 1-21, 2020. Springer. DOI: https://doi.org/10.1007/978-3-030-59944-7_1 (chapter of Book [1])
4. Gharib Mohamad, Giorgini Paolo, *Salnitri Mattia*, Paja Elda, Mouratidis Haris, Pavlidis Michalis, Ruiz Jose **A holistic approach for privacy requirements analysis: An industrial case study.** In Visual Privacy Management: Design and Applications of a Privacy-Enabling Platform. Pages 22-53, 2020. Springer. DOI: https://doi.org/ 10.1007/978-3-030-59944-7_2 (chapter of Book [1])
5. Ahmadian Shayan, Peldszus Sven, Jürjens Jan, *Salnitri Mattia*, Giorgini Paolo, Mouratidis Haris, Ruiz Jose **The Architecture of VisiOn privacy platform.** In Visual Privacy Management: Design and Applications of a Privacy-Enabling Platform. Pages 22-53, 2020. Springer. DOI: https://doi.org/10.1007/978-3-030-59944-7_3 (chapter of Book [1])
6. Peldszus Sven, Ahmadian Shayan, *Salnitri Mattia*, Jürjens Jan, Pavlidis Michalis, Mouratidis Haris **Visual privacy management.** In Visual Privacy Management: Design and Applications of a Privacy-Enabling Platform. Pages 109-148, 2020. Springer. DOI: https://doi.org/ 10.1007/978-3-030-59944-7_4 (chapter of Book [1])
7. Bonutto Dimitri, Christantoni Ilia, Kosmidis Dimitris, Micucci Franco, *Salnitri Mattia* **Empirical evaluation of the visiOn privacy platform.** In Visual Privacy Management: Design and Applications of a Privacy-Enabling Platform. Pages 109-148, 2020. Springer. DOI: https://doi.org/ 10.1007/978-3-030-59944-7_5 (chapter of Book [1])

International journals

8. Giulia Mangiaracina, Pierluigi Plebani, *Mattia Salnitri*, Monica Vitali. **Efficient Data as a Service in Fog Computing: An Adaptive Multi-Agent Based Approach**. IEEE Transactions on Cloud Computing (2022). DOI: https://doi.org/10.1109/TCC.2022.3220811
9. Julius Kopke, Giovanni Meroni, *Mattia Salnitri* **Designing Secure Business Processes for Blockchains with SecBPMN2BC**. Future Generation Computer Systems. Vol141, 382-398 (2023) DOI: https://doi.org/10.1016/j.future.2022.11.013
10. Cinzia Cappiello, Giovanni Meroni, Barbara Pernici, Pierluigi Plebani, *Mattia Salnitri*, Monica Vitali, Diana Trojaniello, Ilio Catallo, Alberto Sanna. **Improving health monitoring with adaptive data movement in Fog Computing.** Frontiers in Robotics and AI, section Sensor Fusion and Machine Perception. Vol 7:96, 2020 DOI: https://doi.org/10.3389/frobt.2020.00096

11. Qusai Ramadan, Daniel Strüber, *Mattia Salnitri*, Jan Jürjens, Volker Riediger, Steffen Staab. **A Semi-Automated BPMN-based Framework for Detecting Conflicts between Security, Data-Minimization and Fairness Requirements.** Software and Systems Modeling., 2020 DOI: https://doi.org/10.1007/s10270-020-00781-x.
12. *Mattia Salnitri*, Konstantinos Angelopoulos, Michalis Pavlidis, Vasiliki Diamantopoulou, Haralambos Mouratidis, Paolo Giorgini. **Modeling the Interplay of Security, Privacy and Trust in Sociotechnical Systems: A Computer-Aided Design Approach**. Software and System modelling, vol. 19, 467–491 (2020). https://doi.org/10.1007/s10270-019-00744-x
13. Jennifer Horkoff, Fatma Başak Aydemir, Evellin Cardoso, Tong Li, Alejandro Maté, Elda Paja, *Mattia Salnitri*, Luca Piras, John Mylopoulos, Paolo Giorgini. **Goal-Oriented Requirements Engineering An Extended Systematic Mapping Study.** Requirement Engineering Journal Vol. 24, 133–160 (2019). DOI: https://doi.org/10.1007/s00766-017-0280-z
14. Jennifer Horkoff, Tong Li, Feng-Lin Li, *Mattia Salnitri*, Evellin Cardoso, Paolo Giorgini and John Mylopoulos. **Using goal models down-stream: A systematic roadmap and literature review**. International Journal of Information System Modeling and Design. Vol 6(2), 1 – 42 (2015). DOI: https://doi.org/10.4018/IJISMD.2015040101 ISSN: 1947-8186
15. *Mattia Salnitri*, Fabiano Dalpiaz and Paolo Giorgini. **Designing secure business processes with SecBPMN**. Software & Systems Modeling. Vol. 16, 737–757 (2017). DOI: https://doi.org/10.1007/s10270-015-0499-4

International conferences

16. Michele Cantarutti, Pierluigi Plebani, *Mattia Salnitri*. **Fast Replica of Polyglot Persistence in Microservice Architectures for Fog Computing**. International Conference on Service Oriented Computing. ICSOC 2020. DOI: https://doi.org/10.1007/978-3-030-65310-1_4 ISBN: 978-3-030-65309-5
17. Plebani Pierluigi, *Salnitri Mattia*, Vitali Monica. **Strategies for data and computation movements in fog computing**. IEEE International Requirements Engineering Conference. RE 506-507 (2019). DOI: https://doi.org/10.1109/RE.2019.00077 ISBN: 978-172813912-8
18. Marco Robol, Elda Paja, *Mattia Salnitri*, and Paolo Giorgini **Modeling and reasoning about privacy-consent requirements.** The Practice of Enterprise Modeling. PoEM 2018. Lecture Notes in Business Information Processing, vol 335. Springer, Cham. DOI: https://doi.org/10.1007/978-3-030-02302-7_15 ISBN: 978-3-030-02301-0
19. Pierluigi Plebani, *Mattia Salnitri*, Monica Vitali. **Fog Computing and Data as a Service: A Goal-Based Modeling Approach to Enable Effective Data Movements**. In Advanced Information Systems Engineering. CAiSE 2018. Lecture Notes in Computer Science, vol 10816. Springer, Cham. DOI: https://doi.org/10.1007/978-3-319-91563-0_13 ISBN: 978-3-319-91562-3
20. Qusai Ramadan, Daniel Struber, *Mattia Salnitri*, Volker Riediger and Jan Jurjens. **Detecting Conflicts Between Data-Minimization and Security Requirements in Business Process Models**. Modelling Foundations and Applications. ECMFA 2018. Lecture Notes in Computer Science, vol 10890. Springer, Cham. DOI: https://doi.org/10.1007/978-3-319-92997-2_12 ISBN: 978-3-319-92996-5
21. Marco Robol, *Mattia Salnitri*, Paolo Giorgini. **Toward GDPR-Compliant Socio-Technical Systems: modeling language and reasoning framework.** In The Practice of Enterprise Modeling. PoEM 2017. Lecture Notes in Business Information Processing, Vol 305, 236-250 (2017). Springer, Cham. DOI: https://doi.org/10.1007/978-3-319-70241-4_16 ISBN: 978-3-319-70240-7
22. Qusai Ramadan, *Mattia Salnitri*, Daniel Strüber, Jan Jürjens and Paolo Giorgini. **From Secure Business Process Modeling to Design-Level Security Verification.** In ACM/IEEE 20th International Conference on Model Driven Engineering Languages and Systems. MODELS. 123-133 (2017). DOI: https://doi.org/10.1109/MODELS.2017.10 ISBN: 978-1-5386-3493-6
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25. Jennifer Horkoff, Fatma Basak Aydemir, Evellin Cardoso, Tong Li, Alejandro Mate, Elda Paja, *Mattia Salnitri*, John Mylopoulos, Paolo Giorgini. **Goal-Oriented Requirements Engineering: A Systematic Literature**

Map. IEEE International Requirements Engineering Conference. RE 106-115 (2016). DOI: https://doi.org/10.1109/RE.2016.41 ISBN: 978-1-5090-4122-0

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27. Jennifer Horkoff, Tong Li, Feng-Lin Li, *Mattia Salnitri*, Evellin Cardoso, Joao Pimentel, Paolo Giorgini and John Mylopoulos. **Taking Goal Models Downstream: A Systematic Roadmap.** IEEE International Conference on Research Challenges in Information Science. RCIS, 1-12 (2014) DOI: https://doi.org/10.1109/RCIS.2014.6861036 ISBN: 978-1-4799-2393-9 **Best paper award**
28. *Mattia Salnitri*, Fabiano Dalpiaz and Paolo Giorgini. **Modeling and Verifying Security Policies in Business Processes**. Enterprise, Business-Process and Information Systems Modeling. BPMDS 2014. Lecture Notes in Business Information Processing, vol 175. 200 – 214 (2014). Springer, Berlin, Heidelberg. DOI: https://doi.org/10.1007/978-3-662-43745-2_14 ISBN: 978-3-662-43744-5
29. *Mattia Salnitri*, Fabiano Dalpiaz and Paolo Giorgini. **Aligning Service- Oriented Architectures with Security Requirements**. On the Move to Meaningful Internet Systems: CoopIS 2012. Lecture Notes in Computer Science, Vol 7565. 232 – 249 (2012). Springer, Berlin, Heidelberg. DOI: https://doi.org/10.1007/978-3-642-33606-5_15 ISBN: 978-3-642-33605-8

International workshops and forums

30. *Mattia Salnitri*, Pierluigi Plebani, and Alessandra Raffone. **Towards Designing Energy-Aware Cybersecurity Policies.** *International Conference on Advanced Information Systems Engineering*. (CAiSE) Forum Cham: Springer International Publishing, 2023.
31. Chiara Criscuolo, Tommaso Dolci, and *Mattia Salnitri*. **Towards Assessing Data Bias in Clinical Trials**. In proceedings of Seventh International Workshop on Data Management and Analytics for Medicine and Healthcare (DMAH) 2022. VLDB workshop DOI: https://doi.org/10.1007/978-3-031-23905-2_5
32. Cinzia Cappiello, Marco Gribaudo, Pierluigi Plebani, *Mattia Salnitri*, Letizia Tanca. **Enabling Real-world Medicine with Data Lake Federation: a research perspective.** In proceedings of Seventh International Workshop on Data Management and Analytics for Medicine and Healthcare (DMAH) 2022. VLDB workshop DOI: https://doi.org/10.1007/978-3-031-23905-2_4
33. *Mattia Salnitri*, Mahdi Alizadeh, Daniele Giovanella, Nicola Zannone and Paolo Giorgini. **From Security-by-Design to the Identification of Security-Critical Deviations in Process Executions**. Information Systems in the Big Data Era. CAiSE workshop. Lecture Notes in Business Information Processing, vol 317 218-234 (2018). Springer, Cham DOI: https://doi.org/10.1007/978-3-319-92901-9_19 ISBN: 978-3-319-92900-2
34. *Mattia Salnitri*, Elda Paja and Paolo Giorgini. **Maintaining Secure Business Processes in Light of Socio-Technical Systems Evolution.** IEEE International Requirements Engineering Conference Workshops. REW (MoDRE) 155-164 (2016). DOI: https://doi.org/10.1109/REW.2016.038 ISBN: 978-1-5090-3695-0
35. *Mattia Salnitri*, Elda Paja, Mauro Poggianella and Paolo Giorgini. **STS-Tool 3.0: Maintaining Security in Socio-Technical Systems.** In proceeding of Conference on Advanced Information System Engineering (CAiSE) Forum 2015, Pages 205-212, 2015 URN: urn:nbn:de:0074-1367-5
36. *Mattia Salnitri*, Elda Paja and Paolo Giorgini. **Preserving compliance with security requirements in socio-technical systems**. Cyber Security and Privacy. CSP. Communications in Computer and Information Science, vol 470. 49-61 (2014) Springer, Cham. DOI: https://doi.org/10.1007/978-3-319-12574-9_5 ISBN: 978-3-319-12573-2
37. *Mattia Salnitri*, Paolo Giorgini. **Transforming Socio-Technical Security Requirements in SecBPMN Security Policies**. CEUR Workshop Proceedings 1157, CEUR-WS.org (2014).
38. *Mattia Salnitri*, Paolo Giorgini. **Modeling and Verification of ATM Security Policies with SecBPMN**. IEEE International Conference on High Performance Computing & Simulation. HPCS 588-591 (2014).

EDUCATION

Ph.D. In Computer Science
University of Trento – Trento (IT) September 2011 – April 2016

Thesis: Secure Business Process Engineering: A Socio-Technical Approach.

Advisor: Prof. Paolo Giorgini.

Master in Computer Science
University of Trento – Trento (IT) March 2009 – September 2011

Thesis: A Commitment Based Approach for Service Agreement Specification: Modeling Language and Methodology.

Advisor: Prof. Paolo Giorgini.

Bachelor in Computer Science
University of Trento – Trento (IT) October 2005 – March 2009

Thesis: JamClass: an extensible course management tool.

Advisor: Prof. Fabio Casati.

PERSONAL SKILLS

Language

- Mother tongue: Italian
- Other language: English

Organizational / managerial skills:

- Good teamwork skills acquired with collaborations with researchers for publications of papers and with European project partners.
- Managerial skills acquired with the coordination of international teams, in European projects such as partners for PACAS, VisiOn and Aniketos, and with the collaboration and supervision of students, Ph.D. candidates and developers of the University of Trento.
- Intercultural skills gained during my university career, where I collaborated with researchers coming from all over the world.

Relevant skills:

- I am a BPMN 2.0 expert, I deeply know the standard. I created an extension of BPMN 2.0 for security and formalized it. The work was published in research papers.
- I am a goal-based modelling languages expert, I published several papers on the argument, including three papers on surveys of goal-based modelling languages.
- I have good knowledge of programming languages such as Java, JavaScript, and Node.js.
- I have good knowledge of the organization and management of European Projects since I participated with the University of Trento and Politecnico di Milano in four European projects: DITAS, Aniketos, VisiOn and PACAS. In particular, in PACAS I was the work package leader.

Milano 20/12/2023