

Research Projects

Total positions:	5
Positions MD 118/2023 under PNRR:	2
Position Fondazione Bruno Kessler:	1
Positions MD 117/2023 under PNRR:	2

PhD scholarship bound to specific research topics/areas:

2 scholarships with bound research topic and minimum 6-month study period abroad requirement pursuant to MD 118/2023 funded by PNRR - NextGenerationEU:

Research topics:

C1- Developing future digital workspaces to support sustainable remote work

Academic Advisor: **prof. Xiaofeng Wang**

Co-advisor: **dr. to be defined**

Project Description:

Developing future digital workspaces to support sustainable remote work:

Remote work became a noteworthy and disputable topic due to the COVID-19 pandemic. Many organizations are pondering about the transition to remote work, including public administrations. However, with the various benefits of remote work also come a number of challenges because brainstorming, knowledge sharing and team building, etc. are more difficult in the digital space. Meanwhile, the lack of social contacts and interactions that happen typically in physical workspace may lead to the decrease of well-being and work-life balance of remote workers. Various digital tools exist to support remote work, e.g., video conferencing, chatting, online task management. However, there is no clear understanding in the existing literature on what future digital workplaces would be beyond a collection of digital tools, and how they address remote work challenges effectively. To fill these knowledge gaps, this project aspires to develop a comprehensive understanding of the challenges and characteristics of remote work, and build a digital workspace that supports sustainable remote work. To achieve these objectives, the project will first empirically investigate the current state-of-the-art and practice of remote work. Based on this understand, then a digital workspace will be developed that leverages cutting-edge concepts (such as metaverse), AI-enabled technologies (which will greatly change the way we work, remote or not), as well as good practices identified from the contexts where online collaboration is perceived effective and natural (such as open-source software development, online collaborative gaming). A novel kind of collaboration and synergy between remote workers will be enabled by such digital workspaces. The overall research paradigm employed in the project will be Design Science Research that incorporates various empirical research methods (e.g., case studies and interviews). The research is interdisciplinary in nature, covering relevant areas of software engineering and organization science. The project will result in cutting-edge scientific publications on the practices and

challenges of remote work and on innovative novel online tools that can support it. The project will yield an economic and social impact that can be linked to several sustainable development goals designated by UN, e.g., Target 8.3 (Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-small- and medium-sized enterprises, including through access to financial services

Required skills:

The PhD candidate should have good knowledge and a broad view on the field of software engineering, and a keen interest in the topics related to the proposal. A good knowledge and experience in developing

web-based applications using modern frameworks and/or tools are preferred. Some knowledge or experience of conducting empirical studies using qualitative and quantitative research methods (e.g., interviews, surveys) are also preferred. The candidate should have good communication and scientific writing skills, or willingness to develop such skills.

C2 - Art with and for AI: Towards Increased Trust

Advisor: **prof. Antonella De Angeli**

Co-advisor: **to be defined**

Project Description:

This project proposes interdisciplinary research at the frontiers between human creativity and machine learning. The objective is twofold. Firstly, we aim to synergize new possibilities for artistic expressions driven by human imagination and machine learning. Secondly, we want to design critical artefacts to increase public awareness and build trust in Artificial Intelligence (AI).

Awareness refers to the perception and knowledge of the possibilities and limitations of machine learning. It is a fundamental predecessor of informed trust and a key component of public digital literacy and adoption. The project brings forward several contributions to the PNRR with respect to the topic, the application field, and the educational format. The requirement of increasing the digital literacy of Italian citizens is at the core of the plan. (AI) is identified as a key enabler of recovery and resilience across different missions and the horizontal reformation of the Public Administration. Current research, however, has demonstrated the complexity of explaining how AI works does not only apply to possible users, but also to computer scientists. Foundational concerns have been raised with respect to low public acceptance, a generalized mistrust on machine learning that make decisions and predictions on the human's behalf while relying on biased data.

Source credibility alongside advice personalization and predictability are fundamental determinants of trust in machines. The key research question, therefore, is "how can we enhance AI credibility?" making it transparent for all citizens, independent of their digital skills, cultural background, and idiosyncratic interests. The project addresses this question by combining the scientific method of experimental research in human-computer interaction, the reflexive approach of science and technology studies, and creative practices of critical design. Main project outcomes will be critical design artefacts and academic research and public exhibition that contribute to public awareness of AI.

The project will be run in collaboration with the Municipality of Bozen-Bolzano and in particular with the Councillor of Social Policies who will help the student to select a concrete case study reflecting a concrete concern of the administration and the city. The student is expected to alternate between attendance at the University and at the Municipality. The academic team will be supplemented by a cultural association, which is currently working with the University in several projects including Food Data Digestion

Required skills:

The project is open to candidates of different profiles, including the social sciences, design, and computer science. Knowledge of Human-Computer Interaction is an advantage alongside musical knowledge.

1 scholarship with bound research topic funded by Fondazione Bruno Kessler

Research topic:

B1 - Process mining: representation, prediction and explanation of temporal data

Academic Advisor: **dr. Chiara Ghidini**

Co-advisors: **dr. Massimiliano Ronzani**

Project Description:

Thanks to the increasing digitalisation of contemporary organizations, event data about the execution of processes are continuously collected. Process intelligence aims at transforming these data into insights into how processes are executed in reality.

In spite of the reported effectiveness of state of the art approaches for process intelligence, an effective intelligent usage of execution data is still reported to be one of the key challenges of today's strategic management. Indeed, AI is becoming increasingly central to realise a view that shifts from descriptive and reactive predictive analytics to proactive prescriptive analytics, able to improve the impact, sustainability, and relevance of data-enabled decisions. Realising this vision requires addressing several foundational challenges: (i) the representational descriptive challenge, which arises from the multiperspective representation of knowledge for the specific domain containing time, resources, data objects, costs ...; and (ii) the predictive and proactive challenge, which demands the usage of data in an explainable manner and to realise recommender systems able to deal with the temporal dimension of data so as to support decision making. It also calls for an integrative approach that leverages the power and flexibility of Machine Learning techniques, combines the (implicit) knowledge contained in the data with the explicit (and often de facto or legally binding) rules governing the process behaviour, and resorts to different reasoning techniques. The PhD project will focus on the development of new AI based techniques able to deal with some of the challenges above and their application in several domains, e.g., the healthcare one.

Required skills:

- Good mathematical background
- Good programming skills
- Good Knowledge of Machine Learning techniques
- Good communication skills and ability to work in team
- Knowledge of Process Mining Techniques (optional)
- Knowledge of Conceptual and/or Logic formalisms (optional).

2 scholarships with bound research topic and minimum 6-month study period abroad requirement pursuant to MD 117/2023 funded by PNRR - NextGenerationEU:

Research topics:

1. Conceptual Modelling of Ratings using ESG criteria for Social Sustainability – Co-finanziata da DATATELLERS SRL (supervisor prof. Enrico Franconi)
2. Artificial Intelligence, Semantic Technologies and Knowledge Representation applied to the restaurant industry – Co-finanziata da OKKAM SRL (supervisor prof. Enrico Franconi)