# Academic
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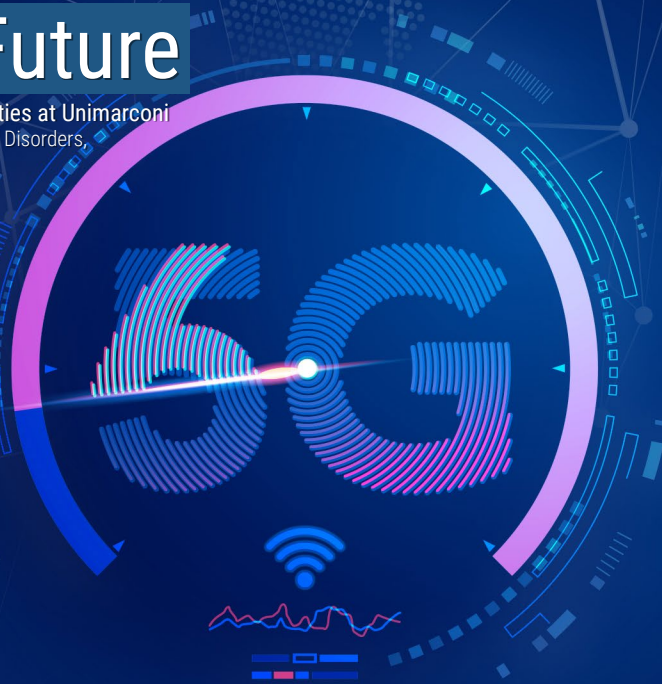
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5G

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# Academic Highlights

## FOSTERING GLOBAL ACADEMIC COLLABORATIONS
### UniMarconi Participates in International Faculty Development Program 2024 at Chandigarh University

Guglielmo Marconi University participated in the International Faculty Development Program (IFDP) 2024, organized by the prestigious Chandigarh University, one of the leading private universities in India. It is ranked A+ by the Indian accreditation agency and recognized as the best private Indian university by the QS Rankings 2024.

The International Faculty Development Program, which began in 2017, is an annual event that invites academic experts from around the world to interact with professors, doctoral students, and undergraduates, fostering international collaborations and keeping research and teaching at the cutting edge.

This year, the IFDP hosted over 110 experts from 87 universities across 32 different countries from July 1 to 10, 2024. The experts held seminars on research topics and industrial and social applications, engaging in both formal and informal contexts.



UniMarconi was represented by the Rector, Prof. Marco Abate, and Prof. Alberto Garinei, Full Professor of Mechanical and Thermal Measurements. Our participation has already led to the signing of two Memorandums of Understanding with Chandigarh University, paving the way for future collaborations on research projects, joint teaching activities, and exchanges of students and staff.

## BRIDGING THE GAP: 5G TO 6G EVOLUTION

GOn July 27, 2024, Professor Romeo Giuliano, a distinguished expert in Wireless Networks and Systems at Guglielmo Marconi University, took center stage as a keynote speaker at the "2nd International Conference on Data Science and Network Security (ICDSNS-2024)" hosted by the Kalpataru Institute of Technology in Tiptur, India. His presentation, titled "3GPP Network Evolution to 6G: Connected Vehicles and Other Smart Things," offered a visionary exploration of the future of wireless networks and their groundbreaking applications in connected technologies.

In his keynote address, Professor Giuliano delved into the ongoing transformation of mobile networks, particularly focusing on the next leap beyond 5G. He outlined the evolution from the current 3GPP (3rd Generation Partnership Project) standards, which govern 5G networks, to the forthcoming 6G technology. As mobile network standards advance, 6G promises unprecedented speeds, lower latency, and enhanced connectivity that will redefine the relationship between technology and society..



Connected vehicles, such as autonomous cars, will benefit from the ultra-low latency and increased data speeds of 6G networks, enabling them to communicate more effectively with other vehicles (V2V), infrastructure (V2I), and pedestrians (V2P). This interconnectivity will improve road safety, traffic management, and overall urban mobility.

# Spotlight on Research

## THE NEXT GENERATION EU PROGRAMME AND ARTIFICIAL INTELLIGENCE APPLICATIONS

The Next Generation EU (NGEU) program, was launched in 2020 with a budget of €750 billion, to help countries mitigate the economic and social impact of the pandemic, and make their economies more sustainable, resilient, and future-proof. Each EU member state was required to develop and submit its own National Recovery and Resilience Plan (NRRP) as operating tool to apply the NGEU Programme.

Under the Italian NRRP, two research projects managed by Unimarconi researchers were financed.

The SPECTRA project (full title "Spectral pattern extraction for classifying transient radiations in astronomy with Artificial Intelligence") aims to innovate astronomical observation by applying Artificial Intelligence (AI) to identify and analyze transient astronomical sources from high-energy gamma-ray data. Transient sources, such as gamma-ray bursts, supernovae and solar flares, are crucial phenomena to understand the high-energy Universe. However, the detection of such phenomena is challenging due to their ephemeral nature and the large amount of data produced by gamma-ray experiments. The approach proposed in this project aims to use Deep Learning algorithms to process and analyze spatial and temporal data from telescopes and satellites.



The SAIFIN project (full title "Satellite data and Artificial Intelligence for Fintech") aims to develop an algorithmic trading system based on Artificial Intelligence (AI) capable of identifying financial trading strategies by leveraging data and information available from the web and satellite sources. This approach, which utilizes satellite data and high-performance computing, enables nowcasting of key metrics to achieve better results in high-frequency trading (HFT), as well as in short-term and medium-to-long-term trading. the system will consist of two modules, which will form the two work packages of this project: the first module will handle the extraction of information from the web and satellite data, followed by processing to generate a synthetic and functional representation of the data. The second module will be the actual automated trading system, where the information gathered from the first module will be used to train an AI-based model aimed at determining an effective trading strategy.

For more information on the Unimarconi research projects visit the dedicated page:
https://www.unimarconi.com/research-projects/

# Glance at the Future

## RESEARCH ON SOCIAL SCIENCES AND HUMANITIES AT UNIMARCONI
### Addressing Maternal Mental Health, Adolescent Disorders, and Linguistic Evolution through PRIN Projects

"PRIN - Research Projects of National Relevance" is the most competitive funding program devoted mainly to universities, granted by the Italian Ministry of University and Research (MIUR). Under this Programme, Unimarconi researchers' psychologists are engages on two projects.

The Mothers (full title "Poor sleep during pregnancy as risk factor for post-partum stress and mental health: a translational, longitudinal and clinical study. Maternal outcome after therapy for sleep") project explores the psychobiological mechanisms leading to peripartum mental disorders, focusing on poor sleep continuity as a key risk factor. It combines clinical and preclinical teams to examine how poor maternal sleep increases vulnerability to stress and mental disorders, and investigates the molecular mechanisms and intergenerational effects. The project will assess the effectiveness of prenatal psychological interventions in preventing these outcomes. From a basic research perspective, it will explore long-term effects on adult sleep phenotypes and epigenetic mechanisms, while clinically, it will evaluate sleep-mental health links from pregnancy to six months postpartum. A randomized controlled trial will test a sleep-targeted intervention to prevent peripartum psychopathology. The project aims to develop new models, biomarkers, and preventive interventions to improve sleep quality and mental health outcomes in pregnant women.



The project "Healthier and earlier through digital technology: towards a transdiagnostic staging model of eating and sleep disorders in adolescence" focuses on the high prevalence and co-occurrence of sleep and eating disorders among adolescents, which are linked to significant comorbidities and functional impairments. It aims to investigate the shared mechanisms behind these disorders, such as negative affect and heightened reactivity to disease-related stimuli, using a transdiagnostic staging model. A longitudinal, multimodal approach will assess the psychological risk factors for developing these conditions. High-risk individuals will be identified through online surveys and directed to self-care resources. Virtual reality will be tested as a tool to reduce reactivity to stimuli and improve emotional regulation. A pilot study will assess the feasibility and efficacy of a virtual reality intervention. The project builds on the research team's expertise and collaborative network, ensuring the project's success and widespread dissemination of findings.

Moreover, the PRIN project intitled "The lexicalization of the adjective class in Indo-European and Semitic" on Social Sciences and Humanities topics is also managed by Unimarconi researchers. It aims to bridges together historical and typological linguistics. Its main results concern parts of speech (PoS) typology, Indo-European (IE) and Semitic studies, as well as linguistic terminology, theoretical morphology and the history of language science. It is well-know that a cross-linguistically agreed and consistent theory of PoS classification has never been proposed so far. Moreover, quite a few scholars think that such theory is not only lacking at present; rather it is impossible in principle. The project will counter such view bringing in two results. It will: i) propose a new and consistent theory of PoS classification across languages, testing such theory against a balanced variety sample of 60 languages; ii) use such theory to describe two enormous and previously neglected or understudied typological changes at the level of the PoS which occurred in two of the most ancient language families of the world, namely Indo-European and Semitic.

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# EXPLORING THE FUTURE: ARTIFICIAL INTELLIGENCE IN THE AUTOMOTIVE SECTOR

On June 18, 2024, Professor Fabio Orecchini, Full Professor of Machines and Systems for Energy and the Environment at Guglielmo Marconi University, contributed his expertise at the highly anticipated event titled "Artificial Intelligence and its Application in the Automotive Sector." The event, held at Villa Blanc, home to Luiss Business School's Auto and Mobility Observatory, brought together key figures in the automotive and AI industries to discuss the rapidly evolving relationship between artificial intelligence and automotive technology.

Supported by industry giants such as Unrae, Honda, Toyota, Kia, and Renault, the event showcased new research conducted by the Observatory, which delves into the transformative impact AI is having on the automotive world. As artificial intelligence continues to shape and redefine industries, the automotive sector is becoming one of the most dynamic arenas for its application, with innovations affecting everything from vehicle design to user experience, manufacturing processes, and autonomous driving technologie..



During the event, Professor Orecchini and other industry experts discussed how AI technologies, including machine learning, computer vision, and advanced data analytics, are pushing the automotive industry into new territories. AI is not only optimizing manufacturing by streamlining production and enhancing quality control but is also transforming the driving experience with advanced driver-assistance systems (ADAS), predictive maintenance, and smart connectivity between vehicles and infrastructure.

AI is reshaping mobility services. Ride-hailing platforms, shared mobility solutions, and vehicle-to-everything (V2X) technologies are increasingly relying on AI to enhance efficiency and customer satisfaction, pointing to a future where the way we view transportation could shift dramatically.