

<b>PhD Programme in electronic and computer engineering</b>	
Curriculum 1: COMPUTER ENGINEERING AND AUTOMATIC CONTROL Curriculum 2: ELECTRONICS AND TELECOMMUNICATIONS	
DISCIPLINARY SCIENTIFIC AREA	09 - INDUSTRIAL AND INFORMATION ENGINEERING
COORDINATOR	PROF. ALESSANDRO GIUA
HEAD DEPARTMENT	DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING
DURATION	3 years
LEARNING OUTCOMES AND RESEARCH TOPICS	<p>The PhD programme in Electronic and Computer Engineering aims to train young researchers to make them ready to carry out academic and industrial research projects in the following areas:</p> <ol style="list-style-type: none"> <li>1. Automatic Control and Systems Engineering</li> <li>2. Telecommunications</li> <li>3. Electromagnetism</li> <li>4. Electrical Circuits and Modelling</li> <li>5. Industrial Electronics Power</li> <li>6. Computer Engineering</li> <li>7. Microelectronics</li> <li>8. Electrical and Electronic Measurements</li> </ol> <p>The central point of the doctoral education is the development of an original research project to be carried out in close contact with the supervisor and strongly aimed to the advancement of knowledge in the relevant field of engineering.</p> <p>The main goal of the PhD programme is to create professionals who find suitable job placement at academic institutions, research centres, high-tech firms, and that they are potentially able to initiate economic undertakings with high scientific and technological content.</p>
ELIGIBILITY AND OTHER REQUIREMENTS FOR CANDIDATES	EVERY ITALIAN 2ND CYCLE DEGREE ( <i>LAUREA MAGISTRALE/SPECIALISTICA/VECCHIO ORDINAMENTO</i> ) AND EQUIVALENT AND SUITABLE FOREIGN ACADEMIC DEGREES
ADMISSION TESTS	<p>ASSESSMENT OF QUALIFICATIONS AND CURRICULUM VITAE, AND VIDEOCONFERENCE INTERVIEW</p> <p>The interview will mainly focus on the presentation and discussion of the candidate's research project (to be written using the form available on the webpage <a href="https://www.unica.it/dottorato">Dottorato di ricerca   Università degli Studi di Cagliari (unica.it)</a> - "Instructions for registration to the competition and forms - Annex C"), in order to assess the adequacy of the profile with regard to personal competence in the disciplinary field of the project, aptitude for scientific research and linguistic knowledge (English language).</p>
POSITIONS	4
SCHOLARSHIPS	<p>2 funded by funded by NRRP Ministerial Decree no. 630/2024</p> <p>2 funded with funds of the Electrical and Electronic Engineering Department, specific topic:</p> <ol style="list-style-type: none"> <li>1. <i>Mixed-level approximate computing methodologies in reconfigurable hardware coprocessor;</i></li> <li>2. <i>MLIR-based hardware compilation and high-level synthesis tools for reconfigurable coprocessors design.</i></li> </ol>



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WEBSITE	<a href="https://www.alessandro-giua.it/DRIEI/">https://www.alessandro-giua.it/DRIEI/</a>
<b>SCHOLARSHIPS FUNDED BY MINISTERIAL DECREE NO. 630/2024</b>	
<b>Scholarship no. 1 – CUP F22B24000240005</b>	
RESEARCH PROJECT	Anti-counterfeiting solutions by Hiding Data With Deep Networks
PRINCIPAL INVESTIGATOR	Prof. Gian Luca Marcialis
DESCRIPTION OF DOCTORAL TRAINING	<p>The potential of image processing, digital watermarking, and biometrics has further developed thanks to advancements in Artificial Intelligence. Neural networks have demonstrated the possibility of generating classifications for the development of security techniques for data and identity authentication and protection. Identity confirmation, proof of possession, and authenticity are the new frontiers in the domain of Cybersecurity. In line with the PNRR and regarding the competitiveness in the research and development field of companies and research institutes in the respective regions (specifically, the Mezzogiorno and the Islands, with reference to Sardinia but also Lazio where the co-financing company is located), the candidate will acquire an in-depth knowledge of biometric, steganographic, and artificial intelligence technologies with the aim of proposing models and methods for the protection and obfuscation of sensitive data through synthetic data. The doctoral program includes:</p> <ul style="list-style-type: none"><li>• Acquisition, through the experience and know-how of the proposing group, of the tools of computer vision and artificial intelligence for generating techniques for image and biometric authentication.</li><li>• A period spent in the company for integration with the client responsible for encryption, sealing, and embedding data, including biometric data, using private keys with certificate issuance anchored in a public blockchain.</li><li>• A period spent abroad for further acquisition of know-how on synthetic biometrics and digital watermarking techniques, and collaboration with internationally recognized research groups.</li><li>• Study and implementation of methods and models for hiding, obfuscating, and subsequently detecting sensitive data in images and biometrics.</li><li>• Participation in doctoral schools and relevant international conferences, and publication of at least one article in a top-tier international scientific journal or the definition of one or more patents.</li></ul>
COMPANY	DEDEM S.p.A., headquartered in via Cancelliera, 59, Ariccia (RM) - Contact person: Mr Federico Lama
NO. OF MONTHS TO BE SPENT IN THE COMPANY	6
FOREIGN INSTITUTION	1)Universidad Autonoma de Madrid, C/ Einstein 13, 28049 Madrid, SPAIN, VAT number: ESQ2818013A - Contact person: Prof. Julian Fierrez 2)Norwegian University of Science and Technology (NTNU) - Norwegian Biometrics Laboratory (NBL) - Teknologiveien 22 Postbox 191 2802 Gjøvik, Norway//Hochschule Darmstadt Schöfferstr. 10 64295 Darmstadt (Germany) - Contact person: Prof. Christoph Busch 3)Laboratory for Machine Intelligence, Faculty of Electrical Engineering UL,



	Tržaška cesta 25, SI-1000 Ljubljana, Slovenia - Contact person : Prof. Vitomir Struc
NO. OF MONTHS TO BE SPENT IN THE FOREIGN INSTITUTION	6
<b>Scholarship no. 2 – CUP F22B24000240005</b>	
RESEARCH PROJECT	IOT and Industry 4.0 technologies for the analysis and engineering of complex Food Systems for the production of high value-added dairy products
PRINCIPAL INVESTIGATOR	Prof. Alessandro Fanti
DESCRIPTION OF DOCTORAL TRAINING	The study for innovation in local artisanal production poses problems related to interfacing modern IOT systems (with existing machinery) for food safety and authenticity, including traceability, and this may require new communication paradigms. This is to propose an integrated production process that combines elements of "Industry 4.0," high-speed communications (fiber/5G Network), IoT technologies, digitization, machine learning algorithms, academic knowledge and skills, and business reality. The interdisciplinary development of these systems and dedicated sensing fully falls within the" themes aimed at bringing significant knowledge development, including applied knowledge, in the areas of interest of the NRP" particularly in the areas of Keyabling Technologies.
COMPANY	ARGIOLAS FORMAGGI S.r.l, SP14, 3, 09041 Dolianova, Cagliari
NO. OF MONTHS TO BE SPENT IN THE COMPANY	12
FOREIGN INSTITUTION	To be defined
NO. OF MONTHS TO BE SPENT IN THE FOREIGN INSTITUTION	6