



The **Ph.D. Course in Mathematical Models for Engineering, Electromagnetics and Nanosciences** (MMIENS), based at the Department of

Basic and Applied Sciences for Engineering (SBAI), is aimed at preparing young graduated students to perform theoretical and applied research in the fields of mathematics, electromagnetics and material sciences. The most important aim of the curriculum in Mathematics for Engineering is *to provide an intense scientific and technological preparation and, at the same time, to provide young mathematicians an opening towards the problems coming from the productive world*. The Doctorate encourages theses concerning problems posed by an external entity, since an applied mathematician should be able to communicate with the productive and managerial world.



**Superelectric s.r.l.** develops high resolution monitoring systems of Cultural Heritage by means of drones

and hyperspectral and multispectral sensors, to create useful information for the conservation, protection and fruition of archaeological heritage and cultural heritage. In the environmental monitoring sector, the company has focused for over 15 years its research and innovation in the field of image spectrometry using internally produced airborne instruments (SystemONE class spectrometers). SUPERELECTRIC has developed a SW platform for the delivery of services "on demand" for multispectral monitoring in agriculture and the same is about to be applied to the monitoring of cultural heritage for their protection and preservation.



**Monteverde Giuseppina** earned a Master degree in Management Engineering at Sapienza University of Rome with a grade of 110/110 cum laude with mention of excellence, discussing a thesis on *“Defects detection and classification of PCB using image processing operations and machine learning”*. During her

university studies she took part in the Erasmus program, a placement scheme of 6 months in Spain, and the “Percorso di Eccellenza”, for which she was selected amongst the ten most deserving students of the faculty and that allowed her to carry out additional study and training activities including the deepening of knowledge of programming languages such as Python, Matlab, SQL andAMPL. Since November 2020 she is qualified to practice as Information Engineer, section A.



**HYPERSpectral imaging through Artificial intelligence for Building Control** The project is aimed at the development of innovative

methodologies based on artificial intelligence for the processing of hyperspectral images oriented to the monitoring and control of vertical wall structures, with particular reference to acquisition systems mounted on drones and applications in different sectors including cultural heritage and civil engineering. The specific objectives of the project include the definition of methodologies for the recognition and classification of deterioration, which allow to produce an alert about the presence and evolution of the same, and the development of methodologies of analysis and prediction to extract useful information for addressing any maintenance and / or restoration, allowing to optimize both the costs and the time.