



## **PORTABLE MICROWAVES DEVICES FOR ELECTROMAGNETIC IMAGING**

*The EMERALD project, coordinated by Politecnico di Torino, has kicked off.*

*27 European partners: universities, hospitals and private companies.*

*Supported by the European Union "Marie Skłodowska Curie actions" with 3,3 million euro*

**Torino, 2 October 2018** - Thirteen new PhD students are embarking on a research journey in the area of microwave imaging this month, as part of the EU project EMERALD - ElectroMagnetic imaging for a novel geNERation of medical AL Devices. It is supported by the EU H2020 Programme in the framework of "Marie Skłodowska Curie actions" with 3,3 million euro and coordinated by **professor Francesca Vipiana**, Department of Electronics and Telecommunications of Politecnico di Torino.

EMERALD will enhance a **collaboration network** between engineers, seeking possible applications to medical imaging of electromagnetic waves at the microwave frequency, and medical doctors, working at the transfer of this technology from lab test phase to patients. Medical devices developed by the project will be portable and low cost, allowing real-time monitoring of therapy efficacy and pathology evolution. This represents the true novelty of the proposed devices compared to the traditional ones, as magnetic resonance or computerized tomography (CT), very reliable but expensive, non-portable and, in the case of CT, with possible side effects due to the use of ionizing radiations (X Rays).

The project will last 4 years and will recruit **13 Ph.D. candidates** hosted by EMERALD partners. 8 of them will develop new technologies and 5 will concentrate their work on devices. They will interact with academic institutions, private companies, hospitals with the objective of reaching the pre-clinical phase, making devices ready to be tested on patients. Possible applications of the new technologies go from detecting cardio-vascular pathologies (ictus, ischemia) to making possible non-invasive lymph nodes analysis or focused surgery for tumors.

Politecnico di Torino researchers will concentrate on application to cerebral pathologies like ischemia, ictus, hemorrhage, hematoma caused by traumas. The portable device developed will be an "helmet" allowing on-site monitoring of injured people. The use of non-ionizing radiations such as microwaves will allow frequent testing, impossible with CT and could be very useful in monitoring patient pathology. Two Ph.D. will work in Politecnico: one will develop the hardware elaboration algorithms, under the supervision of professor **Mario Casu**, and the second one will develop a device for cerebrovascular pathologies, supervised by professor **Francesca Vipiana**.

The Institute for Electromagnetic Sensing of the Environment of the National Research Council of Italy (IREA-CNR), based in Naples, will host two of the EMERALD Ph.D., both under the supervision of Dr. **Lorenzo Crocco**. The first fellow, in cooperation with Trento University (co-supervisor: professor **Paolo Rocca**), will develop reliable and effective microwave imaging algorithms to process the data provided by the devices developed within the EMERALD network. The second Ph.D., in cooperation with Sapienza University of Roma (co-supervisor: professor **Marta Cavagnaro**), will develop an innovative device for guided thermal ablation treatments by means of microwave imaging.

