# The CRIMSON project revolutionizes the study of the cellular origin of diseases

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A breakthrough in microscopy and endoscopy will soon revolutionize the study of the cellular origin of diseases, advancing in the field of precision medicine. This is the goal of CRIMSON, a transdisciplinary and transnational research project recently funded by the European Commission. It will develop the next generation biophotonic imaging device for biomedical research, combining advanced laser techniques with artificial intelligence data analysis. This innovative microscope will provide three-dimensional quantitative maps of subcellular compartments in living cells and organoids and will enable rapid tissue classification with unprecedented biomolecular sensitivity. The high acquisition rate will allow observation of intra and intercellular dynamic changes by time-lapse imaging. The CRIMSON project, starting from 1 December 2020, lasting 42 months and with a budget exceeding 5 million euros, will also simulate future in-vivo studies and demonstrate the ability to image inside the body, creating an innovative endoscope and applying it to thick ex vivo tissue samples. The findings have a potentially profound social impact, improving patients' quality of life and reducing the costs of public health care. A multidisciplinary team of world-leading organizations with vertical

integration of all the required skills makes up the consortium, coordinated by the Politecnico di Milano (Italy). Three research centers, with long-standing experience in photonics, spectroscopy and non-linear microscopy, they will develop the technology. Three biomedical partners will validate the imaging system on open biological questions related to cancer, as paradigmatic examples of the complexity and heterogeneity of cellular diseases. Four innovative SMEs, including a biomedical equipment manufacturer, will exploit the innovation commercially, thereby creating a competitive advantage in the European biophotonics related market for microscopes and research and development tools. This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement no. 101016923.

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