

# PRESS RELEASE

## ‘Remote’ detection of viruses on surfaces

*Researchers from the Universidad de Sevilla have developed and patented a prototype to detect remotely viruses (including synthetic SARS-CoV-2) deposited on surfaces, analyzing images taken at multiple wavelengths – the so-called hyperspectral imaging –. The research is ongoing on human samples of coronavirus.*

Seville (Spain), 10 August 2021.

A group of researchers based in Spain and, particularly, in Andalusia, has designed a new optical technique allowing them to detect the presence of viruses in drops of fluids or in dry residuals spread over a surface. The work is led by Prof. Emilio Gómez-González, full professor of applied physics at ETS Engineering School at Seville University. The research, sponsored by the Institute of Health ‘Carlos III’, has resulted in a patented technique able to analyze simultaneously numerous samples, without the need to touch them nor to use reagents.

The new technique is based on hyperspectral image stacking, that is, images taken at multiple wavelengths (or « colors ») in the visible and near-infrared ranges. As well as processing them through advanced statistics algorithms and artificial intelligence. It has been applied to detect two types of synthetic viruses, usually taken as models for SARS-CoV-2 (synthetic lentiviruses and coronaviruses), in two fluids (saline solution and artificial saliva). The results of these works is being published today in *Scientific Reports* (from *Nature Publishing Group*). The researchers keep working actively on the analysis of human samples of SARS-CoV-2.

The method is based on hyperspectral imaging, recently used to detect pathogens, mainly bacteria and fungi, in the farming industry and biology. Nevertheless, the present work goes further on, developing and extending this technology to the health sector, so as to detect viruses through an innovative and complex processing. To sum up, the system registers images of the samples arranged in a matrix and determines the positions in which the virus is detected as well as its concentration.

### **A Spanish team with a strong Andalusian component and EU support**

This research is developed within the framework of the C-CLEAN project, from the COVID-19 Emergency Call from the Carlos III Health Institute, depending on the Spanish Ministry of R&D. The paper is the first result published for a project which generated great interest when it started a bit more than a year ago, in the middle of the first wave of the pandemics.

More than 30 researchers from 11 different centers participate in C-CLEAN: the University of Seville, coordinating the project, the Explosive Ordnance Disposal (EOD) specialists of

EOD-CBRN Group of the Spanish National Police, the 'Virgen del Rocío' and 'Virgen Macarena' University Hospitals in Seville, the Institute of Biomedicine of Seville (IBIS), the Andalusian Network for the Design and Translation of Advanced Therapies (RadytTA), the University of Cádiz-INiBICA, the Spanish-German Astronomical Center (Calar Alto Observatory, Almeria), the Institute of Astrophysics of Andalusia-CSIC (Granada), the Andalusian Technological Corporation (CTA) and the HUMAINT project from the Joint Research Centre (JRC) of the European Commission.

It must be emphasized that the project has been carried out in a very short timescale (15 months only) and under extraordinarily difficult circumstances deriving from the COVID-19 pandemics.

The method idea and system design come from the principal investigator, Prof. Emilio Gómez-González, a full professor at the ETS engineering school at Seville University, where he leads the Interdisciplinary Physics Group (GFI), also a researcher in the Group of Applied Neuroscience at the Institute of Biomedicine of Seville (IBIS) and a collaborator of the HUMAINT project at JRC.

## **PUBLICATION**

[www.nature.com/articles/s41598-021-95756-3](https://www.nature.com/articles/s41598-021-95756-3)

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## **IMAGES**

**Figure 1:** Experimental assembly and prototype at the laboratory of the interdisciplinary Physics Group at III Applied Physics Dept. from University of Seville ETS engineering school.

**Figure 2:** Detail of the prototype at the laboratory of the interdisciplinary Physics Group at III Applied Physics Dept. from University of Seville ETS engineering school.