УНИВЕРЗИТЕТ У НОВОМ САДУ
UNIVERSITY OF NOVI SAD

TOP ACHIEVEMENTS 2022

BIOSENSE INSTITUTE

Innovative solution - Detection and identification of pollen particles in real time

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Real-time detection of pollen particles is of great importance for people sensitive to pollen, as more than 100 million Europeans suffer from allergic rhinitis and 70 million from asthma, which is estimated to cost the European Union €50-150 billion annually. In order to enable the availability of information on atmospheric concentrations of allergens in real time, the BioSense Institute applies the technique of flow cytometry, in which during sampling aerosols are illuminated by a laser beam and detectors collect scattered photons, which are recorded during the entire time the particle passes through the chamber and thus a scattering image of the particle is formed in which the variation of pixel intensity corresponds to the size and shape of the particle.

As the size and shape can be extremely variable in nature, chemical analysis of the particles enables additional discrimination. The UV laser pulse interacts with the particle twice. The first interaction is performed with the default UV laser polarization, and the second occurs after rotating the laser polarization by 90 degrees with a time delay of several nanoseconds, thus obtaining information on the fluorescence spectrum of the particle and its lifetime. By applying the methods of Artificial Intelligence, the original signals were manipulated and the detection of pollen particles and the identification of the type of pollen was enabled, and the information is delivered to users in real time through the RealForAll application.