

## Plasmonics for single biomolecule analysis

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Detection and interaction analysis of chemical and biological species have become essential in numerous fields important to modern human society including health sector (biomarker-based diseases diagnosis and development of therapeutic drugs), environmental monitoring (analysis of pollutants), and safety (detection of harmful pathogens). There will be discussed recent advances in optical spectroscopy and microscopy – based techniques that, when combined with micro/nanofluidic devices and functional biointerfaces, allow for the analysis of biomolecules with unprecedented accuracy. In particular, there will be given a focus to topics embraced by the OPJAK project Sensors and Detectors for Future Information Society that are spanning from plasmonic biosensor technologies for single molecule detection assays, plasmonic substrates for vibrational spectroscopy –based fingerprinting of target analytes, nano-optics for label-free single molecule imaging, and development of advanced antifouling biofunctional coatings. The paper will introduce metallic nanostructures that are tailored for nanoscale manipulation with light in plasmon-enhanced fluorescence and surface-enhanced Raman spectroscopy and there will be as well discussed recently emerged optical scattering techniques for rapid single molecule tracking in nanochannels. The opportunities brought by the ability to detect target molecular species at ultimate single molecule level in complex biological fluids will be addressed and the necessity of using dedicated coatings for mitigation of unspecific sorption will be highlighted.

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