## SARATOV AUTUMN MEETING XXVII

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# XI Symposium on Optics and Biophotonics

## Nanobiophotonics XIX

Invited Lecture

### Introduction to metamaterials with an outlook towards biological applications

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#### Abstract:

For many, metamaterials is still a new topic, and in any case there are quite a few peculiarities, which I will discuss and summarise conceptually. At the same time, research on metamaterials has triggered and inspired a number of new highlights across a wide range of related research directions. One of the specific examples I will discuss, has been inspired by the growing importance of all-dielectric metamaterials, which prompts for dielectric nanoparticles. For example, current mass-production of silicon nanoparticles yields a great dispersion of sizes, so the output must be sorted. We have proposed an all-optical way to sort dielectric nanoparticles according to their resonances, with a method to produce an angular spectrum of sizes with an easy distinction between sizes differing by 10%. The outcomes of this research might be relevant for nanoparticle manipulation also with medical applications in mind. I will also address some recent advances in nanofabrication, whereby direct laser writing procedures have been developed for super-fast production of plasmonic or dielectric arrays with highly controllable shape of structural features and steady periodicity. Once again, such structures could be of interest for biomedical applications. Finally, I will also mention metamaterials application for improving magnetic resonance imaging, whereby increased spatial resolution and/or reduction in acquisition times is possible.

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