

# 12<sup>th</sup> Nanotechnology Products and Summit

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## Dror Fixler

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### Nano-theranostics with plasmonic nanoparticles

Current medical treatments are largely based on statistics and time. In our talk, we will present highly efficient probes describing patient-specific *in vivo* disease behaviors and therapy responses. Our method is based on gold nanoparticles (GNPs) that bind to fluorescent molecules and other chemical molecules. Using the plasmon properties of the GNPs, we control the optical signals obtainable from our constructs so that they will be able to respond to their surroundings in a sensitive manner. In addition, in this method, we will image our constructs using several modalities to emphasize their usefulness for *in vivo* detection in a variety of exciting biological research topics. In our talk, we will show several empanels aiming to present a new, simple and non-invasive method to detect, locate, and to treat several diseases. One example will be detection and treatment of atherosclerosis (AS) at its very early stages. We use GNPs combined with the diffusion reflection (DR) method to demonstrate the detection of vulnerable AS plaques. Our method is based on the fact that macrophages are a major component in the vulnerable plaque and are able to uptake metal nanoparticles that can be discovered by the DR system. In addition, it is well known that high density lipoprotein (HDL) reduces AS. Thus, the specific treatment of AS is presented, as the GNPs serve as drug carriers of HDL. Early and accurate non-invasive detection of AS plaques by DR method and GNPs may allow serially monitoring the rate of disease progression and thus tailoring therapeutic measures accordingly.

### Biography

Dror Fixler received his PhD degree in 2003 from the Department of Physics, Bar-Ilan University, Israel. He is a member of the Faculty of Engineering and the Nano center of Bar-Ilan University. He has published over 70 original research papers and holds over 11 issued patents. His research interests include fluorescence measurements (FLIM and anisotropy decay), optical super resolution, high-end electro-optical system engineering and light-tissue interaction. He received several international awards and organized and presented at over 20 international conferences.

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