

## **Abstract**

Our intuitive understanding of light has its foundation in the ray approximation and is intimately connected with our vision: as far as our eyes are concerned light behaves like a stream of particles. Here we look inside the wavelength and study the properties of plasmonic structures with dimensions of just a few nanometres: a tenth or even a hundredth of the wavelength of visible light, where the ray picture fails utterly. In this talk we show how the new concept of transformation optics that manipulates electric and magnetic field lines rather than rays can provide an equally intuitive understanding of sub wavelength phenomena and at the same time be an exact description at the level of Maxwell's equations. The concepts are applied to a number of plasmonic structures revealing unexpected phenomena such as hidden symmetries and compacted dimensions.