

# Case study: Optical properties on demand

**Researchers at Southampton's ORC are merging nanotechnology with light to study the physics and technology of artificial optical materials with properties on demand.**

Funded by an EPSRC (Engineering and Physical Sciences Research Council) Programme Grant for Photonic Metamaterials, our scientists are pushing the boundaries of photonics by developing artificial optical materials which can change their properties on demand.



Image courtesy of Bruce Ou

The Nanophotonics and Metamaterials Group studies and engages the changing balance of forces, structural transformations, light confinement and coherent effects at the nanoscale to create materials with properties not available in natural media and design them such that they can be controlled by external signals.

The team's ambition is to explore the technological applications of reconfigurable photonic metamaterials through better understanding the new physics of advanced materials structured on the nanoscale. Dr Eric Plum explains: "Our researchers believe that new nanotech-enabled photonic metadevices and metasystems will not only be key for improving competitive performance in all kinds of applications using light and lasers, but they will play a crucial role in solving several mounting societal challenges such as the ever-growing demand for telecommunications bandwidth and the ever-increasing energy consumption of data processing devices."