Today we use lenses for many tasks. In microscopes they allow us to observe things that are too small to see otherwise. In telescopes, they reveal large stars and planets that are too far to see with the unaided eye. In CD and DVD players and recorders, lenses focus beams of light to very small areas, allowing us to store increasing amounts of data onto a small surface. There is a limit, however, for the smallest things that can be seen by even the best microscopes, a limit beyond which no conventional lens can help. With the introduction of nanotechnology, and the resulting miniaturization of many components, conventional lenses are insufficient. A completely new type of lens is needed.

In 1968 a new sort of lens was proposed, a lens that does not use curved surfaces, and is not made of glass. It is based on an entirely different material, which bends light rays in a strange manner, and allows light to travel backwards. Many years later in 2000 Sir John Pendry showed that this lens is not subject to the limitations of ordinary lenses. It allows us to see objects no matter how small, limited only by the perfection to which it can be manufactured.

The materials needed for such a lens cannot be found in nature, yet they have recently been fabricated, and are called metamaterials. The first lenses to take advantage of this were made here in Toronto and later in Los Angeles.