

## **Bras to Bridges Lecture By Professor John Tyrer**

Professor Tyrer started his lecture by posing the question; “How do you measure something without touching it?”

His dynamic and thought provoking lecture traced the development of light measurement in various forms from the early days of photography through holography to the latest laser based metrology. He queried the fact that many scientific and engineering measurements still rely on physical contact despite the proven accuracy of light-based metrology.

Digital image processing is now capable of providing the basis for a whole new family of measurement techniques, which unveil vast amounts of new data from difficult challenges and now provide a window on how things really work by simply watching a screen.

In a well illustrated talk the audience were shown examples of the application of holography to improve banknote security as well as numerous applications of light based metrology to the metals, health and even the fashion industry. The measurement of shape is very important for manufacturers who need to know a product has been made correctly. He explained that the detection of changes in shape can provide vital information on a structure’s working efficiency, such as the ability to transmit load, and the ways in which heat and vibration flow through a structure.

These challenges have only recently been met on traditional engineering structures such as bridges. However, the real difficulty arises with non-rigid components such as parts of the human body, this is crucial when trying to design medical implants, such as artificial hips, which replicate parts of the body that have been damaged or eroded. According to the lecturer current hip surgery has not taken account of the stresses borne by the human leg.

In his lecture Professor Tyrer described the use of various optical instruments that are applied to a wide range of measurement problems. Among many examples he showed how nano technology can lead to an engineering-based understanding of the causes of medical implant failure in hip replacements and ways that modern lingerie, such as bras, can be properly engineered to fulfil the required needs of the wearer.