Using Modern Imaging Techniques as a Tool in Engineering Education

A number of concepts in Engineering are difficult to illustrate using conventional teaching aids, for example, thermal conduction and convection in mechanical, electrical or even computer systems. Of special interest is the design and placement of heat sinks on electronic circuit boards. In 2003 the School of Technology and Design was successful in securing funds to buy a thermal imaging camera specifically to enhance high-precision engineering education. Rather than being prescriptive, engineering students who are on placement in local industries have been given the opportunity to find projects that make use of the camera. Most have found applications in predictive maintenance, such as identifying worn bearings on machines by detecting unusually higher temperatures. Within the Engineering syllabus, the camera has been used to demonstrate thermal conduction in a variety of materials, which would otherwise be very difficult to observe. In addition we have just completed our first student projects which included the Schlieren optical technique which was used to illustrate convection. Having realised how useful imaging has been to the students, we are about to acquire a high-speed camera. There a number of lecture rooms equipped with image projectors means that not only do the students benefit from professional presentations, but using the cameras they can experience live demonstrations.