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Date Monday, April 20, 2026

Time 11:00 AM to 12:00 PM

Location HSB Room 315

Title: *Confocal Microscopy Today*

Abstract: The most important property of the confocal microscope is probably its ability to record high resolution thin, high contrast, in-focus optical slices from within a thick specimen. In many cases, the increase in contrast in these image slices is the important point. In other cases, taking a through-focus series of such optical sections allows computer rendering of the specimen in three dimensions. The original designs of such instruments used the point source – point detector optical system proposed by Marvin Minsky in the 1950s. This optical architecture provides the necessary optical sectioning but, in order to form an image, it is necessary both to introduce scanning and, because of the need to use point illumination and point detection, a bright light source such as a laser must also be used. This was the only practical approach when confocal microscopy first came to prominence in the 1970s. The early systems, and many commercial implementations, were (and still are) built around conventional microscopes. However, since these early days technological advances in areas such as high-quality CCD cameras, non-laser light sources and inexpensive optical image processing has permitted alternative, 21st century, approaches to obtain optical sectioning to be developed. We will describe one such approach which uses a combination of structured illumination and structured detection to allow optical sectioning to be achieved at high speed without the need for laser illumination. We will show examples where the approach can either be combined with a conventional optical microscope or built as a stand-alone system.

Bio: Tony Wilson obtained his undergraduate (BA, MA) and graduate (DPhil) degrees at the University of Oxford. Following a period at Bell Labs he returned to Oxford where he was Professor of Engineering Science and Senior Fellow of Hertford College.

He was editor of the Journal of Microscopy for over twenty years and has been President of the Royal Microscopical Society, of which he is an honorary Fellow, and Master of the Worshipful Company of Scientific Instrument Makers in London. He was elected to a Fellowship of the Royal Academy of Engineering, the equivalent of the National Academy of Engineering in the United States. He is also Chairman and CEO of Aurox Ltd which manufactures a number of confocal imaging systems.