

Professor Christopher (Kit) R Hill

1929 – 2024



One of the few remaining true pioneers of medical ultrasound, Professor Christopher R Hill, passed away on April 15th 2024, at the age of 94. Professor Hill, (known to many as Kit), was a British physicist who was well known in the ultrasound community for his work on both therapy and diagnosis, and had been instrumental in developing and fostering the strong international links in medical ultrasound that exist to this day.

Before embarking on his ultrasound career, and following a degree in Natural Philosophy (Physics) from Oxford, UK, Kit spent 4 years as a Development Engineer with Microwave and Communications Systems at the Canadian General Electric Company. He was lured back to the UK in 1957 and joined the Institute of Cancer Research's (ICR's) Physics Department with a remit to do a PhD in environmental radiation research. His special interest was in the country-wide distribution of alpha-emitters, and was involved in measuring radioactivity in breast milk, and in thyroid glands, following the reactor accident in Windscale (1957), a subject to which he returned following the Chernobyl accident in 1986.

In the early 1960's Kit, working in a department in which Val Mayneord had recently studied the use of ultrasound for detecting brain midline shift, became intrigued by the work of William Fry and others in the USA, who were studying the ability of focused high power beams to create trackless lesions deep within the body, and decided this would be interesting for treating cancer. He therefore initiated research at the Institute of Cancer Research (ICR) that was

aimed at improving the understanding of the way in which ultrasound interacts with biological tissue, with a focus on both safety and therapy. He was one of the first to apply radiobiology techniques to study bio-effects in this area. His primary interest was in non-thermal effects, especially those due to acoustic cavitation. He was one of the first to draw attention to the need for objective (quantitative) measures in cavitation studies, having recognised that it was important to know whether or not cavitation had been induced when trying to understand interaction mechanisms. This work continues to this day, the ICR having built up an excellent international reputation under Kit's leadership.

Around 1967, Kit was approached by Ralph McCready who wanted to introduce one of the five prototype ultrasound scanners that were being built in Glasgow by Tom Brown and Ian Donald into the hospital with which the ICR is associated (the Royal Marsden). Ralph headed up the Nuclear Medicine department there. They raised money from the UK's Department of Health to lease a system. However, they found that, while the scanner could give adequate images for obstetrics, it was not useful for cancer, and so, with the help of David Carpenter from George Kossoff's group in Sydney (who had developed a grey scale method, initially for displaying water-bath ultrasound scans), they built one of the world's first grey scale contact ultrasound systems based on an articulated-arm scanner. Such scanners, built under Kit's direction, were used extensively to explore the applications of grey scale ultrasound in cancer medicine in the Royal Marsden Hospital. Recognising that the diffuse echoes they were seeing carried useful diagnostic information, Kit and colleagues started a programme of ultrasound based tissue characterization. Kit preferred the adjective 'investigative' to 'diagnostic' for describing this aspect of the work being carried out at the ICR. This work, which is now commonplace in the clinic, continues to this day at the ICR, and can be considered as the forerunner of today's quantitative and functional imaging. He showed characteristic foresight in the 1970s in recognizing the potential of ultrasound echo motion analysis to provide information on the biomechanical properties of tissues, particularly shear modulus, a subject nowadays known as elastography.

Kit was one of the first to place emphasis on calibration and dosimetry (exposimetry) for both diagnostic and therapy ultrasound, publishing one of the first reviews on this in 1970.

Kit Hill was a thoughtful and insightful man. Those who were members of his Team over the years knew that they were being welcomed into a group with an excellent international reputation that was at the forefront of ultrasound research, and had high academic standards, but above all had a 'nurturing' feel about it. They recognized that Kit cared about their well being, both personally and professionally. There are many in the global ultrasound community who will have fond memories of being welcomed into Kit and Susan's home.

On the national and international stage, Kit chaired the International Electrotechnical Commission (IEC) Working Group on Medical Ultrasound Equipment between 1970 and 1981. He was President of the British Medical Ultrasound Society (BMUS) from 1977-1978, and of the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) from 1981 – 1984. He was instrumental in setting up both these professional societies, and also in founding the World Federation of Societies for Ultrasound in Medicine and Biology (WFUMB) of which he was Honorary Secretary from 1979-1985. He was the designer of the logo originally used by EFSUMB, but now used only by WFUMB - the snake coiled around an ultrasound pulse that is familiar to so many people today. He says in his memoirs that if he 'had a penny for every time it had been reproduced' he would be 'quite rich'.

One of Kit's most important legacies stems from his recognition of the importance of a good understanding of the possibility that imaging ultrasound may lead to unwanted biological effects, and of transmitting this information to users and patients alike. At his insistence, EFSUMB established the European Committee for Ultrasound Radiation Safety (ECMUS), (originally known as the Watchdogs). The ever increasing numbers of scans, and the introduction of new imaging techniques, mean that it is more important than ever that a watching brief is kept on safety, and that guidance for the safe use of diagnostic ultrasound is available.

Kit was the joint winner of both the first and the second Ultrasound in Medicine and Biology prizes in 1982 and 1983. Amongst his many prizes and accolades, in 2003 Kit was awarded the International Society of Therapy Ultrasound's Fry Award for his pioneering work. An appropriate honour given his beginnings in medical ultrasound. The British Institute of Radiology awarded their Barclay Prize to his group at the ICR in 1982. He authored more than 200 peer reviewed research papers and edited at least seven books and conference proceedings, the most recent of which was the second edition of the 'Physical Principles of Medical Ultrasonics' (2004) which also appeared in Russian translation, much to Kit's pleasure as he had close links with Russian colleagues.

In retirement, Kit became involved with the Pugwash Conferences on Science and World Affairs. He was active both at British, and at international levels as a committee member, Secretary and then Treasurer. He accompanied Professor Joseph Rotblatt to Stockholm when he, and Pugwash, were awarded the 1995 Nobel Peace Prize for their efforts "to diminish the part played by nuclear arms in international politics and, in the longer run, to eliminate such arms". Kit wrote an account of Professor Rotblatt's life and work 'Professor Pugwash: the man who fought Nukes'; this was aimed at the younger generation, and was published in 2008.

Kit is survived by his four children, six grandchildren and six great grandchildren. His wife and soul mate, Susan, passed away in 2017.

Gail ter Haar, Jeff Bamber, Francis Deck, Carmel Moran