

THE TRIBOLOGY TRUST

(Administered by the Institution of Mechanical Engineers)

CITATION

The 2010 Tribology Gold Medal

Awarded to

PROFESSOR FRANK E. TALKE

In recognition of his outstanding achievements in Tribology in particular for his meritorious work in the field of magnetic storage systems, ink jet technology and interferometric instrumentation



After receiving his PhD degree in Mechanical Engineering at the University of California, Berkeley in 1968, Prof Talke joined IBM's Research and Development Laboratories in San Jose, California. During his 17 years at IBM he was engaged in studying design and mechanics problems in magnetic recording and ink jet printing technology. In particular, he investigated the design and optimization of magnetic recording sliders and the tribology of contact start/stop, an approach commonly known as Winchester technology. Whilst at IBM, Professor Talke was also involved in studying mechanics and design problems of tape drives, and he pioneered an effort in developing a proto-type drop-on demand-colour ink jet printer. At IBM he was the recipient of two "Outstanding Contribution Awards" and one "Outstanding Technical Achievement Award" for his seminal work in tribology of magnetic recording and ink jet printing technology.

In 1986 he accepted a position at the University of California, San Diego, where he was a Founding Member of the internationally well known Center for Magnetic Recording Research. There, Professor Talke continued his pioneering investigations into the understanding of friction and wear of magnetic recording sliders during start-stop and load-unload, investigated the dynamics of the head disk interface using laser Doppler interferometry, and developed high precision instrumentation for the measurement of non-repeatable run-out of hard disk drive spindles.

He is a pioneer in the application of laser Doppler vibrometry to the study of the dynamics of the head/disk interface and the use of monochromatic light interferometry to the measurement of sub-100 nm head/disk spacing. He pioneered the use of novel lubricants and additives for the head/disk interface at the nano-scale. His research was instrumental in achieving an improved understanding of the tribology of the head/disk interface which is a prerequisite for the extraordinary increase in the areal density of hard disk drives that we have all benefited from.

His work on the surface texturing of sliders, on the tribology of wear-protective carbon overcoats on sliders and disks, on the dynamics of sliders and the use of various lubricants and additives resulted in important advances in the field of magnetic recording tribology. His research in the area of head/tape spacing measurement using monochromatic light interferometry has been instrumental in the development of multi-wavelength interferometric test equipment for the measurement of the head disk spacing. His pioneering investigations into the use of laser Doppler vibrometry have made this technique an essential tool that is now being used by all disk drive manufacturing companies for studying head/disk interface phenomena.

At present Professor Talke is actively involved in exploring the tribological and mechanical limits of high density recording using dual stage actuators for increasing the track density and “thermal flying height control sliders” for the reduction of the head disk spacing to the order of several nano meters or less.

Professor Talke is an international authority in tribology and mechanics of magnetic storage systems, interdisciplinary research in data storage technology, and the development of instrumentation and new techniques for improving the storage density in hard disk drives. He combines demanding theoretical research in the field of tribology with successfully putting the results into practice. His former students now hold important research and development positions in companies in the magnetic recording industry such as Hitachi, Seagate, or Western Digital. A strong influence of his work is the impact on the economy of the hard disk drive industry, tribology of magnetic recording being a key area for achieving the growth of this technologically very important field.

Professor Frank E Talke has authored or co-authored more than 290 archived publications and holds 11 US patents. He is a Fellow of the ASME, the STLE, and the IEEE. He received the Max Planck Award for International Cooperation and was inducted to the National Academy of Engineering in 1999. Professor Talke is the co-recipient of the First Seagate/ASME Tribology Award in 2002. He also received an Honorary Doctorate from the Technical University of Munich, Germany, in 2005 and the senior Humboldt Research Prize in 2007. Professor Talke was the recipient of the prestigious ASME medal, the highest ASME honour, in 2008 and he was inducted into Acatech, the German National Academy of Engineering in 2009. He received the ASME Mayo D, Hersey Award in 2010.

Professor Frank E. Talke’s achievements and leadership in the field of tribology of magnetic recording storage devices make him a worthy recipient of the 2010 world’s highest award in Tribology, the Tribology Gold Medal.

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