



<Citation for 2010 Japan Prize>

Prof. Shun-ichi Iwasaki (Japan)

Field Eligible for the Award: Industrial Production and Production Technology

Achievement: Contributions to high-density magnetic recording technology by the development of a perpendicular magnetic recording method

Citation for the Award:

Computers have been playing the leading role in the creation of today's information society. Hard disc drive (HDD) technology, which has been particularly important for magnetic recording, is one of the key elements that constitute computers along with LSI technology. We can say that without the advance of HDD technology, the development of today's Internet systems and Cloud computing systems would never have taken place. In the future, as we head towards an age of total digitalization, increasing the capacity of HDDs will be called for; and the perpendicular magnetic recording method developed by Prof. Shun-ichi Iwasaki is the innovative technology that makes this possible.

All conventional magnetic recording, which uses a ring-type head, employs a method by which the recording medium is magnetized in a planar. With this method, in order to simply increase the recording density of the signal on the medium, it is necessary to make the medium's magnetic layer thin so as to prevent attenuation of the magnetization. However, this method has an essential problem—thermal instability of signal is inevitable.

By returning to and investigating the fundamentals of magnetic recording, Prof. Iwasaki succeeded in the following findings and developments: 1) he discovered that a magnetic mode perpendicular to the surface of the recording medium is effective for high-density recording; 2) he conceived the epoch-making idea that high sensitivity can be achieved, if a perpendicular magnetized film is made into a double-layered structure with an in-plane magnetization layer attached behind, and 3) he developed a perpendicular magnetic head that uses a thin magnetic membrane. In 1977 these findings and developments resulted in the realization of a perpendicular magnetic recording method for high recording density for the first time in the world. As a result of these accomplishments, he brought about a major paradigm shift from the conventional horizontal recording—for which various methods had been developed and whose life had thus been extended—to perpendicular magnetic recording.

In 2006 the world's leading computer disc manufacturers began manufacturing HDDs that are based on a perpendicular magnetic recording method. It is said that all HDDs to be manufactured in 2010 will be of the perpendicular magnetic recording type. This new technology has thus established a firm position in the manufacturing of HDD—the main memory devices of a computer—moreover it has greatly contributed to the production technology of HDD.

Thus, through his fundamental review of conventional technology and his forward leap in thinking, Prof. Iwasaki has developed a new field of magnetic recording, and has made an incomparable contribution to the creation and development of large-capacity recording technology geared to the age of total digitalization. Prof. Iwasaki is deemed most eminently deserving of the 2010 Japan Prize given to honor contributions to “Industrial Production and Production Technology” in the field of electrical engineering and information technology.

<Curriculum Vitae>

Prof. Shun-ichi Iwasaki
Director, Tohoku Institute of Technology
Professor Emeritus, Tohoku University

Nationality: Japan

Date of Birth: August 3, 1926 in Fukushima Prefecture, Japan Age: 83

Academic Degrees:

1949 B.A., Tohoku University
1959 Dr. Eng., Tohoku University

Professional Career:

1949-1951 Tokyo Tsushin Kogyo K.K.
1951-1958 Assistant, Research Institute of Electrical Communication, Tohoku University
1958-1964 Assistant Professor, Research Institute of Electrical Communication,
Tohoku University
1964-1989 Professor, Research Institute of Electrical Communication, Tohoku University
1986-1989 Director, Research Institute of Electrical Communication, Tohoku University
1989 Professor Emeritus, Tohoku University
1989-2008 President, Tohoku Institute of Technology
2004-Present Director, Tohoku Institute of Technology

Affiliation: Tohoku Institute of Technology

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Major Publications:

1. S. Iwasaki and K. Nagai, Some Considerations on the Design of High Output Magnetic Tape for Short Wavelength Recording. SCI. REP. RITU., B-(Elect. Comm.), 15, 2, 85, 1963
2. S. Iwasaki and T. Suzuki, Dynamical Interpretation of Magnetic Recording Process. IEEE Trans. On Magn., MAG-4, 3, 269, 1968
3. S. Iwasaki and Y. Nakamura, An Analysis for the Magnetization Mode for High Density Magnetic Recording. IEEE Trans. On Magn., MAG-13, 5, 1272, 1977
4. S. Iwasaki, Y. Nakamura and K. Ouchi, Perpendicular Magnetic Recording with a Composite Anisotropy Film. IEEE Trans. On Magn., MAG-15, 6, 1456, 1979
5. S. Iwasaki, Perpendicular Magnetic Recording. IEEE Trans. On Magn., MAG-16, 1, 71, 1980

Awards and Honors:

1987 Japan Academy Prize
1987 Persons of Cultural Merit
1988 Institute of Electrical and Electronics Eng. (IEEE),
USA Technical Achievement Award of the Computer Society
1989 Cleo Brunetti Award of IEEE
2002 Achievement Award of the Magnetics Society
2003 Order of the Sacred Treasure, Gold and Silver Star

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