
Editorial

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Biographical notes: Bo Liu received his Bachelor and Master Degree in Computer and Electrical Engineering from the Huazhong University of Science and Technology (HUST), Wuhan, China in 1982 and 1984, respectively, he did his further study in Manchester and received his PhD Degree from the Manchester University, UK in 1993. He worked as a faculty member in HUST China, in 1985–1990. He joined the Data Storage Institute, Singapore, in 1993. He is Principal Scientist of the Institute. He is also the Head of the Spintronics, Media and Interfaces Division of the Institute. He is a member of IEEE and has more than 130 peer-reviewed journal publications and 15 patents.

Jing Gui received his BS and MS in Physics from Northeast University, China in 1982 and 1984, respectively, and his PhD in Materials Science from the University of California, Berkeley in 1991. He has been working in the field of head-disc interface tribology at Seagate's Media Research Center since his graduation from UC Berkeley. At Seagate, he is Executive Director and has been responsible for research and development of advanced mechanical technologies to underpin the magnetic recording media technology roadmaps, particularly in the areas of head-media spacing, durability, flyability, and mechanical and chemical reliability. He has co-authored more than 50 peer-reviewed scientific papers, and he is a co-inventor of 57 US patents.

Jinmin Zhao received her Bachelor Degree in Automotive Engineering from Chongqing University, China in 1984 and her PhD Degree in Mechanical Engineering in Huazhong University of Science and Technology, China in 2001. She worked as a faculty member in Wuhan University of Science and Technology, China in 1984–1997. She joined the Data Storage Institute, Singapore, in 2001. She is a senior research fellow of institute. She has co-author more than 20 peer-reviewed scientific papers.

Memory is our coherence, our accumulation of feeling and sensing, our starting point of our passion and quality of life. Memory is so crucial that, without it, we would be nothing. Nowadays, the amount of information memorised or recorded by physical devices in every 3~4 years is more than the sum of the information recorded in the whole history of human being.

Magnetic disk drive technology is the prime technology for data storage in modern society. In fact, almost 90% of the total information storage capacity generated in 2006 comes from the magnetic disk drive technology.

Our society is moving towards data available anytime, anywhere and at any realistic data storage capacity demand. Therefore, data storage technology must make continuous and aggressive advances to sustain and support this immense explosion of information storage demand. Impressive developments have been achieved in the last decade in the key enabling aspects for ultra high density magnetic data storage technology, from nano and atomistic magnetic media technology for high packing density data storage, nano-spintronics technology for high sensitivity data retrieval, to atomistic and nano mechanics for extremely small head-disk spacing for ultra high resolution data recording and retrieval.

The Nobel Prize in Physics 2007 was awarded to Dr Albert Fert and Peter Grunberg for their discovery of Giant Magneto-Resistance or GMR which makes today's high sensitivity magnetic data retrieval possible. This illustrates the technology challenge level of modern data storage research. Today's high end disk drives have reached an areal density of 200 Giga-bit per square inch (Gb/in²) or a bit size of 23 nm × 140 nm only. Researchers are targeting at further technology breakthroughs to enable 10,000 Gb/in² or 10 Tera-bit per square inch (Tb/in²) areal densities – to secure the storage capacity demands of future information society in next 15 years.

This special issue of *International Journal of Product Development* focuses on the product and engineering challenges of modern information storage technology. With a collection of 16 quality papers, the topics covered in this special issue include nano-magnetics and magnetic media material technology, nano-spintronics and magnetic read/write head technology, nano-mechanics and actuator technology for head-positioning and ultra-low flying height technology, advanced signal processing and recovering technology, advanced system design and integration technology, and optical data storage technology.

We would like to take this opportunity to express our sincere thanks to the authors of those quality papers as well as the *International Journal of Product Development* for inviting us to be the Guest Editors of this issue.