

Thursday, November 19th, 2009

Western Digital, 1710 Automation Parkway, San Jose, CA

[Directions and Map](#)

Cookies, Conversation & **Pizza too at 7:00 P.M.**

Presentation at **7:30 P.M.**

Biomedical Nanomagnetism : A Spin through New Possibilities

Prof. Kannan M. Krishnan

2009 IEEE Magnetics Society Distinguished Lecturer

University of Washington, Seattle

Abstract

Two of the principal challenges in biomedical nanoscience and personalized medicine are: a) the detection of disease at the earliest possible time prior to its ability to cause damage (diagnostics and imaging) and b) delivering treatment at the right place, at the right time whilst minimizing unnecessary exposure (targeted therapy with a triggered release). The former is dominated by optical methods, emerging “life on a chip” systems and the versatile magnetic resonance imaging technology. The latter remains an ongoing challenge. In this context, we have been developing multifunction platforms for therapy, diagnostics and imaging based on functionalized, biocompatible, nanomagnetic molecular probes. Our work encompasses innovations in synthesis and functionalization, controlled self-assembly, advanced characterization, a wide-range of magnetic measurements and modeling to tailor their behavior for high moment or high frequency applications and carrying out cytotoxicity and biocompatibility studies. Currently, in vitro (magnetic separation and diagnostic relaxometry), in vivo (hyperthermia treatment of cancer, triggered drug delivery) and imaging (contrast enhancement in MRI and the development of a novel magnetic particle imaging microscope) applications are all being pursued. This first part of the lecture will include an overview of nanotechnology, size-dependent magnetic behavior and the emerging field of biomedical nanomagnetism. This will be followed by a comprehensive discussion of our current work in these areas highlighting the fundamental principles behind our research in the context of emerging technological and clinical opportunities.

Biography

Kannan M. Krishnan



Kannan M. Krishnan received his B. Tech in Mechanical Engineering from IIT, Kanpur (India) in 1978, his MS in Materials Science from SUNY, Stony Brook in 1980 and his Ph.D in Materials Science from the University of California, Berkeley in 1984. He subsequently held various scientific and teaching positions at Lawrence Berkeley National Laboratory, UC Berkeley before joining the University of Washington, in 2001, as the Campbell Chair Professor of Materials Science and Adjunct Professor of Physics. He has also held visiting appointments at the Hitachi Central Research Laboratory (Japan), Tohoku University, Danish Technical University, University of Sao Paulo, University of Western Australia and Indian Institute of Science. Prof. Krishnan is well recognized for both research and teaching. His many awards include the Guggenheim Fellowship (2004), the Rockefeller Bellagio Residency Fellowship (2008), the Burton Medal (Microscopy Society of America, 1992), Japanese Society for the Promotion of Science Senior Scientist Fellowship (2002), the University of Washington, College of Engineering Outstanding Educator Award (2004) and an appointment as the Professor-at-large at the University of Western Australia (2006-8). He is a Fellow of the American Association for the Advancement of Science and the Institute of Physics (London), and has served on the editorial boards of the Journal of Materials Science and Journal of Physics D: Applied Physics.

Prof. Krishnan's inter-disciplinary research interests are in magnetic nanostructures and thin film heterostructures, biomedical nanomagnetism, oxide spin electronics, advanced materials characterization and structure-property correlations at relevant length scales. All the projects are vertically integrated from the underlying science to their engineering (information storage, MEMS, magnetoelectronic devices) and biomedical (diagnostics, imaging and therapeutics) applications.

Contact:

Prof. Kannan M. Krishnan, Department of Materials Science, University of Washington, Seattle, WA 98195-2120, USA; telephone: 1-206-543-2814; fax: 1-206-543-3100; E-mail: kannanmk@u.washington.edu

January 26th, 2010

Western Digital, 1710 Automation Parkway, San Jose, CA

[Directions and Map](#)

Cookies, Conversation & Pizza too at 7:00 P.M.

Presentation at 7:30 P.M.

Technology Trends for Magnetic Storage What Is The Future?

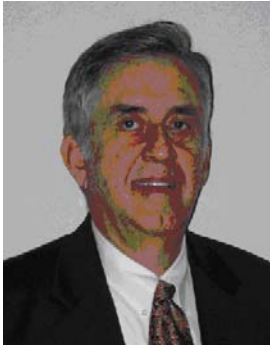
**Dr. Edward Grochowski
Computer Storage Consultant**

Abstract

Today's hard disk drive has evolved through miniaturization into a small storage device with up to 2.5 Terabytes of storage, with the promise of multiterabyte products appearing in the very near future. This storage device, based on reduced form factors and large capacity, is well suited for today's storage applications, from large server units to mobile PC's and consumer based products. The technology which made this storage device possible includes advanced read/write heads which now include PMR, TMR, thin film media, PRML data channels and many other features which have added to the usefulness of HDD's while significantly reducing price per gigabyte. An analysis of this technology will be given as well as projections of where newer advances could extend the applications of magnetic storage products to the future. A comparison of HDD storage to alternative non-volatile technologies including Flash memories and MRAM devices will be discussed. The challenges of advanced processing techniques will be outlined. A major part of the presentation will include trend charts, with technical rationale, to assist in the projecting the future.

Biography

Dr. Edward Grochowski



Ed Grochowski is a well known speaker on magnetic storage technology. He began his career with IBM's microelectronic silicon activity in New York and later joined the IBM Almaden Research Center where his interests included hard disk drive and component evolutionary trends. Dr. Grochowski holds nine patents and has authored and presented numerous articles on magnetic disk drives and component technology, including a website of storage trend charts. He has a Ph.D. from New York University in Chemical/Materials Engineering. Ed served as Executive Director of IDEMA USA and for over ten years chaired the conferences and technical committees for DISKCON USA and DISKCON Asia Pacific, as well as the prestigious Symposium series. He was a long time coordinator of the 4K byte sector standards committee. Ed is also a member of the IEEE.

As a consultant, Dr. Grochowski has been associated with Hitachi GST, IDC, TrendFocus and Coughlin Associates. With the latter, he co-authored a comprehensive 2008 storage report addressing HDD technology trends and capital equipment requirements for the industry, and plans to publish an update of this work in early 2010.

Contact:

- Dr. Edward Grochowski
- San Jose, CA
- <http://edwgrochowski.com>
- EdwGrochowski@aol.com