



# IEEE Magnetics Society NEWSLETTER

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**Martha Pardavi-Horvath, Editor**

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# NEWS FROM THE PRESIDENT OF THE MAGNETICS SOCIETY

## President's report to the membership

In the last quarter the Magnetics Society has continued with its developments in a steady manner. The major event during the last quarter has been the *MMM conference* which took place at the Fairmont Hotel in San Jose from 30 October to 3 November. The conference was an outstanding success under the chairmanship of Randall Victora, with an all time record attendance for a stand-alone MMM conference and, as far as the Society is concerned, only exceeded in attendance by the joint conference in San Francisco some years ago. The technical quality of the conference was extremely high, and the shift away from aspects of magnetic recording to new topics such as spin electronics was notable. In particular the explosion in interest in spin tunnel junctions based on MgO layers was marked.



As usual at such meetings, all the major committees of our Society met. It was gratifying to see that the arrangements laid down in the revised Constitution, which is posted on this website, are now beginning to take effect. A very dynamic meeting of the Technical committee was held where a new generation of young people from a wide range of countries and backgrounds freely expressed their opinions and came up with good ideas for future Society activities. These were reported back to the appropriate officers, and ideally some of these ideas will be implemented in the near future. I am still happy to receive input from others interested in the Society for new directions that we could take in the future.

A meeting of the Chapter chairs from around the world was also held, and it was gratifying to see the exchange of best practice ideas between the different chapters taking place over lunch. In the last six months the Society has formed four new chapters in Singapore, Taiwan, North Japan and South Brazil. We are still interested in forming new chapters in as many countries of the world as possible. Financial resources are available to support the formation of new chapters, and anyone interested in providing a new chapter or in becoming involved in chapter activities generally is very welcome to contact either myself or Richard Dee ([r.dee@ieee.org](mailto:r.dee@ieee.org)). It is often not realised that the membership of the Society at about 2,750 is only in face to face contact with the Society via the InterMag conference and the chapters. Given that the attendance at InterMag is typically about 1,000, this means that two thirds of our membership relies on the chapters for face to face contact. Hence the development of chapter activities is of vital importance for the future of the Society and for increasing participation amongst our membership and particularly younger members.

In other areas, the development of our conferences and the widening of participation in their organisation and management continues under the careful supervision of Doug Lavers of the University of Toronto who is our Conference Executive Committee chair. Members may wish to note that arrangements have been made for the next InterMag under the chairmanship of Mel Gomez of the University of Maryland. Thereafter we have the joint conference under the chairmanship of Julie Borchers in Baltimore from 7 to 11 January 2007 followed by the next off-shore InterMag which will be held from 4 to 8 May 2008 in Madrid, Spain, under the chairmanship of Manuel

Vázquez of the CSIC in Madrid. Following the success of our conference in Nagoya we are now commencing the site search for the next Asia-Pacific InterMag. Again all members are welcome to make suggestions regarding our conference activities by contacting Doug Lavers at [doug.lavers@utoronto.ca](mailto:doug.lavers@utoronto.ca).

It is well known that the Magnetics Society always welcomes approaches from people organising meetings and conferences for both cooperative arrangements and, when necessary, financial support. The Magnetics Society is willing to consider any proposals to underwrite financially meetings in our general subject area. In order to secure financial support of this kind organisers of such meetings are required to adhere to Magnetics Society policies on issues such as invited papers and also IEEE policies in areas such as providing discounts for Society members. However thereafter the organisers are largely free to organise their meetings as they see fit, adopting their choice of format and also publishing in non IEEE journals. Of course given that the Magnetics Society and hence IEEE would be taking the financial risk careful scrutiny of budgets and budget approval are essential. The Society is also able to advance financial resources to enable such conferences to take place. Any Society members wishing to organise meetings and seeking financial underwriting should contact Doug Lavers who will listen sympathetically to the needs of the membership.

In terms of our finances the Society remains in a very stable condition with good reserves in excess of \$2M. This level of reserve is an IEEE requirement as the annual turnover of the Society is of a similar level and IEEE requires that we maintain a reserve approximately equal to our turnover. Recent changes at IEEE involving the distribution of resources gained from publication activities, which dominate our activity, have recently been changed. These changes reflect the income to IEEE from electronic downloads rather than from the purchase of paper copies of our Transactions. Due to these changes it is anticipated that the Society's finances will become even healthier as we go forward. I, and the other officers of the Society, are acutely aware of the need to use these resources to provide member benefits. We will be coming forward with plans at the committee meeting scheduled for the InterMag in San Diego and about which I will inform you in my newsletters as we go forward.

In closing therefore I would like to thank you for your continued membership and commitment to the Magnetics Society. I would urge you to encourage your colleagues in both Applied Physics and Engineering with technical interests in the field of magnetism to join the Society. The benefits of membership are substantial and because of issues described above are likely to increase in the near future. Principally the benefits of membership are the status accorded to those in the engineering profession of belonging to an organisation (IEEE) with a world wide membership of 350,000 people. Enhanced membership such as senior member status or fellowship accord an even greater boost to your reputation and standing in the community.

Under our new arrangements only Society members are able to benefit from provisions such as our student travel grants. In this area we typically award about \$25,000 per year for travel to the InterMag conference, usually giving about \$750 to each student. Also in future you will see an increased conference fee differential for our flagship conferences. This discount alone almost offsets the full cost of membership of the IEEE and the Magnetics Society. We also have our Chapter programme, which is now carefully integrated with the Distinguished Lecturer tours, and there are other peripheral benefits -- particularly for young people, for example, who are able to rent cars in

the United States when below the age of 25. Hence overall it is my view that membership in the Magnetics Society and IEEE provides substantial rewards, and it is only through vibrancy of the membership that our Society is able to continue. I thank you all for your participation and encourage you to increase your inputs in any areas where you may have interests.

Please accept my best wishes for the calendar year 2006.

*Kevin O'Grady*  
*IEEE Magnetics Society President*  
*January 2006*

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# IEEE MAGNETICS SOCIETY OFFICERS

## 2005-2006

### OFFICERS

First Name	Last Name	Position	Company / Institution
Kevin	O'Grady	President	The University of York
Carl	Patton	Vice President	Colorado State University
Randall	Victoria	Secretary/Treasurer	University of Minnesota
Ron	Indeck	Past-President	Washington University

### APPOINTED CHAIRS

First Name	Last Name	Position	Company / Institution
Richard	Dee	Chapters	SUN Microsystems
Ron	Goldfarb	Publications	NIST
Mel	Gomez	Technical Committee	University of Maryland
Bruce	Gurney	Awards	Hitachi Global Storage Technologies,
J.W.	Harrell	Education	The University of Alabama
Can	Korman	Publicity	The George Washington University
Laura	Lewis	Finance	Brookhaven National Laboratory
Bob	McMichael	Standards	NIST
Phil	Wigen	Nominations	Ohio State University

### NON-VOTING MEMBERS

First Name	Last Name	Position	Company / Institution
Roy	Chantrell	Distinguished Lecturers Coordinator	The University of York
David	Jiles	Editor in Chief of the Transactions	Ames Laboratory
Diane	Melton	Executive Director	Courtesy Associates
Martha	Pardavi-Horvath	Newsletter Editor	The George Washington U.

## **New IEEE Fellows**

“The grade of **Fellow** recognizes unusual distinction in the profession and shall be conferred only by invitation of the Board of Directors upon a person with an extraordinary record of accomplishments in any of the IEEE’s designated fields of interest. “

The Fellow Committee has named 271 IEEE Senior Members to Fellow Grade effective 1 January 2006.

## **Congratulations to our newly recognized distinguished colleagues:**

### **Charles Falco**

University of Arizona

for contributions to characterization of magnetic and optical films.

### **Frank E. Talke**

University of California, San Diego

for contributions to magnetic recording disk and tape drives.

### **Ed Williams**

Retired - ReadRite Corporation

for leadership in the magnetic recording industry.

## **Letter from the President of the Magnetics Society**

In my capacity as President of the Magnetics Society of the IEEE I am writing to pass on my warmest congratulations to you on your election to the grade of Fellow of the Institution of Electrical and Electronic Engineers.

I personally am aware of the level of commitment and professional expertise required for the elevation of Fellowship which is why it is such a rare award. The Magnetics Society is proud of your achievement and congratulates you warmly.

Very best wishes.

*Kevin O'Grady*

## CHARLES FALCO, FELLOW of IEEE



*Charles Falco* is a Professor of Optical Sciences at the University of Arizona where he holds the UA Chair of Condensed Matter Physics. His IEEE citation reads "for contributions to characterization of magnetic and optical films," and he also is a Fellow of the American Physical Society and the Optical Society of America. He has published more than 250 scientific manuscripts, co-edited two books and has seven U.S. patents, most of which are related to various physical properties of thin film materials. However, in addition to his scientific research, in 1998 he was co-recipient of an award from an international association of art critics for his work as co-curator of the Solomon R. Guggenheim museum's "The Art of the Motorcycle" exhibition. With over 2 million visitors thus far in New York, Chicago, Bilbao, and the Guggenheim Las Vegas, it has become the 5th most attended museum exhibition ever assembled. More recently, a collaboration with the artist David Hockney has resulted in widespread coverage in the popular media, including an hour-long BBC special and a segment on CBS '60 Minutes', and over 50 invited talks and public lectures in 9 countries, including at the European Science Foundation Exploratory Workshop on "Optics, Optical Instruments and Painting: The Hockney-Falco Thesis Revisited."

## FRANK E. TALKE, FELLOW of IEEE

Professor in the Center for Magnetic Recording Research at UCSD

[ftalke@UCSD.Edu](mailto:ftalke@UCSD.Edu)

(858) 534-3646



*Frank E. Talke* received his Ph.D. from UC Berkeley in 1968 and worked at the IBM Research and Development Laboratories in San Jose from 1969-1986. He was a visiting professor at UC Berkeley in 1984, and joined the Department of Mechanical and Aerospace Engineering at UCSD in 1986. He is currently with the Center for Magnetic Recording Research, where he holds an endowed chair in the area of mechanics and tribology of magnetic recording systems. His current research interests are in the areas of mechanics and tribology of magnetic recording technology, precision engineering, and optimization of mechanical design. Professor received the Max Planck Price for international cooperation and was elected a member of the National Academy of Engineering in 1999. He is a Fellow of the ASME, STLE, and the IEEE.

His citation for the election to IEEE Fellow reads: "for contributions to magnetic disk and tape drives".

## EDGAR M. WILLIAMS, FELLOW of IEEE



*Edgar M. Williams* retired December, 1999 as a Fellow at READ-RITE Corporation in Milpitas, California and is now a consultant in magnetic recording technology. He has 42 years of experience in magnetic recording and in xerographic technologies, of which 19 years were with IBM Corporation, San Jose where he developed recording materials, media, heads, and laser printers. In 1983 he co-founded Gemini Magnetics, Inc. and developed thin film recording media, and in 1985 he joined Read-Rite as Director of Technology where he established thin film head design and applications engineering activities for the corporation. He was promoted to Vice President in 1989, appointed to Chief Technical Officer in 1993 and became Read-Rite's first Fellow in 1997. He has published the books, *Design and Analysis of Magnetoresistive Recording Heads* and *The Physics and Technology of Xerographic Processes*, has published papers, monographs, book chapters, and has taught over the many years in his profession. He holds four U. S. Patents in recording heads. Mr. Williams has degrees in EE and in Physics, is a Fellow of the IEEE, a member of the American Physical Society, was an adjunct faculty member of the I.I.S.T. at Santa Clara University, and is a past Editor of the IEEE Transactions on Magnetics.



## CHAPTERS CORNER

by

**Dr. Richard H. Dee,**

Magnetics Society Chapters Chair

### NEWS NEWS NEWS...

#### Chapter Chair Meeting

There was a chapter chair meeting held during the MMM Conference in San Jose, CA this last November 2005. Present were chapter chairs or reps from Japan, Korea, Singapore, Taiwan, Romania, UKRI, Washington, Pittsburgh and Santa Clara as well as the Society Chapters Chair Richard Dee, the President of the Society Kevin O'Grady, and the Distinguished Lecturer coordinator Roy Chantrell. Issues concerning funding, distinguished lecturers, membership, membership listing, and activities were discussed while enjoying a nice lunch.

Keep an eye out for emails concerning a future meeting of chapter chairs at the upcoming INTERMAG conference in San Diego.

#### New Pikes Peak Chapter Forming

We've heard news that members in the Colorado Springs area of the Pikes Peak Section of the IEEE (Colorado, USA) have submitted a petition to the IEEE to form a local Magnetics Society Chapter under the leadership of *Radek Lopusnik*. We wish them all the best for the future.

#### News from the Romanian Chapter

This year we shall organize a Joint conference:

5th International Workshop "*Materials for Electrical Engineering*" (**MmdE-2006**),

joint with the 3rd International Conference **IEEE – ROMSC** (Romanian Magnetics Society Chapter) It will be in Bucharest between 15 and 17 June 2006.

Also we have just received the confirmation from Cecelia Jankowski (IEEE Regional Activities) that our IEEE Student Branch was approved. The members have already sent a petition to form a Student Branch Chapter (Magnetics Society).

#### News from the Korean Chapter

Prof. C. L. Chien, Physics, Johns Hopkins University, one of the 2005 Distinguished Lecturers, presented an invited talk entitled as 'Spin Torque and Nanorings' at the 2005 Korean Magnetics Society Winter Conference, December 8-10, 2005 in Yong Pyong Ski Resort. This talk was sponsored by IEEE Magnetics Society through 2005 DL Program, and by IEEE Magnetics Society Korea Chapter (Chaired by Prof. Young K. Kim at Korea University).

#### News from the Poland Chapter

The Magnetics Chapter in Poland will be highly involved in organization 9th International Workshop on 1 & 2 Dimensional Magnetic Measurements and Testing which will be held in Czestochowa, Poland, 18-19 September 2006. You can find all available at the moment information on website of the Conference [www.2-dm.com](http://www.2-dm.com).

If you are the local chapter chairman reading this, please share with us all that's happening in your chapter and local area (e.g. talks, people activity, magnetics news, company or university news etc.). Forward a paragraph (or two), a picture, a reference to an interesting article or something inventive or newsworthy (in your opinion) to me at [r.dee@ieee.org](mailto:r.dee@ieee.org) so we can include in the next MagSoc newsletter.

*Dr. Richard H. Dee*

**Magnetics Society Chapters Chair**

[r.dee@ieee.org](mailto:r.dee@ieee.org)

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## THE DISTINGUISHED LECTURER PROGRAM OF THE MAGNETICS SOCIETY

The Distinguished Lecturer (DL) program of the IEEE Magnetics Society has been in existence for a number of years. On an annual basis, three DLs are nominated and funded by the Magnetics Society to deliver a lecture by invitation of individual institutions or chapters. At the recent AdCom meeting an outline of the formal aims of the program were discussed and approved.

It is hoped that the adoption and pursuance of these aims will enhance the already significant contribution of the DL program to the vitality of the Magnetics Society and the field of magnetics overall.

### 1. The aims of the DL Programme

- To celebrate achievements in magnetics and honour the finest researchers and communicators in the field.
- To provide outreach to the wider community and promote the trans-national aims of the Magnetic Society.
- To support Chapter activities by providing high profile speakers for local meetings.
- To inspire and enthuse, especially young researchers entering a career in magnetics.
- To advertise and promote the IEEE Magnetics Society as the society of choice for magnetics professionals.
- To act as an engine to recruit new members to the Magnetics Society.

### 2. Criteria for Selection

Given the aims of the DL programme there are two principal criteria, based on awarding DL's to dynamic individuals with a strong presence in their field. However, the outreach aims of the programme also suggest further secondary criteria.

#### *Principal Criteria*

- Excellence in some field of magnetics. This is not limited to excellence in research, but should also recognise the important contributions of individuals in developing the applied/technical aspects of magnetics.
- Excellent communication skills.

#### *Secondary Criteria*

- Diversity
  - Technical – coverage of as many aspects of magnetics as possible
  - Geographical
  - Gender and Ethnic

- The DL should also be a member of the Magnetism Society. Under exceptional circumstances a non-member can be considered as long as he/she agrees to become a member.

This year we have an excellent set of DL's giving talks on 3 diverse areas:

- Half-Metals, Spin Torque, and Nanorings (Prof. Chia-Ling Chien, Johns Hopkins),
- Micro Fabrication Techniques for Magnetic Information Storage Devices: From Bubbles to Thin Film Recording Heads to Nano Magnetic Structures (Dr. Robert E. Fontana, Jr. Hitachi Global Storage Technologies), and
- Dynamics in magnetic micro- and nanostructures (Prof. Burkard Hillebrands, Technische Universität Kaiserslautern)

Further details of their talks in addition to brief biographies can be found in the following section. The DL's are currently in the process of finalizing their plans for the second half of the year, so if you are interested in having one (or more) talk in your location, now would be a good time to issue the invitation! Please contact the DL's directly for their availability or contact the DL coordinator (Roy Chantrell, rc502@york.ac.uk) for further information or help with arrangements. Roy would also be happy to receive comments on the aims of the program and any suggestions for its further development. He would also be interested in hearing of innovative use of the program, so as to be able to circulate examples of good practice. As one example, the UK chapter has a record of organizing 'topical meetings' around the visit of a DL, in which the DL presentation is complimented by a further 2-3 invited talks within the same area. These meetings have proven extremely popular and made the magnetism society very attractive to UK magneticians.

Finally, the success of the DL program was founded on the efforts of previous coordinators (Isaak Mayergoyz and Stan Charap). On behalf of the membership, the awards committee chair (Bruce Gurney) and Roy Chantrell would like to record their appreciation of a job well done by Isaak and Stan in creating a lively and effective program with its enormous contribution to the activities of the Magnetism Society.

***Roy Chantrell***

***Coordinator, IEEE Distinguished Lecturer Program***

Physics Department,

York University,

York, YO10 5DD, UK

Email: [rc502@york.ac.uk](mailto:rc502@york.ac.uk)

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## IEEE MAGNETICS SOCIETY DISTINGUISHED LECTURERS FOR 2006

### SPIN ELECTRONICS

**Michael Coey**

Trinity College Dublin

Conventional electronics has ignored the spin on the electron. Besides its fundamental unit charge, the electron has a magnetic moment due to its quantum of angular momentum. Things began to change in 1988, with the discovery of giant magnetoresistance in metallic thin film stacks. This led to the development of spin valves and magnetic tunnel junctions, which allowed magnetic recording to ride the tiger of 100% year-on-year growth of recording density for the past ten years. Tunnel junctions are the active elements for most schemes for nonvolatile magnetic random-access memory, which will be briefly surveyed.

These devices, which underpin the multi-billion dollar magnetic recording industry, are nothing more than sophisticated magnetoresistors, the simplest two-terminal electronic device. If we are to see a second generation of spin electronics, it will be necessary to develop more complex devices such as a three-terminal spin transistor with gain. Here magnetic semiconductors are required, or at least the ability to manipulate spin-polarized currents in normal semiconductors. The puzzling new family of dilute magnetic oxides, such as ZnO:Co or SnO<sub>2</sub>:Mn, and the emerging class of d<sup>0</sup> ferromagnets such as HfO<sub>2</sub> or CaB<sub>6</sub> may produce a new paradigm for magnetism in solids, and support entirely new device concepts. A major challenge is to separate spin and charge currents in solids, and transmit information magnetically, without dissipation.



**Michael Coey** received a BA degree in physics from Cambridge University in 1966, and a PhD from the University of Manitoba in 1971. He worked as a researcher in the Centre National de la Recherche Scientifique in the 1970s, before moving to Trinity College Dublin, where he has been Professor of Experimental Physics since 1986.

Michael Coey has broad interests in magnetism, spanning materials hard and soft, crystalline and amorphous, metallic, semiconducting and insulating as well as magnetic phenomena and devices. He coordinated the 'Concerted European Action on Magnets' (1984-94), a pioneering group of academic and industrial researchers devoted to all aspect of the understanding, development an application of rare-earth iron permanent magnets. More recently, he led the Oxide Spin Electronics Network, OXSEN 1996-2000. Currently he is Deputy Director of Ireland's nanoscience centre CRANN. He serves as Divisional Associate Editor of *Physical Review Letters* and on the editorial board of the *Journal of Magnetism and Magnetic Materials*.

His main research interests at present are in spin electronics, including magnetic semiconductors, as well as magnetotransport and magnetoelectrochemistry. He has published more than 500 papers, and is co-author of books on Magnetic Glasses and Permanent Magnetism. Michael Coey is the recipient of the Charles Chree medal of the Institute of Physics, and the gold medal of the Royal Irish Academy. He is a fellow of the Royal Society, and a Foreign Associate of the National Academy of Science.

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## MASSIVE INFORMATION: EXPLOITATION AND SECURITY

**Ronald S. Indeck**

Washington University

Magnetic information technologies have enabled the amount of data stored last year to increase, by some estimates, by nearly one order of magnitude over that of the previous year. Personal data stores have reached into the terabyte regime and enterprise stores are now measured in petabytes. Digital music and video recorders have brought large data stores into the consumer market. About 80 percent of these data are unstructured (i.e., not indexed), inherently unstructureable (e.g., audio, images, or DNA data), rapidly changing (e.g., intelligence data and medical records), or held as an object within an otherwise structured database (such as memo fields, voice records, etc.). To find something of interest and ultimately extract actionable knowledge from these unstructured data, like finding specific needles in a haystack of many needles, one must process all of the data stored — not just an index as is often done with structureable data. Furthermore, since data stored are increasing at a rate faster than electronic processing capacity (as guided by Moore's Law) our ability to manage this information in reasonable times is further aggravated.

New and tractable processing approaches, yielding performance improvements in excess of 100,000 over conventional systems, may be possible over storage networks and large disk arrays with capabilities that include line-speed compression, encryption, signal processing and other broad functionality. In this presentation I will explore emerging systems and hybrid concepts that circumvent conventional, sequential processor and bus-bandwidth limits, making data movement more effective and efficient, as well as enabling content-enhanced storage on ingest. Early critical applications include intelligence (both government and commercial), medicine, scientific research, financial services, and enterprise storage networks.



**Ronald S. Indeck** received the B.S.E.E., M.S.E.E., and Ph.D. degrees from the University of Minnesota. He is a Founder and Technical Advisor to Exegy, Inc. He was a National Science Foundation Research Fellow at Tohoku University in Sendai, Japan. Since 1988 he has been in the Department of Electrical Engineering at Washington University, where he is the Das Family Distinguished Professor and Director of the Center for Security Technologies. He has published more than 50 peer reviewed technical papers and has been awarded more than 20 patents. He has received the National Science Foundation Presidential Young Investigator Award, the Missouri Bar Association's Inventor of the Year Award, the IBM Faculty Development Award, the Washington University Distinguished Faculty Award, the IEEE Centennial Key to the Future Award, and the IEEE Young Professional Award.

Indeck is a Fellow of the IEEE and a member of the American Physical Society. He is on the board of the Federal Bureau of Investigation's InfraGard program. He has served several international conferences and was co-chairman of the 2002 International Magnetics Conference. He has served as an editor of *IEEE Transactions on Magnetics* and as president of the IEEE Magnetics Society. Indeck currently consults for industry and government, and leads research in projects of recording physics, magnetic devices, security, and data mining in massive databases.

**Contact: Prof. R. S. Indeck,**

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## BEYOND THE LIMITS OF MAGNETIC RECORDING: AN ITINERANT MAGNETICIAN LOOKS AT HYSTERICAL LOOPS

**Mason L. Williams**

Hitachi Global Storage Technologies (Retired)

For several decades there have been declarations that digital magnetic recording as we know it is about to reach the ultimate limit of areal density. Technological advances have enabled steady progress primarily through simultaneous scaling of dimensions and tolerances over several orders of magnitude and use of materials with larger energy densities. In the 1990's it became clear that then current approaches would be limited to about 40 Gb/ sq. in. by the combined requirements that individual grains have reversal barriers of above 40 kT for long term data retention and that a bit cell contain 100 or more grains for adequate media signal-to-noise. Recent areal density demonstrations at about 6 times that limit have been possible with perpendicular recording and improved materials, but perhaps we are again nearing the ultimate physical limits, unless a novel idea comes along. In addition to perpendicular recording, technologies suggested to extend the limits include patterned media, thermally-assisted writing and tilted media. We'll discuss the potential advantages and challenges of these approaches. Areal density is primarily limited by write head materials and fabrication tolerances, while data-rate is limited by sensor technology which must provide several times kT of signal energy (and low noise levels) to detect a bit. Sensors have evolved from inductive heads to anisotropic magneto-resistive heads to in-plane giant magneto-resistive (GMR) devices with CPP (current across the gap) GMR devices with spin-tunneling sensors also under consideration. We'll discuss the attributes of these technologies and the anticipated requirements. Powerful error correction codes will also be required if we are to reach 1 Tb/ sq. in, so attention must be paid to writing, reading and arithmetic.



**Mason L. Williams** received a B.S. in Engineering in 1964 from the California Institute of Technology, and the M.S.E.E. degree in 1966 and a PhD in Electrical Engineering with Physics minor in 1970 from the University of Southern California where he studied under Professor Jan Smit.

In 1970, Dr. Williams joined IBM in San Jose, California, initially in a Manufacturing Research department. In his first year he was assigned to work with R. Larry Comstock on characterization and testing of experimental magnetite film media. That collaboration led to the so-called "Williams-Comstock" analytical model of digital magnetic recording. In 1982, he joined the Magnetic Recording Institute and managed an investigation of perpendicular magnetic recording briefly. In 1985 he became manager of Advanced Recording

Heads at the IBM Almaden Research Center in San Jose. In that role he managed the development of micro-magnetic modeling for magneto-resistive head elements and the first building of spin-valve head test structures to verify biasing techniques. In 1992, Dr. Williams became the IBM representative to the Ultra-High Density Magnetic Recording Head project of the National Storage Industry Consortium, aimed at 10 Gb/sq in technology. In 1996, he became part of the Extremely High Density Recording Strategy Team at INSIC. In 1999, he was elected to the IEEE grade of Fellow. In 2001, he was selected as an IBM Master Inventor, and holds several recording head patents. At the end of 2002, Dr. Williams retired from IBM and joined Hitachi Global Storage Technologies. He worked on novel perpendicular head approaches and then focused again on recording physics and integration modeling until retiring from Hitachi in 2005.

**Contact: Mason L. Williams,**

5826 Vargas Ct, San Jose, CA 95120 USA; telephone: (408) 268-7791;

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# CONFERENCE REPORTS

## *Information For future Student Travel Award Winners*



Awards Committee



Dear *Student Travel Award Winner*,

As part of your student travel award from the IEEE Magnetics Society for Intermag 2005 you are requested to write a brief report on your experiences in going to the conference. This report should be no more than two pages in length, with no more than two figures or photographs, and should give an account of one or more of the following aspects of your attendance at the conference.

- You may use all or some of your report to describe the technical highlight of the conference from your point of view. This may be the particular session that you attended or it may be the Educational committee tutorial or some other part of the conference which you found particularly valuable in a technical sense.
- You may wish to comment on the conference as a whole. We would welcome your opinions on the organisation of our conferences and whether they serve the student population well.
- We know that very often students have an interesting time when going to a conference, both in terms of the travel experience and social interactions with other students or general conference participants. Feel free to use all of your report to describe your overall experience.

This year the Magnetics Society will provide travel awards to approximately 25 students. We expect to collect the student conference reports and publish many of them in the Society Newsletter on our website. This means that a selection of reports will be published in each edition of the Newsletter.

As with most publications of this kind our Newsletter Editor, Prof Martha Padarvi Horvath of George Washington University, will have the right to edit your report.

Please submit your report within the next four weeks to Prof Padarvi Horvath( [mpadarvi@gwu.edu](mailto:mpadarvi@gwu.edu) ) and please carbon copy Matt Carey ([matthew\\_carey@hitschigst.com](mailto:matthew_carey@hitschigst.com)) and Bruce Gurney ([bruce.gurney@hitschigst.com](mailto:bruce.gurney@hitschigst.com)).

We hope you enjoyed your conference experience and that in return you will give the writing of your report a high priority.

Best wishes,

Matt Carey/Bruce Gurney  
Student Travel Coordinator/Awards Chairman  
IEEE Magnetics Society

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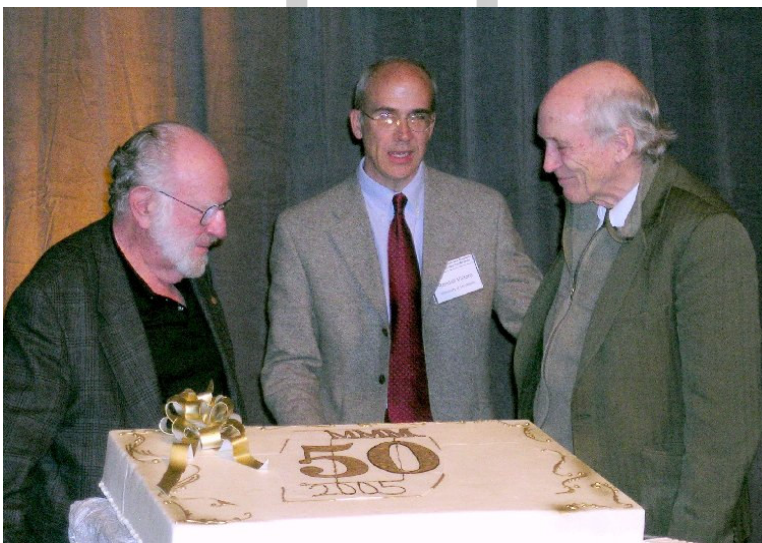
## Conference report

### 50<sup>th</sup> MMM

## The 50<sup>th</sup> Conference on Magnetism and Magnetic Materials

The conference on *Magnetism and Magnetic Materials* celebrated its 50 anniversary at the Fairmont Hotel in *San Jose*, CA from October 30 to November 3, 2005. There were **1548 registrants**, making it the largest stand-alone conference in the history of MMM. In fact, the attendance exceeded most Joint Conferences with the notable exception of the San Francisco MMM-INTERMAG in 1998.

The *program* was also unusually large, with 1405 contributed papers (out of 2142 submitted), 5 symposia, 1 tutorial, and 28 individual invited speakers.



**Marcel Muller and Tony Arrott, celebrating their 50<sup>th</sup> MMM with Conference Chairman, Randy Victora** (All photos courtesy of Ron Goldfarb)

A feature unusual to this MMM was a *plenary session* featuring 5 distinguished speakers, each discussing an important achievement that corresponded (roughly) to each decade of the conference. These talks included basic science, new discoveries in materials, and future directions. Listed chronologically, they were:



1. *Magnetism and Magnetic Fluctuations in One, Two and Three Dimensions*,

Robert Birgeneau, U.C. Berkeley

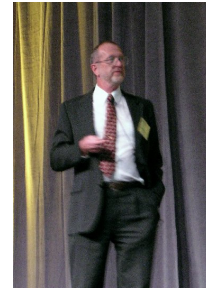
2. *Computational Quantum Magnetism: Then and Now*

Arthur Freeman, Northwestern University



3. *Innovation via Insurrection: Nd-Fe-B Permanent Magnets,*  
Jan Herbst, General Motors

4. *Early Development of Thin Film Heads,*  
David Thompson, IBM (retired)



5. *From GMR to the nascent fields of spintronics*  
Albert Fert, Université Paris-Sud

The session filled the Fairmont's largest ballroom and included 2 attendees of the original MMM conference 50 years ago: **Tony Arrott** and **Marcel Muller**. (There was no MMM conference in 1985 owing to the San Francisco ICM that year.)

After the talks, champagne, cake, appetizers, and beer were used to *celebrate* the occasion at a cost of ~\$39,000 (which may also be a conference record!). We hope the souvenir pub glasses provided to all attendees will encourage good memories of the occasion.

***Randall Victora***

Chairman of the 50<sup>th</sup> MMM

[victo004@umn.edu](mailto:victo004@umn.edu)

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## IEEE NEWS

### IEEE Officers for 2006 and Organization

#### 2006 IEEE Executive Committee

##### 2006 IEEE President and CEO

##### IEEE President-Elect

##### IEEE Past President

Director & Vice President, Educational Activities

Director & Vice President, Publication Services & Products

Director & Vice President, Regional Activities

Director & Vice President, Standards Association

Director & Vice President, Technical Activities

Director & President IEEE-USA

Director & Delegate, Division VIII

Director & Secretary

Director & Treasurer

Staff Director, Corporate Activities

Staff Secretary

##### **Dr. Michael R. Lightner**

Prof. Leah H. Jamieson

Mr. W. Cleon Anderson

Dr. Moshe Kam

Prof. Saifur Rahman

Mr. Pedro A. Ray

Mr. Donald N. Heirman

Mrs. Celia L. Desmond

Dr. Ralph W. Wyndrum, Jr.

Mr. Stephen L. Diamond

Prof. J. Roberto de Marca

Mr. Joseph V. Lillie

Mr. Lyle M. Smith

Mrs. Julie Eve Cozin

#### **The IEEE is organized into**

- » 311 **local sections** in 10 geographic **regions**.
- » about 1,450 **chapters** comprised of local members with similar technical interests.
- » 39 **societies** and 5 **technical councils** that compose 10 **technical divisions**.
- » more than 1,300 **student branches** at colleges and universities in 80 countries.
- » 300 **student branch chapters**.

#### **New Division Structure For 2006:**

As approved by the Technical Activities Board in June 2005, some changes take place on 1 January 2006 for the placement of Societies and Technical Councils into Divisions.

#### **Division IV - Electromagnetics and Radiation**

- Antennas and Propagation Society
- Broadcast Technology Society
- Consumer Electronics Society
- Electromagnetic Compatibility Society
- **MAGNETICS SOCIETY**
- Microwave Theory and Techniques Society
- Nuclear and Plasma Sciences Society
- Superconductivity Council

## IEEE Executives

The voting membership of the IEEE elects a new president each year, who serves for three years – first as **President-elect**, then as **President and CEO**, and finally as **Past President**.

The IEEE presidents also serve on the **three top-tier IEEE governing bodies**:

- » [IEEE Board of Directors](#)
- » [IEEE Executive Committee](#)
- » [IEEE Assembly](#)

[Elections](#) are held annually for top IEEE officers.

## IEEE Major Boards

Six subordinate boards **govern major areas of IEEE interest**:

- » [Educational Activities](#)
- » [IEEE-USA](#)
- » [Publication Services and Products Board](#)
- » [Regional Activities](#)
- » [Standards](#)
- » [Technical Activities](#)

Each has an elected volunteer leader.

## IEEE Committees

There are currently **21 standing committees** of the IEEE Board of Directors.

## IEEE Staff

The IEEE has **approximately 900 employees** who support various IEEE activities.

The **Executive Director** is the full-time chief operating officer. The Executive Director serves on the IEEE Board of Directors.



## SENIOR MEMBERSHIP

*Elevate your membership!*

### Requirements for elevation to IEEE Senior Member

IEEE Bylaw I-105.3 sets forth the criteria for elevation to Senior Member Grade, as follows:

"... a candidate shall be an engineer, scientist, educator, technical executive or originator in IEEE-designated fields. The candidate shall have been in **professional practice for at least ten years** and shall have shown **significant performance over a period of at least five** of those years."

There is no cost to convert to a Senior Member. "Senior" refers to professional experience, not age, and you do not need to be a "senior citizen" to be a Senior Member.

For full information visit the [IEEE Senior Member Web pages](#)

- Once you determine that you fulfill the [requirements](#) for Senior Member (SM) grade, identify your three references who must be IEEE Senior Members or Fellows.
- If you have difficulty in locating individuals to serve as your references, contact your local Section or Chapter for assistance. For help in contacting your Section/Chapter Chair, email Denise Howard at [senior-member@ieee.org](mailto:senior-member@ieee.org).
- If you have been notified by a Section officer that he or she intends to nominate you for Senior Member grade, the nominator serves as one reference as long as he/she is a Senior Member or Fellow. Otherwise, the required number of references is still three in addition to the nomination.
- Alternatively, contact your Section Chair and ask if he or she can nominate you. This will help your Section earn a rebate at the end of the year through the [Nominate a Senior Member Initiative](#).



## The INSTITUTE online

The most current version of **The Institute** can always be found at

<<http://www.ieee.org/theinstitute>>

Here's your report on news around the IEEE, from the editors of The Institute. The most current version of The Institute can always be found at <<http://www.ieee.org/theinstitute>>

### *IN THE LATEST ISSUE:*

- IEEE Web Site Gets Revamped
- IEEE Fellow Has Big U.S. Air Force Role
- Let's Not Overlook Standards
- Hear It Now on Spectrum Radio
- Honors for Outstanding Achievements in Educational Activities
- Is Your Job a "Dream Job?"
- Journal Explores Impact of Digital Television
- Deadline Nears for Standards Paper Competition



## **IEEE-USA Today's Engineer**

A Monthly webzine <http://www.todaysengineer.org>

Here's your monthly report from IEEE-USA on building careers and shaping public policy, from the editors of **IEEE-USA Today's Engineer**. The current version of Today's Engineer can always be found online at <http://boldfish.ieee.org:80/u/1586/010606>

### ***In The January 2006 Issue:***

1. IEEE-USA President Introduces Himself, Cites Priority Issues for organization
2. What Lies Ahead: Forecast for 2006 in Today's Engineer Online
3. IEEE-USA Applauds Introduction of the "National Innovation Act of 2005"
4. IEEE-USA Endorses "Proper" Use of Technology in Improving Health Care for Seniors
5. EWeek 2006 Kits Available Online
6. IEEE-USA Meets With Senators to Discuss Challenges to U.S. Science & Technology Leadership
7. IEEE-USA Public-Awareness Program Designed to Enhance the Image of Engineers
8. IEEE-USA Fund to Support Expansion of Teacher In-Service Training in IEEE Regions 1, 4
9. IEEE Computer Society Celebrates 60 Years in 2006
10. RFID Technical Institute Joins IEEE's Education Partners Program

### **1. IEEE-USA President Introduces Himself, Cites Priority Issues for Organization**

As he begins 2006 as IEEE-USA President, Dr. Ralph W. Wyndrum Jr. translates IEEE-USA's mission into four primary areas of focus: ensuring that U.S. technology policy enhances America's future and protects American workers; developing new tools and improving our career resources for members; supporting and publicizing valuable continuous education opportunities for U.S. IEEE members; and promoting IEEE fields of interest needed by the next generation of technical professionals.

Read the IEEE-USA President's first 2006 column at <http://boldfish.ieee.org:80/u/1587/010606>

### **2. What Lies Ahead: Forecast for 2006 in Today's Engineer Online**

Now that we're four years past the end of the last recession, what lies ahead in 2006? The latest edition of Today's Engineer Online examines changes and trends in eight categories that are likely to affect all of us in one way or another in the new year: technology, energy, climate change, workforce, employment benefits, immigration, infrastructure and the economic outlook.

Read this feature and more at: <http://boldfish.ieee.org:80/u/1588/010606>

### **3. IEEE-USA Applauds Introduction of the "National Innovation Act of 2005"**

In a statement provided to the bill's sponsors and in a letter to the U.S. Senate, IEEE-USA noted that the "National Innovation Act of 2005" (S. 2109) "represents a huge step forward in

promoting policies that will sustain U.S. technological leadership and encourage the development of the skilled, creative and competitive workforce critical for U.S. prosperity."

Read IEEE-USA's letter to members of the Senate at: <http://boldfish.ieee.org:80/u/1589/010606>

Read the new release issued by Sen. Joe Lieberman's office:

<http://lieberman.senate.gov/newsroom/release.cfm?id=249800>

#### **4. IEEE-USA Endorses "Proper" Use of Technology in Improving Health Care for Seniors**

The "proper" use of technology can improve the efficiency and quality of health care for our aging population, lower costs and perhaps improve senior citizens' quality of life, according to a position recently adopted by IEEE-USA.

To read the news release, visit: <http://boldfish.ieee.org:80/u/1590/010606>

#### **5. EWeek 2006 Kits Available Online**

Engineers Week (EWeek) is next month, 19-25 February, and free planning kits are available to help you conduct activities in your area. The kit includes the new EWeek poster; activities such as, "How Much Time Does It Take?" and "Radioactive Ping-Pong Balls"; and other related information. To request your kit, contact Helen Hall at 202-785-0017, ext. 8354 or [h.hall@ieee.org](mailto:h.hall@ieee.org). You can also order one by visiting the Eweek Product Catalog <http://boldfish.ieee.org:80/u/1591/010606> and clicking "Engineer Volunteer Kits."

#### **6. IEEE-USA Meets With Senators to Discuss Challenges to U.S. Science & Technology Leadership**

IEEE-USA Vice President for Technology Policy, Dr. Russell Lefevre, and IEEE-USA legislative representatives met on Capitol Hill with the staff of Senators Lamar Alexander (R-TN), Jeff Bingaman (D-NM) and Pete Domenici (R-NM) to discuss the Senators' plans to introduce comprehensive innovation and workforce legislation. In 2005, Senators Alexander and Bingaman requested a study from the National Academies of Science and Engineering to identify the top 10 actions, in priority order, that federal policy makers can take to enhance the science and technology enterprise so the United States can successfully compete, prosper, and be secure in the Global Community of the 21st Century. The study's other goal is to formulate an implementation strategy with several concrete steps that can be used to implement the study's recommendations.

To read on, visit: <http://boldfish.ieee.org:80/u/1593/010606>

#### **7. IEEE-USA Public-Awareness Program Designed to Enhance the Image of Engineers**

At meetings on 29 October and 11 November 2005, IEEE-USA's Operating Committee and Board of Directors, respectively, endorsed a 2006 public-awareness program that reaches out to youngsters, adults and the public-at-large through targeted media and events. The approved \$73,000 in expenditures, plus related support for the 2006 program, will provide support for six components:

- Adding IEEE technologies to TV engineering news spots through AIP's "Discoveries & Breakthroughs"
- Supporting two IEEE-USA Media Fellows in 2006, as part of an overall AAAS program
- Backing the Chicago-based Engineers Without Borders-USA (EWB-USA) program
- Supporting the EWeek 2006 Discover Engineering Family Day in Washington, D.C.
- Pursuing a second United Nations EWeek Girl Day in New York City
- Distributing a precollege engineering education brochure to a cross-section of children's museums nationwide

To read more about IEEE-USA's efforts to promote the image of the engineer, visit:  
<http://boldfish.ieee.org:80/u/1594/010606>

### **8. IEEE-USA Fund to Support Expansion of Teacher In-Service Training in IEEE Regions 1 and 4**

The Teacher In-Service Program (TISP) features IEEE Section volunteers sharing their technical acumen through the development and demonstration of technologically-oriented subject matter to local pre-university educators in an in-service or professional development setting. IEEE Educational Activities, the program's administrator, estimates that TISP has already benefited more than 59,000 students. Thanks to a \$50,000 grant from the IEEE-USA Fund, administered by the IEEE Foundation, TISP will be expanded to IEEE Regions 1 and 4 in 2006, tripling the number of students reached by the program.

For more on TISP and IEEE-USA's participation, visit:  
<http://boldfish.ieee.org:80/u/1595/010606>

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## MAGNEWS

### HITACHI IN LAS VEGAS

#### **HITACHI TO SHOW STREAMING VIDEO ON FIRST CE-ATA HARD DRIVE First Demo of CE-ATA-based Microdrive Foreshadows Readiness of Interface and CE Device Implementation**

*STORAGEVISIONS 2006, Las Vegas* -- Jan. 4, 2006 - At StorageVisions 2006, Hitachi Global Storage Technologies will demonstrate the first working CE-ATA hard drive running on an Intel platform. The live demo will show streaming video from a Hitachi Microdrive(tm) 3K8 one-inch hard drive over the CE-ATA interface, connected to an Intel XScale(R) application processor. Hitachi's CE-ATA demo can be viewed in room N246 at the Las Vegas Convention Center on January 7, from 10:30 AM to 1 PM.

The demo validates integrity of the interface specifications and signals the imminent commercialization of Hitachi's CE-ATA-based Microdrive. With video representing the next killer application for CE devices due to its need for high storage capacity, Hitachi has been in discussion with leading manufacturers of personal media centers, smart phones and other multi-media devices on adoption of the CE-ATA interface. Hitachi plans to ship the Microdrive 3K8 with CE-ATA support this quarter.

CE-ATA was developed to facilitate the unique communication between small-form-factor hard drives and consumer electronic devices that increasingly require low-cost, high-capacity storage. The CE-ATA Consortium intends to accelerate the adoption of hard drives into portable CE devices by addressing CE-specific requirements such as low pin-count, low voltage, power efficiency, cost effectiveness and integration efficiency. The Hitachi Microdrive 3K8 is the first hard drive to realize this goal.

"Hitachi has always been on the forefront of advancing small-form-factor hard drives and their use in consumer electronics," said Bill Healy, senior vice president, marketing & HDD business planning and strategy, Hitachi Global Storage Technologies. "Our leadership in implementing the CE-ATA interface is in line with our effort to bring the value of low cost and high storage capacity to consumers, which, with the onset of video, is needed now more than ever. The CE-ATA interface will help make the task of integrating the hard drive that much easier for device manufacturers."

Hitachi's world-renowned Microdrive has methodically defined the landscape for innovations in miniature hard drives since its 1999 introduction. The revolutionary matchbook-sized Microdrive went unchallenged until 2004, when the demand for higher and higher capacity in even tinier packages led Hitachi to re-cast the one-inch disk into a 20-percent smaller package. The resulting product, affectionately called "Mikey," was introduced at CES 2005. Today, Mikey continues the Microdrive heritage of innovation by becoming the first hard drive to integrate the next-generation CE-ATA interface.

"Public demonstration of the first fully functional CE-ATA one-inch disk drive just three quarters after completion of the new industry interface specification is an incredible accomplishment that marks a significant milestone in the CE-ATA initiative and implies CE-ATA products are around the corner," said Knut Grimsrud, CE-ATA steering committee chairman and Intel Fellow. "Innovative new CE-ATA disk drives connected to Intel XScale(R) application processors provide the core building blocks for the next generation of exciting new portable consumer electronics applications."

### ***About Hitachi Global Storage Technologies***

Hitachi Global Storage Technologies was founded in 2003 as a result of the strategic combination of Hitachi's and IBM's storage technology businesses. By the end of 2003, Hitachi GST became the industry's second largest hard disk drive manufacturer with \$4.2 billion in revenue.

The company's goal is to enable users to fully engage in the digital lifestyle by providing access to large amounts of storage capacity in formats suitable for the office, on the road and in the home. The company offers customers worldwide a comprehensive range of storage products for desktop computers, high-performance servers and mobile devices. For more information on Hitachi Global Storage Technologies, please visit the company's Web site at <http://www.hitachigst.com>.

### ***About Hitachi, Ltd.***

Hitachi, Ltd. (NYSE: HIT), headquartered in Tokyo, Japan, is a leading global electronics company, with approximately 326,000 employees worldwide. Fiscal 2003 (ended March 31, 2004) consolidated sales totaled 8,632.4 billion yen (\$81.4 billion). The company offers a wide range of systems, products and services in market sectors, including information systems, electronic devices, power and industrial systems, consumer products, materials and financial services. For more information on Hitachi, please visit the company's Web site at <http://www.hitachi.com>.

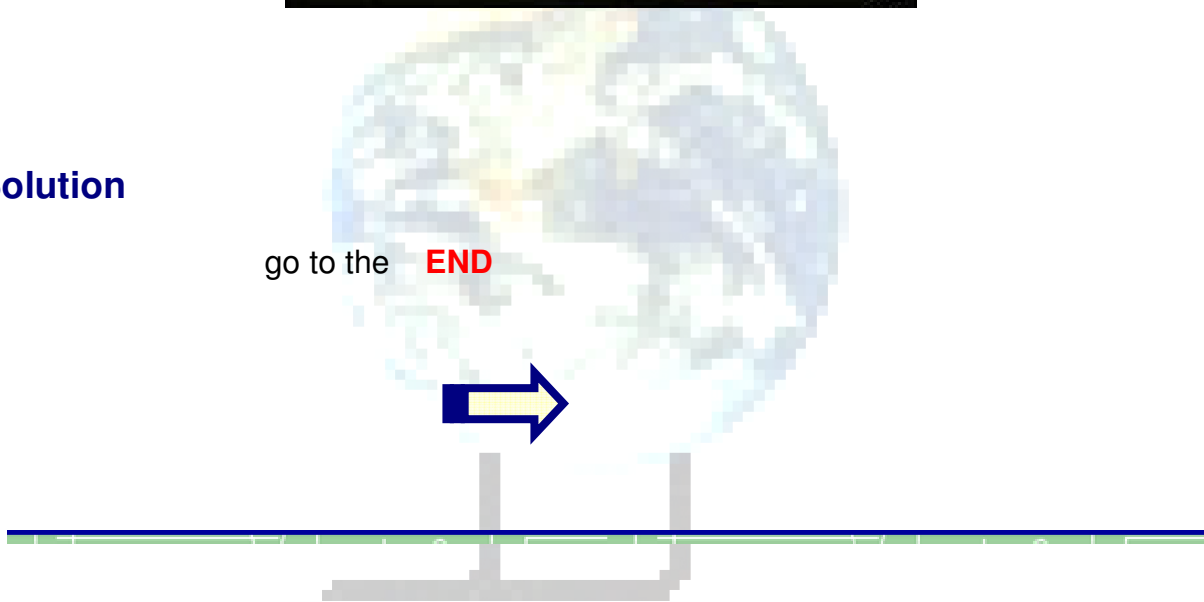
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## QUIZ

What has this to do with magnetism?



Solution

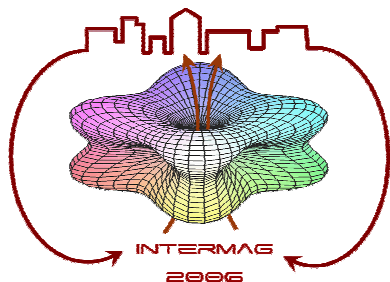


# CONFERENCE ANNOUNCEMENT 1

## International Magnetism Conference INTERMAG 2006

San Diego, California,  
May 8-12 2006

<http://www.intermagconference.com/intermag2006/>



The [INTERMAG 2006](http://www.intermagconference.com/intermag2006/) Conference will be held in **San Diego, California, USA**, from **May 8 to May 12, 2006**. All members of the international scientific communities interested in new developments in magnetism and associated technologies are invited to attend and submit their latest findings to INTERMAG 2006. The Program consists of invited and contributed papers and selected papers from the conference will be published in the *IEEE Transactions on Magnetism*.

*Categories* for submission include:

1. Magnetic Recording & Magneto Optical Recording
2. Spin Electronics and Applications (Non-Recording)
3. Soft Magnetic Materials and Applications
4. Permanent Magnet Materials and Applications
5. Magnetic Thin Films and Nanostructures
6. Other Magnetic Materials & Non-Recording Applications
7. Nanomagnetism Theory
8. Characterization and Imaging
9. Sensor, High Frequency and Power Devices
10. Life Science and Applications
11. Physics and Interdisciplinary Topics

### **Deadlines:**

**Digest submission:** December 19, 2005

**Manuscript submission:** **March 13, 2006.**

**Advance Registration** for the conference begins on **January 30, 2006.**

*Advance Registration* via the web is the most convenient way to register and is highly recommended.

The City of San Diego offers a wide variety of things to see and do as well as a climate that is mild and pleasant all year. For complete information about traveling to San Diego visit the web site at: [www.sandiego.org](http://www.sandiego.org). There you can obtain a travel and vacation planning guide, current weather information, and maps of the area of both the downtown and the area surrounding the **Town & Country Resort and Conference Center** where InterMag 2006 will be held.

The Town & Country is located in San Diego's Mission Valley, and is served by the new light-rail trolley system. Complimentary parking is also available. All Conference activities are located on one level, with easy access for all.

The InterMag Conference sleeping **room rates** will be \$139/single or \$149/double plus tax. More complete information and room reservation forms will be available on the InterMag Conference web site in January 2006.

For more information visit the **INTERMAG Homepage** at:

[www.intermagconference.com/intermag2006](http://www.intermagconference.com/intermag2006)

## CONFERENCE ANNOUNCEMENT 2

### 6th International Conference on the Scientific and Clinical Applications of Magnetic Carriers May 17 – 20, 2006 Krems, Austria (Vienna Region)



This meeting will discuss all aspects of magnetic nanospheres, magnetic microspheres and ferrofluids. This includes

- **Preparation and analysis** of magnetic microspheres and nanospheres made from all kinds of materials such as polymers, ceramic, biomaterials, biodegradables, including fluorescent ones.

- **Applications** covered are magnetic drug delivery, molecular biology, in vitro diagnostics, contrast agents in MR imaging, stem cell separation, toxic metal removal, magnetic cell sorting, hyperthermia treatment, groundwater decontamination and magnetic particle motion analysis, just to name a few.

\* **Daily lecture series** about the fundamental physics of magnetic carriers are given by Dr. Robert Shull, NIST.

\* **Deadline** for abstract submission, reduced online registration and guaranteed hotel reservation: Friday, March 10, 2006

\* **Registration:** Euro 300 until March 10, Euro 380 thereafter; students/postdocs: Euro 150; this fee includes all lunches, a boat trip, the

reception and a dinner in the historic downtown of Krems

\* **Proceedings** will be published as fully peer reviewed articles in the online journal "Biomagnetic Research and Technology"

\* **Travel grants:** We will provide 10 participants with a travel grant of 500 Euros plus free registration. Recipients will be chosen within one week after the abstract deadline, based according to the scientific quality of their abstract. Applicants must either be doctoral and postdoctoral students, or come from an economically disadvantaged country (e.g., former Soviet Union, South America, Eastern Europe, Africa).

You are cordially invited to our next and 6th Conference by:

#### Urs Häfeli

University of British Columbia  
Vancouver, Canada

#### Wolfgang Schütt

IMC University of Applied Sciences  
Krems, Austria

#### Maciej Zborowski

The Cleveland Clinic Foundation  
Cleveland, U.S.A.

#### Mirka and Ivo Safarik

Academy of Science  
Ceske Budejovice, Czech Republic

For more information, please visit our website [www.magneticmicrosphere.com](http://www.magneticmicrosphere.com)

## FORTHCOMING CONFERENCES

### 2<sup>ND</sup> INTERNATIONAL RARE EARTHS CONFERENCE

February 28-March 2, 2006

The Conrad Hotel, Hong Kong

Contact Roskill: Tel: (+44) 20-7659-2022; Fax: (+44) 20-7659-2111; E-mail:

[sales@metalevents.com](mailto:sales@metalevents.com)

<http://www.metalevents.com/>

### FILM DEPOSITION AND THE CONTROL OF INTERFACES FOR SPINTRONICS

1 March 2006

The Institute of Physics, London, UK

Organised by: the Ion & Plasma Surface Interactions Group (IPSI) of the Institute of Physics

Meetings Co-ordinator: [Dawn Stewart](#)

<http://conferences.iop.org/FDC/>

### MAGNETIC NANOMATERIALS

3 April 2006

The Institute of Physics, London, UK

Organised by: [The Magnetism Group of the Institute of Physics](#)

Organiser: [Quentin Pankhurst](#)

### 17<sup>TH</sup> INTERNATIONAL CONFERENCE ON MAGNETISM ICM

August 20-25, 2006;

Kyoto International Conference Hall, Kyoto, Japan

This triennial meeting is organized under the auspices of the International Union for Pure and Applied Physics (IUPAP). The first of the series took place during 1958 in Grenoble, France, and has been followed by similar, highly regarded, conferences held in various parts of the world.

These are dedicated to the presentation and discussion of the latest developments and ideas relevant to magnetic and related materials.

ICM 2006 is jointly sponsored by the Science Council of Japan, the Physical Society of Japan, The Magnetics Society of Japan, The Japan Society of Applied Physics and the Japan Institute of Metals.

Contact JTB Communications: Tel: (+81) 6-6348-1391; Fax: (+81) 6-6456-4105; E-mail:

[icm2006@jtbcom.co.jp](mailto:icm2006@jtbcom.co.jp)

<http://icm2006.com/>

[ICM 2006](#)

### HIGHLY FRUSTRATED MAGNETISM 2006

15-Aug-2006 - 19-Aug-2006

Highly Frustrated Magnetism 2006 (HFM2006) will be held at Ichō Kaikan, which is the alumnus union building for Osaka university medical school, Osaka, Japan.

The conference is a satellite of the International Conference on Magnetism (ICM17), which will be held during Aug. 20th - 25th in Kyoto, Japan.

More information is available at [www.kobe-u.ac.jp/hfm2006/index.html](http://www.kobe-u.ac.jp/hfm2006/index.html)

### **YAMADA CONFERENCE LX**

16-Aug-2006 - 19-Aug-2006

#### **Research in High Magnetic Fields,**

Sendai Civic Auditorium in Sendai, Japan

The *International Conference on Research in High Magnetic Fields* will take place in Sendai (Japan) as the "Yamada Conference LX RHMF2006" from August 16th to August 19th 2006, jointly hosted by the High Field Laboratory for Superconducting Materials (HFLSM), Institute for Materials Research, Tohoku University, and "The High Magnetic Field Forum of Japan". It is a satellite symposium of the International Conference on Magnetism ICM 2006, in Kyoto, Japan, from August 20th to August 25th 2006, and succeeds symposia in Toulouse (2003), Porto (2000), Sydney (1997), Nijmegen (1994), Amsterdam (1991), Leuven (1988) and Osaka (1982). The conference aims to cover recent advance of research in high magnetic fields. The scientific program is planned including tutorial topics, plenary lectures and invited papers as well as contributed papers. Both oral and poster sessions will be scheduled.

More [information](#)

### **IEE MEGAGAUSS XI CONFERENCE 2006**

10-Sep-2006 - 14-Sep-2006

Imperial College, London, UK

The Megagauss XI Conference is the latest in a line of conferences that date back to 1965, when Megagauss I took place in Italy at Frascati (Roma). Since then subsequent conferences have brought together distinguished scientists and technologists from many countries to present their latest theoretical and experimental studies in such areas as the generation of ultrahigh magnetic fields, the development of flux compression generators, liner implosions for fusion problems, high-current switching technologies, and the application of these techniques in many areas of science and technology. For further information, please visit [www.IEE.org](http://www.IEE.org) or contact [powerpns@iee.org](mailto:powerpns@iee.org).

### **19<sup>TH</sup> INTERNATIONAL WORKSHOP ON RARE EARTH PERMANENT MAGNETS AND THEIR APPLICATIONS**

August 29-September 2, 2006;

Beijing International Convention Center, Beijing, China

Contact Prof. Li Wenxiu: Tel: (+86) 10-65211206; Fax: (+86) 10-6512-4122; E-mail:

[SQ@csm.org.cn](mailto:SQ@csm.org.cn)

<http://www.csm.org.cn/REPM06.HTM>

### **10<sup>TH</sup> JOINT MMM/INTERMAG CONFERENCE**

January 7-11, 2007; Baltimore, Maryland

**52<sup>ND</sup> CONFERENCE ON MAGNETISM AND MAGNETIC MATERIALS**  
November 5-9, 2007; Tampa, Florida

**53<sup>RD</sup> CONFERENCE ON MAGNETISM AND MAGNETIC MATERIALS**  
November 10-14, 2008; Austin, Texas

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## IEEE PUBLICATION NEWS

Members who would like to volunteer their services as technical reviewers are needed. Society members with **ideas for new books** or candidates for the *Classic Re-Issue* series are urged to get in touch with:

**John T. Scott,**  
*Magnetics Society Liaison to IEEE Press*  
E-mail: [john.scott@physics.org](mailto:john.scott@physics.org)

For *new books in data storage*, the contact is

"Gordon F. Hughes" [gfhughes@ucsd.edu](mailto:gfhughes@ucsd.edu)

For *new books in other areas*, the contact is

John T. Scott [john.scott@physics.org](mailto:john.scott@physics.org)

### IEEE XPLORE RELEASE 2.1:

IEEE Xplore is now on Release 2.1.

A (downloadable) user guide is at

[http://ieeexplore.ieee.org/guide/g\\_oview\\_guidepdf.jsp](http://ieeexplore.ieee.org/guide/g_oview_guidepdf.jsp).

Starting in 1965 with *vol. 1*, now all papers published in **IEEE TRANSACTIONS ON MAGNETICS** are available at *IEEE Xplore*, as well as the searchable *Cumulative Index 1985-2000, Volumes 21-36*

**Ron Goldfarb**  
**Publications Chair**  
[r.goldfarb@ieee.org](mailto:r.goldfarb@ieee.org)

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## QUIZ – Solution

### Magnetic north pole drifting fast

**The Earth's north magnetic pole is drifting away from North America so fast that it could end up in Siberia within 50 years, scientists have said.**

The shift could mean that Alaska will lose its northern lights, or auroras, which might then be more visible in areas of Siberia and Europe.

The magnetic poles are different from geographic poles, the surface points marking the axis of Earth's rotation. Magnetic poles are known to migrate and, occasionally, swap places. "This may be part of a normal oscillation and it will eventually migrate back toward Canada," Joseph Stoner, a palaeomagnetist at Oregon State University, told a meeting of the American Geophysical Union (AGU) in San Francisco.



#### Wandering poles

Previous studies have shown that the strength of the Earth's magnetic shield has decreased 10% over the past 150 years. During the same period, the north magnetic pole wandered about 1,100km (685 miles) into the Arctic, according to the new analysis. The rate of the magnetic pole's movement has increased in the last century compared with fairly steady movement in the previous four centuries, the Oregon researchers said. The Oregon team examined the sediment record from several Arctic lakes. Since the sediments record the Earth's magnetic field at the time, scientists used carbon dating to track changes in the magnetic field. They found that the north magnetic field shifted significantly in the last thousand years. It generally migrated between northern Canada and Siberia, but has occasionally moved in other directions.

#### Rate of change

At the present rate, the north magnetic pole could swing out of northern Canada into Siberia. If that happens, Alaska could lose its northern lights, or auroras, which occur when charged particles streaming away from the Sun collide with gases in the ionosphere, causing them to glow.

The north magnetic pole was first discovered in 1831 and when it was revisited in 1904, explorers found it had moved by 50km (31 miles). For centuries, navigators using compasses had to learn to deal with the difference between magnetic and geographic north. A compass needle points to the north magnetic pole, not the geographic North Pole.

<http://news.bbc.co.uk/1/hi/sci/tech/4520982.stm>

#### READ MORE



## Long term movement of the north magnetic pole



The strength and direction of the Earth's magnetic field slowly change with time – a phenomenon referred to as secular change or secular variation. The cause of secular variation is related to the process by which the magnetic field is generated. Secular change occurs everywhere on Earth, but the magnitude of the change varies from place to place and also with time.

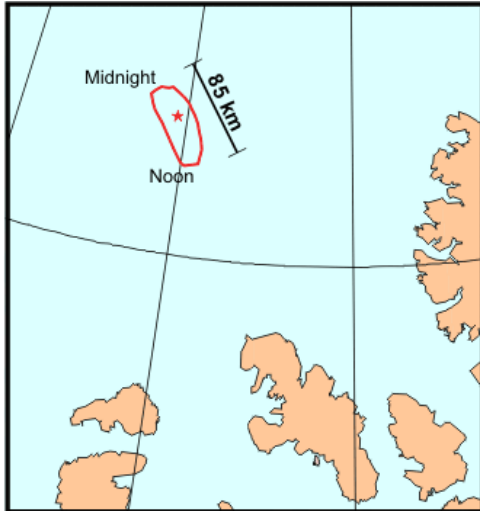
See also: [In-depth](#)

The figure shows the path of the north magnetic pole since its discovery in 1831 to the last observed position in 2001. During the last century the pole has moved a remarkable 1100 km. What is more, since about 1970 the NMP has accelerated and is now moving at more than **40 km per year**. If the NMP maintains its present speed and direction it will reach Siberia in about 50 years. Such an extrapolation is, however, tenuous. It is quite possible that the pole will veer from its present course, and it is also possible that the pole will slow down sometime in the next half century.



## Daily movement of the north magnetic pole

It is important to realize that the position of the north magnetic pole given for a particular year is an average position. The magnetic pole wanders daily around this average position and, on days when the magnetic field is disturbed, may be displaced by 80 km or more. Although the north magnetic pole's motion on any given day is irregular, the average path forms a well-defined oval. The diagram shows the average path on disturbed days.



magnetic pole is seldom to be found at its "official" position, which is the position in the absence of magnetic field fluctuations.

The cause of the north magnetic pole's diurnal motion is quite different than that of its secular motion. If we measure the Earth's magnetic field continually, such as is done at a [magnetic observatory](#), we will see that it [changes during the course of a day](#) – sometimes slowly, sometime rapidly. The ultimate cause of these fluctuations is the Sun. The Sun constantly emits charged particles that, on encountering the Earth's magnetic field, cause electric currents to flow in the ionosphere and magnetosphere. These electric currents disturb the magnetic field, resulting in a temporary shift in the north magnetic pole's position. The size and direction of this shift varies with time, in step with the magnetic field fluctuations. Since such fluctuations occur constantly, the

[http://gsc.nrcan.gc.ca/geomag/nmp/long\\_mvt\\_nmp\\_e.php](http://gsc.nrcan.gc.ca/geomag/nmp/long_mvt_nmp_e.php)

[http://obsfur.geophysik.uni-muenchen.de/mag/news/e\\_nmpole.htm](http://obsfur.geophysik.uni-muenchen.de/mag/news/e_nmpole.htm)



## ABOUT THE NEWSLETTER

The objective of the **IEEE Magnetics Society Newsletter** is to publicize activities, conferences, workshops and other information of interest to the Society membership and technical people in the general area of applied magnetics. Manuscripts are solicited from the Magnetics Society membership, organizers of conferences, officers of the Society, local chapters, and other individuals with relevant material.

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