IEEE Magnetics Society
NEWSLETTER
Volume 46 No. 3 July 2006

Martha Pardavi-Horvath, Editor

TABLE OF CONTENTS

PRESIDENT'S REPORT TO THE MEMBERSHIP

The major event in the life of the Society in the last quarter has of course been the **Intermag** conference in San Diego. As those of you who were there will know the conference, with almost 1,100 participants, was a major success. I believe this is almost certainly a record for a stand alone Intermag conference being held in the United States. For those of you who are interested in the statistics of our conferences 42 countries were represented at Intermag 2006, some 1,421 digests were submitted, of which 963 were accepted with 442 oral presentations. If we include the invited papers and symposia the total number of presentations was 1,004. I think this shows that our subject discipline is in an extremely healthy state and also shows that the organisation of the meetings which the Society sponsors fulfils the needs and wishes of the magnetism community.

Of course none of this would be possible without the work of our volunteers and I wish to place on record on behalf of the Society our gratitude to the conference chairperson, Prof Mel Gomez of the University of Maryland. His organisational skills, exercised with his usual charm, made a major contribution to the success of Intermag 2006. Of course, the organisation of such meetings is always a team effort and, whilst everyone made a major contribution, I think the efforts of the Programme chairs, Bruce Terris of Hitachi GST and Shan Wang of Stanford, and the Publication chair, Bob Schull of NIST, deserve particular mention. Moreover, the Society would wish to recognise the contribution made by all those who served the meeting in large or small capacities.

As a small innovation at the meeting a special *membership desk* was sited immediately prior to the registration booths allowing people the opportunity to join the Society and benefit from the discounted registration fee. This activity was a marginal success with over 100 new members recruited. However it still appears that there is a problem for individuals employed in certain types of organizations, including many corporations and government research institutes, particularly in Europe, in that they are unable to recover the costs of Society membership whereas they can recover the cost of paying increased registration fees. Our AdCom will be looking into this matter, which is becoming quite a serious issue, to see if we can find an administrative solution that enables people to become members of the Society.

Given the success and the large attendance in San Diego it is expected that the conference will make a healthy surplus. I am aware that the generation of surpluses from conference activities causes some members concern as they believe that a "not for profit" organisation should always seek to organise events that break even. My personal view and the official position of the IEEE is that it is not always possible to budget for break even meetings because inevitably on occasions we operate at a loss, and therefore it is essential we have a mechanism to generate surpluses so that these can be balanced out over time. There is also an overhead associated with all Society activities which pays for the cost of the services provided by IEEE headquarters in Piscataway. I think many members do not realise that the infrastructure of IEEE, which is essential for us to continue our activities, includes a number of very expensive items such as full liability insurance for any volunteer involved

in any IEEE activity and also legal cover so that we are protected from any possibility of being sued for expressing opinions. These and other high cost items as well as the general administration of what is in essence a significant business result in an overhead on all activities of about 17%. Compared with most businesses and universities this is really a very modest figure and hence our conferences must generate a surplus of this order so as in effect not to make a loss. It is also the case that in order to maintain our tax exempt status, we have to ensure that the revenues of the Society are used to provide benefits for its members. By implication that means that we must not provide benefits for non-members and so if we do not make a 17% surplus our members are essentially subsidising others.

I am also pleased to report to the membership that the overall *financial health of the Society* is really extremely good. This is only in part due to the success of our recent conferences as the major contribution to our financial health comes from electronic downloads through IEL. This means that the Society is running a surplus of approximately half a million dollars a year. At the AdCom meeting in San Diego a major review of Society finances was undertaken and it was agreed that we will be making a number of *initiatives* to utilise this financial windfall. A couple of the initiatives which will become apparent to the membership are: an increase in the number of distinguished lecturers from 3 to 4 for next year, and also a move to increase the length of Intermag papers from 3 pages to 4 at no extra cost to the conference itself. We have also seen a number of representations concerning the general level of conference fees and the AdCom and Conference Executive Committee will discuss mechanisms by which we can address this issue when we meet in September. Of course if the Society were to provide subsidies for conference fees, then these would be for members only, a situation which may affect the general issue of incentives for people to join the Society.

The other item of note from the San Diego Intermag was that we held the first ever *open general meeting* of the Society at a conference in North America. About 200 people attended the general meeting at which presentations were made by myself, Randall Victora as Secretary/Treasurer, Doug Lavers as Conference Executive Committee chair and Ron Goldfarb as Publications Committee chair. A healthy discussion was held in which people were being quite willing and keen to express their views. I trust that the concept of our annual general meeting will remain popular and I would encourage members to attend the next AGM which will be held during the joint conference in Baltimore in January. Of course, by that time Carl Patton of Colorado State University will have taken over as President and will conduct the meeting.

On a final note, we are shortly approaching the *2006 election for members of the AdCom*. Some of you will have noticed that in San Diego we included a nomination form for members to have the opportunity to nominate candidates. This follows an initiative started in 2005 in which the Nomination committee sought nominations from a much wider circle of individuals, with the result of an increase of about three times in the number of nominations received. I am pleased to report that the initiative of allowing open nominations to Society members has had a similar effect this year and our Nomination committee will shortly be meeting electronically to draw up a ballot. It is the intention of the Society to continue to open up its activities in this way and to increase member participation. Hence if anyone has any good ideas for further measures we can take to meet member needs and aspirations please do not hesitate to contact any of the Society officers listed on the website.

I trust that you will all have a pleasant summer with some time for relaxation.

Kevin O'Grady
University of York
IEEE Magnetics Society President
July 2006

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	Victora	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
Doug	Lavers	Conference exec. Comm.	University of Toronto
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	Cardiff University
Diane	Melton	Executive Director	Courtesy Associates
Martha	Pardavi-Horvath	Newsletter Editor	The George Washington U.

Chapters Corner

News from the
Northern Virginia/Washington Chapter of the IEEE Magnetics Society.

On 20 June, we organized a very successful IEEE Distinguished Lecture at the National Institute of Standards and Technology in Gaithersburg, MD, with Dr. Mason Williams as our speaker. The topic of the lecture was

"Beyond the Limits of Magnetic Recording: an Itinerant Magnetician Looks at Hysterical Loops".

There were around 30 attendees for the event.

Audience and the Speaker – NIST, Gaithersburg

Philip Pong
Secretary
Northern Virginia/Washington Chapter
IEEE Magnetics Society
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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 so we can include in the next MagSoc newsletter.

Dr. Richard H. Dee,
Magnetics Society Chapters and Membership Chair

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 Magnetics 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 magnetics 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 Magnetics Society.

Roy Chantrell
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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_2:Mn, and the emerging class of d^0 ferromagnets such as HfO_2 or CaB_6 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.

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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.

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Conference report

INTERMAG 2006

From the Conference General Chair, Romel D. GOMEZ

The **41st IEEE International Magnetics Conference** (Intermag) was held at the Town & Country Resort and Conference Center in San Diego, California on May 8-12, 2006. As the premiere technical conference on applied magnetism, it attracted over 1000 attendees from Asia, Australia, Europe and North America, as well as 26 industrial partners and exhibitors. It was one of the best attended Intermag conferences in recent years. There were 1421 digests submitted from 48 countries and from which 956 were accepted for presentation. The technical program was organized into 94 sessions which covered new developments in the broad areas of magnetism. The conference featured 6 invited symposia on (i) Spin Transfer: New physics and applications, (ii) Data Storage Devices in 10 years: HDD or Solid State?, (iii) Magnetic Biosensors and Microsystems, (iv) Advances on Magnetic Characterization and Imaging, (v) Synthesis of Magnetic Nanoparticles, and (vi) Advanced Recording Media. In addition, an evening tutorial on "*Noise Mechanisms in Magnetic Devices*," organized by the Magnetics Society Education Committee, was also presented. A forthcoming issue of the *IEEE Transactions on Magnetics* will contain 500 selected papers from the conference. All have been rigorously reviewed and deemed to have significant archival value.

One conference highlight was the *Plenary Session* which featured the informative and forward-looking address by Dr. Mark H. Kryder on "*Magnetic Data Storage and Where It is Taking Us*." Dr. Kryder is currently the Chief Technical Officer and Senior Vice President for Research at Seagate Technology. The *Awards Ceremony* honored several outstanding individuals: Professor H. Neal Bertram - IEEE Magnetics Society Achievement Award; Dr. Jai M. Menon - IEEE Reynold B. Johnson Information Storage System Award; Drs. Eliyahou Harari, Sanjay Mehrotra and Jack Yuan - IEEE Reynold B. Johnson Data Storage Device Technology Award; and Drs. Chia-Ling Chien, Robert Fontana and Burkard Hillebrands as the 2005 IEEE Magnetics Society Distinguished Lecturers. A special recognition was also extended to Ms. Diane Melton of Courtesy Associates for her valuable and enduring contributions to the IEEE Magnetics Society for more than twenty-six years.

San Diego proved to be a great venue. Occasional blue skies and comfortable outdoor temperatures blended with "Gray May" weather of Southern California. The weather and the cozy conference venue turned out to be ideal for promoting personal interactions and networking among the conference attendees.

In closing, I would like to thank the large number of people who selflessly shared their time, effort and intellect in bringing this event into fruition. I am particularly grateful to the members of the Management Committee: Bruce Terris, Shan Wang, Robert Shull, Petru Andrei, Doug Lavers, Jan-Ulrich Thiele, Charles Krafft and Liesl Folks, and to the Courtesy Associates staff. A special thanks to all Program Committee members, Session Chairs, manuscript reviewers and all those who made this conference a huge success.

Romel D. Gomez
General Chair
University of Maryland, College Park
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Plenary Session

Mel Gomez,
General Chair of INTERMAG 2006

Mark Kryder,
Plenary Speaker of INTERMAG 2006

Awards and awardees

Chairmen

Bierstube and Exhibits

Photos: courtesy of:

and

let the good times (rock and) roll

Student Travel Awards

Awardee's Reports

International Magnetics Conference
San Diego, California,
May 8-12, 2006

A GREAT EXPERIENCE IN SAN DIEGO!

I would like to thank to the organizers of INTERMAG 2006 for the invitation to present a paper as a poster and to have a great opportunity to visit San Diego. For me the conference was a most interesting experience because I met during the conference very nice people and profited from some very good contributions.

By my opinion the IEEE Magnetics Society travel grants provide a great opportunity for the students to present their contributions and also for meeting new people working in the same field.

During the Conference I received good help from Petru Andrei who is also Romanian and he suggested that I enroll as a Student Member into IEEE for 2006.

During my presentation of the poster I received encouragement to continue my study concerning the MagnetoStatic wave devices and some suggestions about the future perspective in this field.

Alina before her presentation

It is indeed a privilege for a student to attend an international conference and make an oral presentation. And it was my greater honor to have been awarded a grant to make this possible. My interest is high frequency properties in magnetic materials with an emphasis on magnetic recording media. The number of talks and symposia on this subject was impressive. At the same time, I enjoyed attending talks in sessions emphasizing other fields.

The symposia and tutorials that were organised was excellent. Of course, as is the case with any conference, there were some talks which were quite soporific! One extremely interesting symposium was the one on data storage devices. The competition between HDD and solid state devices from the point of view of the experts in the field was quite illuminating. The chairs of the various sessions ranged in their energy and enthusiasm. I suppose I was lucky to be in the session chaired by D. Manuel Vazquez, who is a balanced and energetic person!

There was an interesting array of exhibitors from the industry which gave an excellent connection for the students to the real world. This is true especially after having used instruments from some of these companies, like Lake Shore Cryotronics for example.

The arrangements made at the conference, be it for oral or poster presentations, or the exhibitor pavilion or bierstube and coffee, were all excellent. However, in this age when communication is extremely important, the internet service was conspicious by its absence. Some activities other than the bierstube, meant for an informal interaction between the students and the experts in the fields would have been welcome.

The energy and the spirit in San Diego, with its Pacific and the bay shores, made the choice of San Diego extremely good for this conference in spring. An evening in San Diego Old Town is a must do. Great Mexican cuisine and huge margaritas made for a complete experience!

As a student, finishing her PhD, it was encouraging and motivating to meet with experts in the field and also see that the number of women physicists is on the rise. All in all, it was a wonderful experience. It requires a conference like this to convince one, that one's work in a tiny portion of the vast field of physics, definitely does go a long way in making this world a smaller and better place.

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The 2006 Intermag conference was held at the Town & Country Resort Hotel in San Diego, California from 8th to 12th of May. I had a poster presentation a entitled 'Incoherent Reversal in Metal Particle Media', which was about measurements that we had done to determine reversal processes in metal particles used in tape storage media.

I travelled to San Diego on Saturday 6th May with James Dutson (a lecturer at York) and we flew from Manchester, with a connecting flight at Atlanta. We were checked into a twin room at the hotel when we arrived, feeling extremely tired after 24 hours of travelling. However, the view from our balcony was a slight disappointment – looking directly at a brick wall. If you looked to the far right you could just see a bit of the pool, a couple of palm trees and the nearby highway. What a wonderful view!

The first day was a free day before the conference began, so we went into downtown San Diego on the local trolley service. The first stop was to go and look around San Diego's Old Town, where there was a Mexican Fiesta taking place. The next stop was at the decommissioned aircraft carrier, USS Midway, which was moored in San Diego's harbour and was open as a tourist attraction. It was a very interesting visit with some of the tour guides being retired naval officers and pilots who had real life experiences from working on the ship. One of them gave a talk about the processes for launching and landing the aircraft, which was very awe inspiring.

The conference was interesting and varied with an emphasis towards recording devices and recording media. One of the highlights for me was a particularly interesting symposium on 'Data Storage Devices in 10 years: HDD or solid state?' It was a morning of invited talks about new types of recording media, ranging from perpendicular media, which is just going into production now, through to HAMR (heat assisted magnetic recording) and patterned media. All of this was looking at how to further drive the data density towards the goal of 1 terabit per square inch. These talks were then followed by some talks about solid-state 'flash' memory devices. It was very interesting to see how the development in the flash industry was going and where the limitations lie. There was also an excellent plenary talk given by Mark Kryder, from Seagate Technology, about the magnetic recording industry, which highlighted the possible new types of media that could replace perpendicular media when it reaches its data density limit.

Closer to my own area, there was a symposium on synthesis of magnetic nanoparticles. This was a very interesting session, which included some talks about methods for the production of monodisperse iron platinum nanoparticles in the $L1_0$ phase. This has continued to be a very large problem for chemists and physicists alike, but once it has been achieved looks to become a very promising candidate for future recording media due to its tendency to self-organise into regular arrays.

I will conclude by saying that it was an interesting and worthwhile trip, and I would like to thank the IEEE magnetics society for the travel grant. The only disappointment was the complete lack of sunshine for the entire week!

Sam Chadwick
Magnetism & Magnetic Materials Research Group
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INTERMAG 2006 was my first conference experience. It was great to meet researchers and engineers, scholars from all around the world, sharing their experience and work. I learned a lot and it was the opportunity for me to be in contact and meet people I only heard of. I especially appreciated the organisation, from the beginning with the submission of my paper abstract to the end with the availability of the all the members on site and afterwards. Their enthusiasm made it so much easier for everyone. Finally, I really enjoyed the location, San Diego and the Town and Country Resort were great!

Christophe del Perugia

Hamilton, June 1st 2006

The Intermag 2006 conference was an excellent experience. There were three major aspects of my experience at the conference that are important to note. The first was that I was able to listen to a wide variety of talks on different aspects of magnetism and magnetic materials. This gave me valuable information on what industries were looking for when it comes to magnetic materials and where my work at Colorado State University fits into the larger picture. Secondly, in talking to other researchers I was able to formulate new ideas on how high power ferromagnetic resonance on metal films should progress and what films are of interest. Lastly, it was a perfect opportunity to find out what kinds of jobs are available in the field of magnetics and to meet people in industry and academia who may have positions open when I graduate. All-in-all I found the conference a very enjoyable and useful experience.

Heidi Olson
Colorado State University

Thanks to the student travel grant of the IEEE Magnetics Society I was able to participate to this very interesting and useful conference.

I have made an oral presentation (AD-02) and a poster presentation (FX-04). These two works represent a sort of summary of the theoretical researches I did during my Ph.D. studies. The topics of my studies are basically on nonlinear magnetization dynamics, in particular magnetization switching and magnetization dynamics driven by spin-polarized currents.

Besides, during the conference I had the possibility to meet other researchers and I discussed with them about our studies to eventually start some collaborations.

Definitely, this was one of the best conference I have attended.

I would like to thank the IEEE Magnetics Society for this student travel award.

Sincerely,

Roberto Bonin
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IEEE NEWS

IEEE Annual Election

Listed below are the positions and candidates that will appear on the 2006 IEEE Annual Election ballot.

Position	Candidate
IEEE President-Elect, 2007	• Lewis Terman (Nominated by IEEE Board of Directors) • John Vig (Nominated by IEEE Board of Directors)
Division I Delegate-Elect/Director-Elect, 2007	• Giovanni (Nanni) De Micheli (Nominated by Division I) • Richard C. Jaeger (Nominated by Division I)
Division III Delegate-Elect/Director-Elect, 2007	• Roberto Saracco (Nominated by Division III) • Curtis A. Siller, Jr. (Nominated by Division III) • William H. Tranter (Nominated by Division III)
Division V Delegate-Elect/Director-Elect, 2007	• Deborah M. Cooper (Nominated by Division V) • Stephen L. Diamond (Nominated by Division V)
Division VII Delegate-Elect/Director-Elect, 2007	• James M. Howard (Nominated by Division VII) • H. Peter Lips (Nominated by Division VII) • John D. McDonald (Nominated by Division VII)
Division IX Delegate-Elect/Director-Elect, 2007	• David G. Goodenough (Nominated by Division IX) • Frederick C. Mintzer (Nominated by Division IX) • Adrianus J. (Han) Vinck (Nominated by Division IX)
Region 2 Delegate-Elect/Director-Elect, 2007-2008	• Amarjeet S. Basra (Nominated by Region 2) • William P. Walsh, Jr. (Nominated by Region 2)
Region 4 Delegate-Elect/Director-Elect, 2007-2008	• Don C. Bramlett (Nominated by Region 4) • S. Hossein Mousavinezhad (Nominated by Region 4)
Region 6 Delegate-Elect/Director-Elect, 2007-2008	• Leonard J. Bond (Nominated by Region 6) • S.K. Ramesh (Nominated by Region 6)

Region 10 Delegate-Elect/Director-Elect, 2007-2008	• Y.W. Liu (Nominated by Region 10) • R. Muralidharan (Nominated by Region 10) • Yong Jin Park (Nominated by Region 10)
Standards Association Board of Governors Member-at-Large, 2007-2008	• H. Landis (Lanny) Floyd, II (Nominated by Standards Association) • Richard H. Hulett (Nominated by Standards Association)
Standards Association Board of Governors Member-at-Large, 2007-2008	• Dennis B. Brophy (Nominated by Standards Association) • Paul Nikolich (Nominated by Standards Association)
Technical Activities Vice President-Elect, 2007	• Jose R. (Roberto) Boisson de Marca (Nominated by Technical Activities) • Harold L. Flescher (Nominated by Technical Activities) • Robert (Bob) C. Rassa (Nominated by Technical Activities)
IEEE-USA President-Elect, 2007	• Russell J. Lefevre (Nominated by IEEE-USA) • Joseph V. Lillie (Nominated by IEEE-USA)
IEEE-USA Member-at-Large, 2007-2008	• Gary L. Blank (Nominated by IEEE-USA) • Gregg L. Vaughn (Nominated by IEEE-USA)

Petition Candidates
There are no petition candidates for any elective position in the 2006 IEEE Annual Election

http://www.ieee.org/portal/pages/corporate/elections/index.html

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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.

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**.

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The INSTITUTE online

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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:

1. Home as the Hub of Health Care
2. New Library Focuses on Energy and Power
3. Marketplace of Ideas: Regulating Nanotechnology
4. Register for 14 July Retirement Planning Seminar
5. Career Forum Archives Highlight What Engineers Must Know
6. 3-D Scanner Wins Designer 2006 IEEE Presidents' Scholarship
7. Nominations Sought for Non-IEEE Awards
8. Discounted Registration Fee for Embedded Systems Conference
9. Experts Discuss Vulnerability of Large Software Projects
10. Robots on Mars: Special Issue of IEEE Robotics & Automation

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1. Home as the Hub of Health Care

Many in government and society are banking on driving down the cost of health care with portable medical monitoring devices for the home and electronic medical records for the hospital and doctor's office. Much headway has been made on the hardware and software, but many policy issues remain. How to keep medical information from unauthorized eyes, who will pay for converting paper records to electronic files, and standards for the devices and the record-keeping systems themselves are just a few of the issues. Read on at http://bmsmail3.ieee.org:80/u/3349/00667584

2. New Library Focuses on Energy and Power

A new online research service, the IEEE Power & Energy Library, can save you time when it comes to searching for articles dealing with power and energy. That's because you no longer have to sift through all 1.3 million articles in the IEEE Xplore digital library's collection of journals, magazines, transactions, and conference proceedings to get to the nearly 100,000 documents on those topics. Find out more at http://bmsmail3.ieee.org:80/u/3350/00667584

3. Marketplace of Ideas: Regulating Nanotechnology

Consumer and environmental groups are petitioning the U.S. Food and Drug Administration for further study of sunscreens and cosmetics containing nanoparticles -- particles smaller than 100 nanometers. Animal studies have shown that such ingredients in some sunscreens and moisturizing cosmetics can penetrate the skin, migrate through the body, and cause biochemical damage. Currently these products require less testing than over-the-counter or prescription medications. Do you think skin-care products containing nanoparticles are safe, or do they require further study? Weigh in at <mailto:institute@ieee.org>

5. Career Forum Archives Highlight What Engineers Must Know

What skills and abilities must the engineer of the future possess? How have degree programs changed in response to changes in the profession? How do you get money from venture capitalists? A panel of educators tackled these and other topics at IEEE Spectrum's second Career Accelerator Forum, held in April. Although the event is over, an archived version is available through 11 July from the "Webcasts" link on the IEEE Spectrum Online site at http://bmsmail3.ieee.org:80/u/3353/00667584

7. Nominations Sought for Non-IEEE Awards

IEEE members are eligible for prestigious awards besides those sponsored by the IEEE. These include the Hoover Medal, the Alfred Nobel Prize, the Sperry Award, and the Washington Award. The IEEE Awards Board encourages you to nominate and endorse members for these awards. Learn more at http://bmsmail3.ieee.org:80/u/3356/00667584

9. Experts Discuss Vulnerability of Large Software Projects

The FBI's Virtual Case File, a US $170 million computer program aimed at providing agents with a system for accessing criminal and terrorism data, failed miserably. Find out why by listening to IEEE Spectrum Online's "The FBI's Software Debacle," a roundtable discussion among software experts on what went wrong and what's needed to ensure that large software projects progress smoothly at http://bmsmail3.ieee.org:80/u/3358/00667584

10. Robots on Mars: Special Issue of IEEE Robotics & Automation

The June issue of IEEE Robotics & Automation Magazine (Vol. 13, no. 2) features nine articles on the Mars Exploration Rover Mission and its vehicles, Spirit and Opportunity, which landed on the Red Planet in early 2004. The issue, edited by Ashitey Trebi-Ollennu of the NASA-Jet Propulsion Laboratory, contains such articles as "Mars Exploration Rover Mobility Development" and "Working the Martian Night Shift." The table of contents and abstracts for all papers are available through the IEEE Xplore digital library, where subscribers to Xplore may access the full text of the issue: http://bmsmail3.ieee.org:80/u/3359/00667584

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IEEE-USA Today's Engineer

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 Online can always be found at:

http://bmsmail3.ieee.org:80/u/3436/119897

IN THE LATEST ISSUE:

1) IEEE-USA President's Message – Talk, and Action, on Innovation
2) Today's Engineer Online: Working on the $100 Laptop
3) IEEE-USA's Services for Unemployed Members -- How are We Doing?
4) IEEE Webinar Event: Ready, Set, Retire!
5) New Engineering Careers Brochure Unveiled for 11-13-Year-Old Students, Children's Museums
6) GAO Finds H-1B Visa Program Undercuts U.S. Workers
7) 360 Training, L&K International Division Offers IEEE Members a 10% Discount
8) IEEE-USA In the News: IEEE-USA President Argues Against Raising H-1B Cap in

1) IEEE-USA President's Message: Talk, and Action, on Innovation

Competing successfully in this new global environment is essential for our national and economic security and to ensure that the United States is able tocreate high-value jobs and maintain a vital national engineering capability. No one questions the seminal role that innovation plays in attaining this edge, yet somehow our innovation process has become mired in a confluence of factors. In his July column, IEEE-USA President Ralph Wyndrum discusses the innovation challenge and IEEE-USA's role.

Read on at: http://bmsmail3.ieee.org:80/u/3437/119897

2) IEEE-USA Today's Engineer Online: Working on the $100 Laptop

Mary Lou Jepsen's humanitarian mission to develop and mass produce a $100 laptop to be used by the world's children is nearing fruition. The ambitious project's CTO describes how a 10-minute interview with MIT Media Labs' Nicholas Negroponte for a faculty position turned into a three-hour

discussion about the need for a low-cost computer and the sort of organization that could make it happen. Jepsen shares a progress report on the organization and the computer that promises to transform education around the globe.

Read this article and others at: http://bmsmail3.ieee.org:80/u/3438/119897

3) IEEE-USA's Services for Unemployed Members -- How are We Doing?

The IEEE offers a number of resources to aid U.S. IEEE members during periods of unemployment or involuntary career transition, including job listings, insurance, reduced membership dues, quick-response workshops, consultants networks and fee surveys, online legislative action center, local Section and PACE Network presentations, the IEEE-USA Salary Service and more. IEEE-USA needs your help evaluating its career resources for unemployed U.S. IEEE members. If you are or have recently been unemployed: (1) Were you aware of the the aforementioned resources; (2) Did you make use of them (if yes, which ones); and (3) How was your experience? Please send your candid responses to mailto:ieeeusa@ieee.org. All comments will be kept confidential.

4) IEEE Webinar Event: Ready, Set, Retire!

The IEEE Financial Advantage Program, in partnership with Grogan Advisory Services, is offering a retirement strategies webinar on Friday, 14 July 2006. The free webinar will address critical retirement planning issues, including: how to avoid common IRA mistakes; in-service distributions; early retirement options; legacy planning; and tax-efficient income streams. Space is limited to the first 200 registrants.

For more information, view the webinar flyer at: http://bmsmail3.ieee.org:80/u/3439/119897
To register, fill out the online registration form at: URL to come
http://bmsmail3.ieee.org:80/u/3440/119897

5) New Engineering Careers Brochure Unveiled for 11-13-Year-Old Students, Children's Museums

IEEE-USA has unveiled a new six-panel engineering careers brochure that is designed for 11-13-year-old, sixth-to eighth-grade U.S. students. Titled "My Science, My Math, My Engineering! How Am I Ever Going to Use This Stuff in the Real World?," the brochure: (1) lists courses youngsters should take to get ready for engineering; (2) shows how they can figure out "if engineering is interesting"; and (3) asks "what could *you* do if you were an engineer?" In one of the brochure panels, James Michener, the novelist and short story writer, is quoted: "Scientists dream about doing great things, engineers do them."

For more information, visit: http://bmsmail3.ieee.org:80/u/3441/119897

To view a PDF online of the brochure, visit: http://bmsmail3.ieee.org:80/u/3442/119897

6) GAO Finds H-1B Visa Program Undercuts U.S. Workers

According to IEEE-USA, a new General Accountability Office (GAO) report affirms what independent observers and the government already know: the H-1B program has little oversight, and

statutory changes are necessary to ensure the program serves the national interest. Read more at: http://bmsmail3.ieee.org:80/u/3443/119897

IEEE-USA In the News:

IEEE-USA President Argues Against Raising H-1B Cap in Magazine Op-Ed Arguing against raising the H-1B visa cap in Optimize magazine, IEEE-USA President Dr. Ralph Wyndrum said Congress should pass legislation that protects U.S. technology workers from displacement by foreign professionals, [and] ensures market wages and other workplace protections for H-1B holders.

Wyndrum cites numerous government reports that have found major flaws in the H-1B program, and research by the San Jose Mercury News. The newspaper concluded, the program gives U.S. citizens virtually no protection from being replaced by a foreign worker," and employers are not required to prove American workers were not available for those jobs."

Stuart Anderson, executive director of the National Foundation for American Policy, argues for raising the annual H-1B quota in the dueling op-eds. See

http://bmsmail3.ieee.org:80/u/3445/119897.

IEEE-USA was also cited in a recent H-1B article by the Los Angeles Times. In addition, IEEE-USA Vice President Ron Hira spoke about L-1B Visa abuses in HR Magazine. See L.A. Times: http://bmsmail3.ieee.org:80/u/3446/119897.

For more IEEE-USA in the News items, go to http://bmsmail3.ieee.org:80/u/3448/119897.

MAGNEWS

CELEBRATE RAMAC!

Commemorate your contributions !!

Store Your Name and a Short Bio on the IEEE Magnetics Society Commemorative Disk Site !
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Data will be added to the Chapter Commemorative File to a LIMITED TOTAL FIXED 'RAMAC' CAPACITY of 5 Million Characters
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6613 Tam OShanter Drive
San Jose, CA 95120-4022

***Endorsed by IEEE Santa Clara Valley Section**

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CNN: Growing demand to store data

Tuesday, July 4, 2006; Posted: 11:47 a.m. EDT (15:47 GMT)

HOPKINTON, Massachusetts (AP) -- Despite a relentless slide in the cost of keeping electronic information, executives at companies that store data for the business world say they expect to keep making money.

The reason? Look no further than what's happening in millions of homes around the world, they say.

Just as businesses are building ever-larger databases and searching for new ways to manage the flood of information, consumers are storing all their music, photo and massive video files -- and seeking better ways to organize it all.

They can do it because technological advances have enabled ever-greater amounts of information to be packed more densely into a given amount of disk space, at little extra cost to storage suppliers. That has increased capacity and made it far less expensive to keep big files.

"Ten years ago, a 1-gigabyte disk drive was a really great thing," said Bob Schultz, senior vice president and manager of Hewlett-Packard Co.'s StorageWorks division. "Last Christmas, I bought a 1-gigabyte memory stick for my daughter's camera. I suppose it cost $5,000 a decade ago for that disk drive, and I think the memory stick cost me $50."

From home offices to corporate data centers, society is demanding ever-greater amounts of information, and easier ways to find it and back it up.

The data storage industry is seeing rising demand from several areas: Growth in mobile computing has increased reliance on centrally stored data that can be accessed remotely; natural disasters have persuaded corporate customers to back up data at multiple sites; and new data storage markets are emerging in places like Asia and Latin America.

Government and legal record-keeping requirements also are expanding as more work is done via e-mail and instant messaging; storage-intensive video data are more common, from security camera footage to movie downloads; and inventory-tracking radio-frequency tags are creating new tidbits to archive.

At Boston's Beth Israel Deaconess Medical Center, a switch from film to digital medical images such as for mammograms has helped drive a 100-fold increase in the amount of information stored at the hospital's data center over the past five years, said John Halamka, chief information officer for Beth Israel and two other Boston-area hospitals.

The three hospitals' storage budget of $2 million has risen at a far slower rate, because new hardware is increasingly efficient at storing large amounts of information at lower costs. At the same time, ever more information needs to be preserved, he said.

The growing demand to store seemingly anything is a key reason why the storage industry is spending more on acquisitions and research -- even though the prices that data firms can charge for supplying increasingly efficient and higher-capacity storage hardware continues dropping, just as prices for computers have fallen relative to the amount of information they can process.

While it costs less for the industry to supply a given amount of storage capacity, the resulting drop in prices has drained hardware revenue and challenged bottom lines.

So data storage firms are relying not only on storage capacity to drive profits, but also services and software that make the flood of data easier to sort through and keep secure.

"If I only have hardware and I just keep helping make you more and more efficient at less and less cost, eventually I'm going to hit a wall and it's going to be tough for me to make money," Joe Tucci, the head of leading storage vendor EMC Corp., said in a recent interview.

The trend is also apparent with consumer storage: It costs less than two-tenths of a penny to store a typical song download of 3.9 megabytes, which would have cost more than $7 to store in 1992, according to John Rydning of technology research firm IDC.

Hopkinton-based EMC shipped customers more storage capacity per month last year than it did in all of 2000, and projects such growth to continue.

The trends are industrywide, affecting EMC and more diversified rivals including HP, IBM Corp., Hitachi, Dell Inc., Sun Microsystems Inc. and Network Appliance Inc.

"It's kind of phenomenal," HP's Schultz said. "You get to these numbers where people say, 'Gee, in the next three years we're going to ship as much capacity as we shipped in the whole history of the industry.'"

But because of dropping prices, storage hardware sales provided only about 38 percent of overall industry revenue last year, compared with more than 50 percent in the late 1990s, according to IDC. The rest of the revenue comes from software and services.

IDC forecasts storage capacity shipped to customers worldwide will rise around 50 percent annually through 2010, with revenue from that hardware increasing 3 percent, to about $30 billion.

Such modest revenue projections have left Wall Street skeptical that the industry can return to the big profits it enjoyed when technology spending surged in the late 1990s.

Declining prices are one reason EMC's stock has remained flat for nearly three years, despite 11 straight quarters of double-digit revenue growth and profits that rose 30 percent last year.

"Pretty much everyone in the industry has faced this pressure," said Erick Maronak of Victory Capital Management, an EMC investor.

Industrywide profits are difficult to measure because HP and IBM offer a vast range of products and services beyond data storage and don't break out storage financial figures.

To offset dropping storage prices, EMC has spent $4.5 billion to acquire storage software and service firms and about $3 billion on research and development over the past three years -- huge investments at a company that recorded $9.7 billion in sales last year. On Thursday, EMC made another big move, announcing a $2.1 billion acquisition of Bedford-based RSA Security Inc. to improve the level of security in its storage technologies.

Sun last year expanded its slice of the business by acquiring Storage Technology Corp. for $4.1 billion, and HP has made two recent storage acquisitions.

Although plunging storage prices have challenged the industry, they also have expanded the industry's pool of customers. Lower costs have allowed medium-sized and small businesses to build huge databases once affordable only for banks, airlines, retail chains and government agencies, which were largely alone in fueling the storage industry's early growth.

The technological advances also have ushered in a new way of thinking about data storage by corporations and consumers, said Mark Lewis, EMC's executive vice president and chief development officer.

Years ago, anytime Lewis bought a new home computer he carefully went through his old computer's files to see which ones were worth saving on his new PC and which ones would unnecessarily take up hard drive space.

These days, he just moves everything from his old PC to his new one.

"I don't even bother to try to delete any information," he said. "I might need it."

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HITACHI announces

Hitachi Launches Its First Perpendicular Hard Drives

2.5-inch hard drives that can hold 160GB of data will be available by mid-year.

Martyn Williams, IDG News Service
Tuesday, May 16, 2006

Hitachi Global Storage Technologies will soon begin selling its first hard drives based on perpendicular recording technology, the company said yesterday.

Perpendicular technology was recently introduced and can help increase the amount of data stored on each disk platter.

In doing so, the company joins several other major drive manufacturers in using the technology. Within the next few years almost all hard drives are expected to transition to perpendicular recording.

The method is similar to the longitudinal recording used in today's drives in that it relies on magnetically charged particles for data storage. In today's drives, the north and south poles of the magnetic particles run parallel to the disk, but in the new method they are arranged perpendicular to the disk. The result of this new arrangement is that each particle occupies a smaller area of the disk's surface and so more particles can be crammed onto the disk.

Product Plans

The Travelstar 5K160 drives, Hitachi's first 2.5-inch drives to employ perpendicular recording, can hold up to 160GB of data, compared to up to 100GB on the current longitudinal recording-based Travelstar 5K100 line of drives. The 2.5-inch drives are typically used in laptop computers.

They are available in bulk to PC makers and will be launched in the retail market in the middle of this year, the company said. A 160GB drive will cost $269.

The drives also employ a new drive-head coating that Hitachi said makes them twice as reliable as current drives.

"We've had prototypes in the field for one and a half years with no returns," said John Best, chief technologist at the San Jose, California, company.

With the 2.5-inch drives launched, the company will now turn its attention to employing the technology in 1.8-inch drives, said Best. Those are expected to be available later this year, although he was unwilling to provide a more specific launch date or details of the drives.

The 1.8-inch drives are used in an increasingly wide range of consumer electronics products. Most notably they are used in Apple Computer's popular iPod digital music player.

http://www.pcworld.com/news/article/0,aid,125719,tk,nl_wbxnws,00.asp

Omneon Selects Hitachi Hard Drives For New Mediagrid Storage Platform

500 GB Hitachi Drives Used to Provide High-capacity Storage and Fast Access to Digital Video Content

SAN JOSE, CA – April 25, 2006 – Hitachi Global Storage Technologies (Hitachi GST) today announced that Omneon Video Networks is using Hitachi Deskstar™ hard drives in its new MediaGrid content library. MediaGrid is a highly scalable storage platform for broadcast and production facilities that simplifies operations by enabling simultaneous access to centrally-stored content. Omneon selected Hitachi Deskstar 7K500 hard drives because they deliver the substantial capacity and performance required for the most demanding media environments.

The Hitachi Deskstar 7K500 was the industry's first half terabyte (500 GB) Serial ATA (SATA) drive. The drives include 3Gb/s data transfer rates, Native Command Queuing, 16 MB buffers and additional features that combine to deliver breakthrough performance for digital video editing and other bandwidth-intensive applications.

Many of today's audio/video applications require hard drives that are optimized for storing and retrieving digital video content. Hitachi has addressed this need by integrating "Smooth Stream" technology into the Deskstar 7K500. Based on the ATA-7 AV Streaming Feature Set standard, Smooth Stream enhances video streaming functionality by enabling the host to control the drive's error recovery processes.

"Hitachi Deskstar drives are the perfect complement to Omneon's latest solution for the media and entertainment industry," said Marcia Bencala, vice president, Corporate Strategy and Product Planning, Hitachi Global Storage Technologies. "Deskstar 7K500 drives will provide fast access to content and large storage capacities for users that are engaged in video editing, animation, special effects and similar applications. Hitachi is bolstering the use of hard drives in AV applications with products that include video stream management, low power modes and other application-specific features."

Omneon's MediaGrid content library featuring Hitachi hard drives will be showcased at the annual National Association of Broadcasters (NAB) Conference in the Las Vegas Convention Center, April 22-27.

Additional information about Hitachi Deskstar hard drives can be found at www.hitachigst.com/deskstar.

More information about the Omneon MediaGrid is available online at www.omneon.com.

About Hitachi Global Storage Technologies

Hitachi Global Storage Technologies is a storage technology leader, founded in 2003 through the combination of Hitachi's and IBM's hard disk drive businesses. Hitachi GST enables users to fully engage in the digital lifestyle by providing high-value hard drives in formats suitable for the office, on the road and in the home.

With its legacy in hard drive invention, Hitachi GST will lead the industry in celebrating the hard drive's golden anniversary in 2006. After five decades of innovation, the hard drive has had a profound effect on the computing and consumer electronics industries. That heritage lives on at Hitachi GST through products that define the standard for hard drive miniaturization, capacity, performance and reliability.

With more than 27,000 employees worldwide, Hitachi GST offers a comprehensive range of hard drive products for desktop computers, high-performance servers, notebooks and consumer devices. For more information, please visit the company's web site at.

About Hitachi, Ltd.

Hitachi, Ltd., (NYSE: HIT), headquartered in Tokyo, Japan, is a leading global electronics company with approximately 347,000 employees worldwide. Fiscal 2004 (ended March 31, 2005) consolidated sales totaled 9,027.0 billion yen ($84.4 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 www.hitachi.com.

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Benecki Named to Board of Bunting Magnetics

NEWTON, KS – ***Walter T. Benecki*** has been appointed as a member of the board of Bunting Magnetics Co., headquartered in Newton, Kansas.

Robert J. Bunting, the company's owner and Chief Executive Officer, announced the appointment: "Having Walt join our board will allow us to aggressively pursue strategic growth objectives in the area of acquisitions,

new product development, and sales expansion. We are pleased to welcome Walt to the Bunting team."

Mr. Benecki is the former president of the Magnetic Products Group of SPS Technologies Inc. (now Arnold Magnetic Technologies) and a past president of the Magnetic Materials Producers Association (now International Magnetics Association). He is currently president of Walter T. Benecki LLC, a consultancy serving the worldwide magnetics industry. More information about Mr. Benecki is available at www.waltbenecki.com.

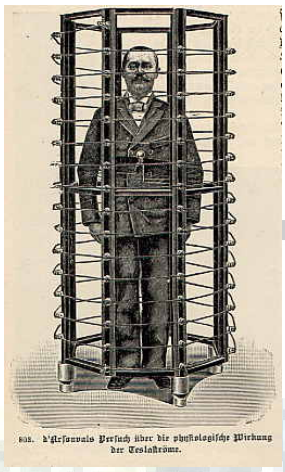
Bunting Magnetics Co. is a major U.S.-based manufacturer of magnetic assemblies and equipment. The company's product line serves global markets and includes a broad range of magnetic materials and components, magnetic separation systems, material handling equipment, magnetic printing cylinders, and metal detection equipment.

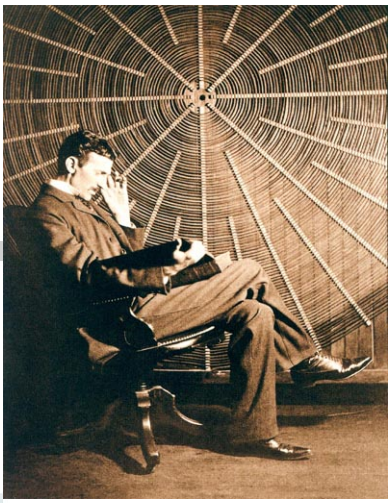
For more information, write
Bunting Magnetics Co.,
500 S. Spencer Avenue,
P.O. Box 468, Newton, KS 67114-0468, USA;
call 1-800-835-2526 (US & Canada) or 316-284-2020;
or send e-mail to
bmc@buntingmagnetics.com.

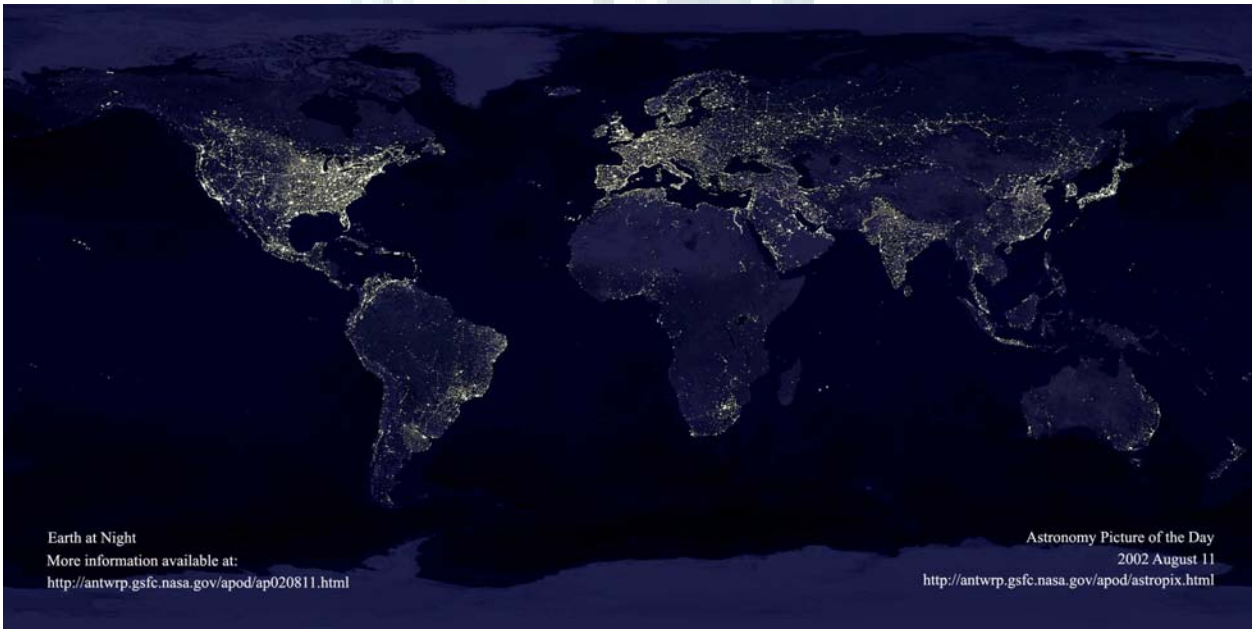
Visit Bunting's Web site at
www.buntingmagnetics.com

Visual Magnetics - QUIZ

What has this to do with magnetism?







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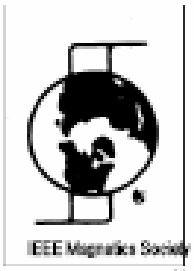
CONFERENCE ANNOUNCEMENT

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 2003 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(mpardavi@seas.edu) and please carbon copy Matt Carey (matthew.carey@hitachigst.com) and Bruce Gurney (bruce.gurney@hitachigst.com).

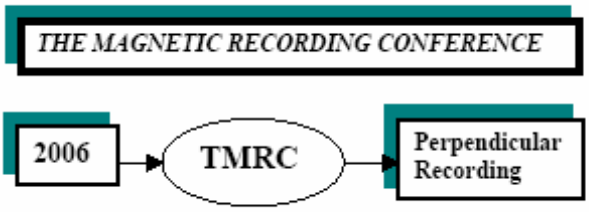
We hope you enjoyed your conference experience and that in return you will give the writing of your report a high priority.

Best wishes,

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

CONFERENCE ANNOUNCEMENT 1

TMRC



August 7-9, 2006 Pittsburgh, Pennsylvania
Sponsored by the IEEE Magnetics Society

And co-sponsored by:

Data Storage Systems Center (DSSC) - CMU
Center for Magnetic Recording Research (CMRR) - UCSD
Institute for Information Storage Technology (IIST) - SCU
Center for Micromagnetics & Information Technologies (MINT) - U of MN
Center for Materials for Information Technology (MINT) - U of AL
Center for Research on Information Storage Materials (CRISM) - Stanford
Computer Mechanics Laboratory (CML) - UCB

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AN INTERNATIONAL CONFERENCE ON PERPENDICULAR MAGNETIC RECORDING

The 17th Magnetic Recording Conference (TMRC 2006)
will be held August 7-9, 2006 at
Carnegie Mellon University, Pittsburgh, Pennsylvania, USA

TMRC 2006 will have a slightly different focus than previous TMRC conferences. In the past, conference topics rotated between magnetic recording heads, media and systems. With the recent introduction of perpendicular recording products, this conference will focus on **perpendicular recording components, system integration and extendibility**. Approximately 30 invited papers will be presented **orally** at the conference and will later be published in the IEEE Transaction on Magnetics. The topics to be presented include:

- Perpendicular recording media technology
- Perpendicular recording head technology
- Perpendicular recording system and integration topics
- Perpendicular recording channels, coding and error-correction technologies
- Perpendicular recording physics
- System reliability
- Extendibility of perpendicular recording technology

Nominations for speakers should be made to the Program Chairs: Prof. Jim Bain (jbain@ece.cmu.edu) and Dr. Francis Liu (francis.liu@wdc.com) via e-mail by March 22, 2006.

There will also be a **poster session** at the conference. The poster session will have contributed posters in addition to those given by the invited speakers. Poster contributors must send a one-page abstract to the Program Chairs by July 15, 2006. The program booklet with invited paper digest will be available by the end of June 2006.

Current information on TMRC 2006 can be found at
http://www.dssc.ece.cmu.edu/tmrc2006/

CONFERENCE ANNOUNCEMENT 2

2006 Asia-Pacific Microwave Conference

APMC 2006

December 12-15, 2006 Pacifico Yokohama, Yokohama, Japan

http://www.apmc2006.org

"SAIL FOR THE MICROWAVE OCEAN"

Final Call for Papers

The 2006 Asia-Pacific Microwave Conference (APMC 2006) will be held at the Pacifico Yokohama, Yokohama, Japan, on December 12-15, 2006. This conference is organized and sponsored by the Institute of Electronics, Information and Communication Engineers (IEICE) of Japan, and is cooperatively sponsored by IEEE MTT-S, URSI, EuMA and IEEE MTT-S Japan Chapter.

CONFERENCE TOPICS

A. Active Devices and Circuits
Low-Noise Devices and Circuits, High-Power Devices and Circuits, Control Circuits (MIX, Osc., SW, etc.), MMICs and HMICs (Receivers, Transmitters, etc.), SiGe/RF-CMOS Devices, Microwave Tubes, Active and Adaptive Antennas, Others

B. Passive Components
Filters and Resonators, Ferrite and Surface Wave Components, Packaging, Passive Devices and Circuits, Waveguides and Striplines, WDM Components, RF MEMS, LTCC Devices, Directional Couplers and Hybrids, Others

C. Systems
Wireless Systems, Broadband Wireless Access, Optical Fiber Systems, Microwave Applications (ITS, SPS, etc.), Microwave Medical & Biological Applications/EMC, Phased Array Antenna Systems, Millimeter-Wave Radar and Sensor, Remote Sensing, Wireless LAN and Bluetooth, Quasi-Zenith Satellite Systems, Digital Broadcasting, Others

D. Basic Theory and Techniques
Scattering and Propagation, Electromagnetic Field Theory and CAD, Antenna Theory, Microwave Antennas, Microwave Photonics, Microwave Superconductivity, Measurement Techniques, Artificial Materials, Others

E. Emerging Technologies
Photonic Bandgap, Software Defined Radio, Wireless Ad hoc Network, Mobile Access, 4G Communication Systems, Tera Hertz and Submillimeter Wave Components, System on Package, HAPS, MIMO Systems, UWB Systems, Others

TIME TABLE

Paper Submission Deadline: May 31, 2006
Notification of Acceptance: August 1, 2006
Final PDF file with Camera-Ready Manuscript Deadline: September 15, 2006

ALL SUBMISSIONS MUST BE IN PDF FORMAT.

Hard copies not accepted

CONFERENCE ANNOUNCEMENT 3

10th Joint MMM/Intermag Conference

January 7-11, 2007 ● Baltimore, Maryland

FIRST CALL FOR PAPERS

Abstract Deadline: August 9, 2006

The 10th Joint Magnetism and Magnetic Materials (MMM)/Intermag Conference will be held at the Baltimore Marriott Waterfront Hotel in Baltimore, Maryland from Sunday, January 7 through Thursday, January 11, 2007. Members of the international scientific and engineering communities interested in recent developments in magnetism and associated technologies are invited to attend the Conference and contribute to its technical sessions.

SCOPE OF THE CONFERENCE: This Conference will include all basic and applied science and technology related to the field of magnetism. The technical subject categories for the Conference are located at the end of this Call.

ABSTRACT SUBMISSION REQUIREMENTS:

• The presenting author ***must*** be a paid registrant. The Conference does not provide support for any contributed papers.
• Abstracts must be submitted prior to the **August 9, 2006 deadline**.
• **All abstracts must be submitted via the WEB submission system ONLY.**
• Submit all abstracts electronically, using the link found at (http://www.magnetism.org).
The link will be **available** starting **July 19, 2006**.
• Abstracts should be **300 words** or less, and are limited by the submission system.
• Abstract acceptance will be announced via email. Authors will be advised as to the status of their submission by mid September 2006**.**

PROGRAM: The program will consist of invited and contributed papers falling broadly within the scope of the categories listed at the end of this Call.

PUBLICATION: The Proceedings of the Conference will be published in June 2007 as special issues of the *Journal of Applied Physics* and *IEEE Transactions on Magnetics*. Entire sessions will be assigned to one or the other of these publications by the Program Committee.
All manuscripts must be received by October 31, 2006.

EXHIBITS: An exhibition of related services, equipment, materials, software, technical journals and books will be held as a part of the 2007 Joint MMM/Intermag Conference. Individuals and organizations who are interested in purchasing booth space should contact **Roseann Kuryla,** Exhibits Coordinator at Courtesy Associates at: email:2007joint @courtesyassoc.com;
Fax: 202-973-8722.

REGISTRATION: Advance Conference Registration will be available starting **October 1,2006**.

VISA REQUIREMENTS FOR ENTRY INTO THE USA: Citizens of other countries must carry a valid passport and visa to enter the USA. Foreign participants should contact the United States

Embassy, Consulate, or Office of Tourism in their home country AS SOON AS OSSIBLE to determine their particular visa requirements. Participants requiring visas must initiate the application process many months in advance of their departure date. More details at: **http://www.magnetism.org**

TECHNICAL SUBJECT CATEGORIES

I. Fundamental Properties and Cooperative Phenomena
II. Magnetoelectronic Materials and Applications
III. Computational Magnetics and Imaging
IV. Soft Magnetic Materials and Applications
V. Hard Magnetic Materials and Applications
VI. Structured Materials
VII. Special Magnetic Materials
VIII. Magnetic Recording
IX. Sensors (not magnetic recording), High Frequency and Power Devices
X. Applications and Interdisciplinary Topics

CHAIRMAN

Julie Borchers
www.magnetism.org

CONFERENCE ANNOUNCEMENT 4

Nano and Giga Challenges in Electronics and Photonics From Atoms to Materials to Devices to System Architecture

Symposium and Spring School (Tutorial Lectures)

Phoenix, Arizona, March 12-16, 2007

Conference Overview

Microelectronics technologies have reached a new stage in their development: the latest miniaturization of electronic devices is approaching atomic dimensions, interconnect bottlenecks are limiting circuit speeds, new materials are being introduced into microelectronics manufacture at an unprecedented rate, and alternative technologies to mainstream CMOS are being considered. As a marriage of today's micro-, tomorrow's nano- and future molecular electronics this series of conferences on Nano and Giga Challenges in Microelectronics (NGCM) is being launched. Following the first successful forums in Moscow, Russia (NGCM2002) and in Krakow, Poland (NGCM2004) the third meeting will be held in Phoenix, Arizona in 2007 hosted by Arizona State University in cooperation with Nano & Giga Solutions and other local, national and international organizations, Universities, research centers, companies and governmental agencies.

GIGAntic challenges for the continuing growth of information technologies beyond the fundamental physical limits in scaling electronic devices to NANO dimension has sparked an unprecedented level of interdisciplinary and international cooperation between industrial and academic researchers, companies - IT market rivals, and countries, including former political and military rivals. The next forum in Phoenix, Arizona, invites academic and industrial researchers to present tutorial, expository and original research papers dedicated to the scientific and advanced technologically problems related to the ultimate merge of micro- and nanoelectronics and photonics in specific areas, such as atomic scale materials design: theory and experiment; bio- and molecular electronics and photonics; high frequency electronics; fabrication of nanodevices; magnetic materials and spintronics; materials and processes for integrated and subwave optoelectronics; nanoCMOS: new materials for FETs and other devices; nanoelectronics system architecture; nano optics and lasers; non-silicon materials and devices; quantum effects in devices.

Organizers

Co-Chairmen

Herb Goronkin (Advisory Board), Technology Acceleration Associates, Phoenix, Arizona, USA
Stephen Goodnick (Program Committee), Arizona State University, Tempe, Arizona, USA
Anatoli Korkin (Organizing and Program Committee), Nano & Giga Solutions, Gilbert, Arizona, USA

http://www.AtomicScaleDesign.Net/ngc2007
http://ngc2007.asu.edu

FORTHCOMING CONFERENCES

17TH 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

http://icm2006.com/

ICM 2006

HIGHLY FRUSTRATED MAGNETISM 2006

15-Aug-2006 - 19-Aug-2006

Highly Frustrated Magnetism 2006 (HFM2006) will be held at Icho 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

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 or contact powerpns@iee.org.

19TH 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
http://www.csm.org.cn/REPM06.HTM

52ND CONFERENCE ON MAGNETISM AND MAGNETIC MATERIALS

November 5-9, 2007; Tampa, Florida

INTERMAG

May 4–8, 2008, Madrid, Spain

53RD CONFERENCE ON MAGNETISM AND MAGNETIC MATERIALS

November 10-14, 2008; Austin, Texas

IEEE PUBLICATION NEWS

IEEE Transactions on Magnetics Coverage Expanded to Include All Aspects of Magnetic Information Storage

The Transactions is widely regarded as the premier journal for magnetic data storage. Regular Transactions issues include articles on heads, media, giant magnetoresistance, spintronics, servos, systems, channels, and codes.

Now, the Transactions announces that coverage of regular papers is being expanded to include all relevant topics in magnetic disk and tape storage, including tribology, head-disk dynamics, and disk- and tape-drive components. These topics already appear in many conference-related papers published in the Transactions.

The Transactions continues to publish articles in other areas of magnetics, including basic physics of magnetism, magnetic materials, applied magnetics, magnetic devices, and computational magnetics.

Authors may submit articles electronically for consideration for publication in the Transactions at http://transmag-ieee.manuscriptcentral.com/.

Members of the Magnetics Society get free on-line access to the TRANSACTIONS (via IEEE Xplore) and an annual CD-ROM. At membership renewal, members may also subscribe to the print edition for an extra fee.

Members who have difficulty accessing the TRANSACTIONS may go to http://ieeexplore.ieee.org/xpl/techform.jsp (also linked from "SUPPORT" on the IEEE Xplore navigation bar) or may send a message to onlinesupport@ieee.org.

Institutional on-line subscription options to Xplore are described at http://www.ieee.org/products/onlinepubs/info/comparefeatures.html.

Ron Goldfarb
Publications Chair
IEEE Magnetics Society

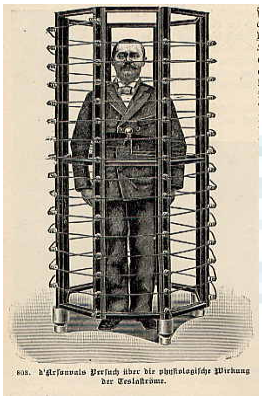
Visual Magnetics - QUIZ – Solution

Celebrating the 150th Anniversary of NICOLA TESLA's Birth

http://teslasociety.com/

Among many-many of Tesla's other achievements:

Nikola Tesla developed the polyphase **alternating current** system of generators, motors and transformers. He held 40 basic U.S. patents on the system, which George Westinghouse bought, determined to supply America with the Tesla system. Edison did not want to lose his DC empire, and a bitter contest ensued over the use of AC and DC. Tesla -Westinghouse ultimately emerged the victor because AC proved to be superior technology. The outcome was a victory for the progress of both America and the world.



http://www.ejournal.at/buecher/babyl/tesla.html

The **Tesla coil** is one of Nikola Tesla's most famous inventions. It is essentially a high-frequency air-core transformer which takes the output from a 120vAC to several kilovolt transformer & driver circuit and steps it up to an extremely high voltage. Voltages can get to be well above 1,000,000 volts and are discharged in the form of electrical arcs. Tesla himself produced arcs up to 100,000,000 volts, but I don't think that has been duplicated by anybody else. Tesla coils create extremely powerful electrical fields. Large coils have been known to wirelessly light up florescent lights up to 50 feet away, and the electric field that goes directly into the light without electrodes, even burned-out florescent lights will glow.

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.

The Magnetics Society Newsletter is published electronically at the IEEE Magnetics Society webpage http://www.ieeemagnetics.org/
The Newsletter is published in January, April, July and October.
Submission deadlines are January 1, April 1, July 1, and October 1 respectively.

Please send articles, letters and other contributions to the editor:

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