



IEEE Magnetics Society NEWSLETTER

Volume 42, No. 2.

April 2004

Martha Pardavi-Horvath, Editor

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 4. **CEFC 2004** Electromagnetic Field Computation, Seoul, Korea, *June 6-9, 2004*
 5. **SCM-2004** Second Seeheim Conference on Magnetism, Seeheim, Germany, *June 27- July 1, 2004.*
 6. **EMSA 2004** 5TH European Magnetic sensors and Actuators conf., Cardiff, UK, *July 4-7, 2004.*

7. **PASPSIII** 3rd Int. Con. Physics and Application of Spin-Related Phenomena in Semiconductors, Santa Barbara, CA, 21-23 *July, 2004*.
 8. **GRC ON MAGNETIC NANOSTRUCTURES**, Big Sky resort, Montana, USA, *August 22-27, 2004*.
 9. **ICF- 9** San Francisco, USA, *August 23-27, 2004*.
 10. **JEMS'04** Joint European Magnetic Symposia, Dresden, Germany, *September 05 – 10, 2004*.
 11. **EIGHTH INTERNATIONAL SYMPOSIUM ON MAGNETIC MATERIALS, PROCESSES AND DEVICES**, Honolulu, Hawaii, *October 3-8, 2004*.
 12. **AVS** Magnetic Interfaces and Nanostructures, Anaheim, CA *Nov. 14-19, 2004*
 13. **MMM 2004**, 49th Conference on Magnetism and Magnetic Materials, Jacksonville, Florida, *November 14-19, 2004*.
 14. **INTERMAG 2005**, Nagoya, Japan, *April 4-8, 2005*.
 15. **HMM 2005** 5th Int. Symposium on Hysteresis and Micromagnetic Modeling, Budapest, Hungary, *May 30 – June 1, 2005*.
- **IEEE Publication news**
AUTHORS NEEDED
IEEE TRANSACTIONS ON MAGNETICS on the web
 - **QUIZ** - Solution
-

IEEE MAGNETICS SOCIETY OFFICERS 2003-2004

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Chapters Corner

If you are the local chapter chair reading this, please share with us all what'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 to me at 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

Magnetics Society Distinguished Lecturers 2004

Dynamics, Damping and Defects in Thin Ferromagnetic Films

Robert D. McMichael

National Institute of Standards and Technology

Modern disk drives can read and write bits every two nanoseconds, a time scale very similar to the magnetic damping time of the ferromagnetic metals used in the heads. The damping characteristics are also important for thermally-driven magnetic noise in sensors. Furthermore, it seems likely that damping will limit data rates in magnetic random access memory, since the magnetization in a memory cell must be allowed to settle between switching events. For all of these applications, measurements of damping are important, and these measurements are most commonly made by ferromagnetic resonance linewidth. The two problems that complicate measurements of damping by ferromagnetic resonance are: 1) defects contribute to the linewidth, so that the linewidth is the combined effect of defects and damping, and 2) the form of the damping itself is the subject of some debate.

Patterning is perhaps the ultimate form of magnetic inhomogeneity in a thin film. Unlike the spin-wave normal modes of a continuous film, the normal modes of patterned elements are shape and size dependent. The dynamic properties can be addressed using available micromagnetic modeling software to obtain images of the normal mode precession patterns.

In this lecture, I will discuss primarily the role of defects in magnetization dynamics. I will emphasize the competition between interactions, which promotes the collective behavior typified by spin waves, and inhomogeneity, which promotes local behavior. An understanding of these effects allows one to use linewidth data to characterize damping and inhomogeneity separately. I will show examples of line widths and modeling from nominally uniform films, exchange biased films, films with wavy substrates, and films with nonuniform magnetization.



Robert D. McMichael (M'92) received the B.S. degree in engineering-physics from Pacific Lutheran University, Tacoma, WA, in 1985 and the M.S. and Ph.D. degrees in physics from The Ohio State University, Columbus, in 1990.

In 1990, he was awarded a National Research Council postdoctoral associateship at the National Institute of Standards and Technology (NIST), and he has continued in the Magnetic Materials Group of the Materials Science and Engineering Laboratory of NIST. His research interests have touched on a diverse set of topics, including: nonlinear magnetization dynamics, ferromagnetic resonance, magnetic refrigeration, hysteresis modeling, giant magnetoresistance, exchange bias, computational micromagnetics, and magnetization dynamics. He currently serves as leader of the Nanomagnetodynamics project in NIST's

Metallurgy Division.

Dr. McMichael serves on the editorial board of IEEE TRANSACTIONS ON MAGNETICS and on the advisory committee for the Magnetism and Magnetic Materials (MMM) conference. He created the logos for several recent MMM conferences.

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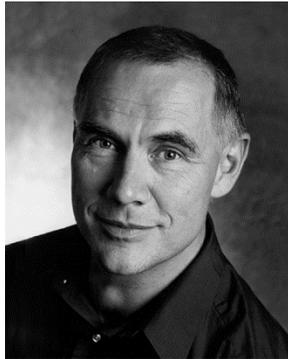
Assault on Storage Density of 1 Terabit per Square Inch and Beyond

Dieter Weller

Seagate Technology

The areal density in magnetic recording has surpassed 50 Gbit/in² in products and 100 Gbit/in² in laboratory demonstrations. These densities have been achieved with recording media composed of Co-alloy nanostructured materials with horizontal orientation of the magnetization (longitudinal recording). Grain sizes are 8 to 10 nm and grain size distributions are near 20% (standard deviation divided by the mean). Going much beyond 100 Gbit/in² requires magnetically harder materials with smaller, thermally stable grains (5 to 8 nm) and tighter distributions (< 15%). Experiments indicate that this may be possible in perpendicular recording, where a soft magnetic imaging layer is used to enhance the write field and enable such grains to be switched. Basic technology demonstrations of about 110 Gbit/in² have already been reported, and modeling suggests that extensions to about 1 Tbit/in² should be possible using that technology.

Going much beyond Tbit/in², however, will require more drastic changes of heads and media. One of the fundamental limitations relates to the media sputter fabrication process, which may not allow the tight grain size and magnetic dispersions required in models. So-called “self-organized magnetic arrays” (SOMA) of chemically synthesized Fe-Pt nanoparticles are being explored as alternatives. These structures not only show extremely tight size distributions (< 5%) but are also magnetically much harder than current Co alloys. Writing will require temporal heating and cooling in a magnetic field, as in heat-assisted magnetic recording (HAMR). A combination of SOMA and HAMR may eventually lead to recording on a single particle per bit, with ultimate densities near 50 Tbit/in² (with 10 years storage time, ambient temperature, and Fe-Pt type anisotropies).



Dieter Weller received the Diploma in physics from the University of Marburg, Germany, in 1982 and the Ph.D. degree in physics from the University of Cologne, Germany, in 1985.

From 1985 to 1990 he worked at the Siemens AG Central Research Laboratories in Erlangen, Germany, on the design, fabrication, and characterization of magneto-optic recording materials and disks. From 1990 through 2000 was with the IBM Research Division in San Jose, CA, where he worked on electronic, magnetic, and magneto-optical properties of thin films and multilayers. He joined Seagate Research in Pittsburgh, PA, in April 2000 as Director of Media Research. His current interests include the exploration of extremely high density magnetic recording schemes and the fabrication of novel nano-phase magnetic materials. He has published over 200 scientific papers as well as several book articles. He is co-editor of *The Physics of High Density Magnetic Recording* (Springer-Verlag, 2001). He holds eight U.S. patents and has 15 pending patent applications.

Dr. Weller is a Fellow of the American Physical Society (APS) and a member of the American Vacuum Society (AVS). He has served as guest editor for the *Journal of Applied Physics* and IEEE TRANSACTIONS ON MAGNETICS and was program co-chair of the 8th Joint Magnetism and Magnetic Materials/Intermag Conference (2001).

Contact: **Dieter Weller**, Seagate Research Center, Seagate Technology, 1251 Waterfront Place, Pittsburgh, PA 15222; telephone: (412) 918 7128; fax: (412) 918 7222; e-mail: Dieter.Weller@seagate.com

Magnetoresistive Random Access Memory: The Path to Competitiveness

Jian-Gang (Jimmy) Zhu

Carnegie Mellon University, Pittsburgh, PA

With the first commercial product on the horizon, magnetoresistive random access memory (MRAM) is on a path to replace static random access memory (SRAM), dynamic random access memory (DRAM), and flash memory (and even disk drives in some applications) as the universal solid-state memory. Non-volatility, fast access time, and compatibility with CMOS technology are three of the most important features that make MRAM potentially superior to other existing memory technologies. To fully exploit these potentials, present MRAM designs need to overcome three major obstacles: stringent fabrication tolerances, relatively high power consumption, and response to write addressing disturbances. Although prototype memory devices have been successfully demonstrated, new, innovative designs are still required to make the technology truly competitive.

In the designs employed by today's MRAM manufacturers, the magnetic moment in a memory element is effectively linear, with its orientation representing the memory state "1" or "0." Switching between the two memory states is done by the Ampérian field generated by currents in a pair of orthogonal conducting wires, often referred to as cross-point writing. The cross-point write addressing scheme generates write disturbances because the half-selected memory elements along each of the activated wires experience one of the two field components during a write operation. The result is a stringent requirement for a narrow switching field distribution for all the elements in a memory block, and consequently a stringent fabrication tolerance. The phenomenon is further exacerbated by the possibility of undesired thermally-activated magnetization reversals, especially at small physical dimensions of the memory elements.

The lecture will cover the micromagnetic magnetization reversal processes in various types of MRAM elements. Over the past seven years, extensive micromagnetic analyses and experimental investigations have provided key understanding to obtain robust magnetic switching, and they have become the design principles for today's memory elements. I will present a comprehensive study of thermally-activated magnetization reversal at small physical dimensions for various MRAM designs and will discuss the imposed area storage density limitations due to the write disturbance. I will conclude by introducing a novel design that completely eliminates the write addressing disturbance and substantially lowers power consumption by utilizing the spin transfer effect.



Jian-Gang (Jimmy) Zhu (M'89, SM'02) received the B.S. degree in physics from Huazhong University of Science and Technology, Wuhan, China in 1982 and the M.S. and the Ph.D. degrees, both in physics, from the University of California, San Diego in 1983 and 1989, respectively. In 1990 he joined the Department of Electrical Engineering at the University of Minnesota as an Assistant Professor and in 1992 was appointed to the McKnight Land Grant Professorship by the Regents. In 1997 he joined the faculty of Carnegie Mellon University, Pittsburgh, PA, where he is now the ABB Professor of Engineering in the Department of Electrical and Computer Engineering and the Data Storage Systems Center. He has authored or co-authored over 170 technical papers and presented over 40 invited talks at international conferences. He has supervised and graduated 19 Ph.D. students. Currently his research includes MRAM device

design, GMR head design, thin film recording media, digital tape recording systems, patterned media, and magnetization noise in magnetic nano-sensors. He is an advisory editor for the *Journal of Magnetism and Magnetic Materials*.

Prof. Zhu was a recipient of a 1993-97 NSF Presidential Young Investigator Award. His patent, "Ultra-High Density Magnetic Sensor," won a "Top 100 Inventions" award given by *R&D Magazine* in 1996.

Contact: Professor **Jian-Gang (Jimmy) Zhu**, Department of Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, PA 15213-3890; telephone: (412) 268 8373; fax: (412) 268 8554; e-mail: jzhu@ece.cmu.edu

Call for Nominations

For 2005-2007 Administrative Committee

In accordance with Article 4.3 of the By-Laws of the Magnetics Society, the Nominations Committee of the IEEE Magnetic Society hereby *solicits nominations* from all members of the Magnetics Society *for candidates to the Administrative Committee (AdCom)*. Eight positions, having three year terms, are to be filled each year on the AdCom. With this memo we solicit your nominations of members of the society for the three-year term beginning January 1, 2005 and running through December 31, 2007. The nomination committee, consisting of S. H. Charap, J. Fiedler, T. Lee, C. Lodder, Y. Sugita, D. Thompson, D. Weller and P. E. Wigen, Chair, will consider all names submitted and compose a ballot from these inputs.

With your nominations please submit a short biography (250 words or less) and the IEEE membership number for each candidate. **A nomination submitted without a biography will not be considered. The IEEE Membership Number of each nominee must be included with the biography.** AdCom members who are completing a second consecutive 3-year terms are not eligible for reelection. Also, please be advised that a petition for a nominee, signed by a minimum of 25 society members in good standing, will automatically place that nominee on the ballot.

The Nominations Committee will work according to the following timetable:

May 7 members	<i>Call for Nominations</i> will be submitted to all eligible Magnetics Society
June 11	Deadline for receipt of nominations (with biographies) by the Nominations Comm. Chairman
July 16	Selection of nominees for the AdCom ballot completed
July 23 members	Ballots for election of eight AdCom members will be mailed to 2002 AdCom
Aug. 20	Deadline for receipt of AdCom ballots by the Nomination Comm. Chairman
Sept. 17	Election of eight new AdCom members completed

Please mail all nominations and biographies to the Chairman or a committee member early enough so that they are received by the **deadline date (June 11, 2004)**.

The address of the chairperson is:

Philip E. Wigen, Nominations Committee Chairman
The Ohio State University, Dept. Of Physics
174 W. 18th Ave., Columbus, OH 43210, USA

Phone: 626-786-4661
Fax: 614-292-7557
E-mail: wigen.1@osu.edu

Present Elected Administrative Committee Members

Terms Expiring December 31, 2004

W. Cain*; M. Doerner; B. Guerney*; R. Katti; C. Patton*; C. Perlov*; T. Suzuki*; S. Wang

Terms Expiring December 31, 2005

G. Bertoti; T. Howell; D. Lambeth; R. O'Handley; C. Ross; D. Weller; P. Wigen; R. Wood

Terms Expiring December 31, 2006

D. Jiles, D. Lavers, T. Lee, L. Lewis, K. Ounadjela, J. Thiele, S. Ueno and R. Victora

*Members completing their second term and not eligible for reelection

Members and contacts of the IEEE Magnetic Society Nominations Committee:

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MAGNETICS SOCIETY

Nominations Committee

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Email

MagNews

1. IEEE News

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 APRIL 2004 ISSUE:

- o U.S. Lifts Restrictions on IEEE Publishing
- o Drop in Membership Not a Complete Surprise
- o Latin America Publishes Its Own Transactions
- o Creator of Ctrl+Alt+Delete Reboots His Career
- o Member Survey Response Spurs Societies to Act
- o What is Your Opinion of the Recent OFAC Ruling?
- o Society Explores the Effect of Technology
- o Five Sections Reach Century Mark
- o Microwave Buzz Hits Texas
- o Computer Communications Conference Proceedings

IEEE SCORES FIRST AMENDMENT VICTORY FOR SCHOLARLY PUBLISHING

Updated OFAC Ruling Removes Government Restrictions on Papers from Authors in Embargoed Countries

Piscataway, N.J., 5 April 2004 – IEEE scored a victory for freedom of the press and the scholarly publishing community with the ruling it received Friday from the U.S. Department of Treasury Office of Foreign Assets Control (OFAC). The ruling exempts peer review, editing and publication of scholarly manuscripts submitted to IEEE by authors living in countries that are under U.S. trade embargoes, such as Iran and Cuba. OFAC determined that IEEE's publications process is "not constrained by OFAC's regulatory programs."

The government's decision confirms the position IEEE has argued for over a year that its entire publishing process falls outside the scope of OFAC's regulations because of the Berman Amendment to the trade sanctions law that excludes the free exchange of information from OFAC's economic embargoes.

IEEE had earlier obtained a September 30, 2003 ruling from OFAC that exempted a large part of its editorial process but left uncertain whether it had to publish such papers "as is" or could edit such papers prior to final publication. This latest April 2 ruling clarifies IEEE's full freedom to engage in scholarly peer review and style and copy editing of papers, all

without OFAC regulation or licensing. The earlier September 30 ruling had also been limited to Iran, while the new ruling covers authors in Cuba, Libya and Sudan as well as in Iran

“Effective immediately, IEEE is returning to its normal publishing process for all authors, which has always been IEEE’s goal,” said IEEE President Arthur Winston. “Since last September’s ruling, IEEE had been only publishing articles from authors in embargoed countries that met its scholarly publishing standards ‘as is’ without editing.”

“The ruling eliminates potentially disturbing U.S. government intrusions on our scholarly publishing process and reaffirms the position IEEE has taken from the beginning that these publishing activities are protected by the First Amendment and exempt from the OFAC regulations,” Winston said, who added, “This issue has been very difficult for IEEE members worldwide and of great concern to all the engineering, science and publishing communities, and we believe OFAC’s new ruling will be a relief for nearly everyone.” IEEE communicated intensively with key OFAC officials, particularly during the past six months, to achieve these results, including several further written submissions and two meetings. Winston explained, “IEEE invited the scholarly publishing industry and OFAC to an open meeting in February, and then OFAC met again with IEEE in March.” In an official acknowledgement of IEEE’s persistent advocacy on these issues, Richard Newcomb, director of OFAC, wrote in the April 2 ruling, “We very much appreciate the approach taken by [IEEE] to comply with federal law in this matter, and to work with us in good faith to arrive at a resolution of these issues.”

In addition to confirming IEEE’s broad right to engage in the full range of normal and customary peer review, style and copy editing for scholarly publications, the new ruling also confirms IEEE’s rights to publish in both print and non-print media, to deliver its peer review comments or questions in any format, and to make both verbatim and idiomatic translations.

The full text of the OFAC ruling is available at www.ieee.org/ofac.

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The IEEE is the world's largest technical professional society with approximately 360,000 members in 170 countries. Through its members, the IEEE is a leading authority on areas ranging from aerospace, computers and telecommunications to biomedicine, electric power and consumer electronics. The IEEE produces 30 percent of the world's literature in the electrical and electronics engineering and computer science fields, and has developed more than 900 active industry standards. The organization also sponsors or cosponsors more than 300 international technical conferences each year. Additional information is available at www.ieee.org.

Contact: **Marsha Longshore**
732 562 6824
908 217 3594 (cell)
m.longshore@ieee.org

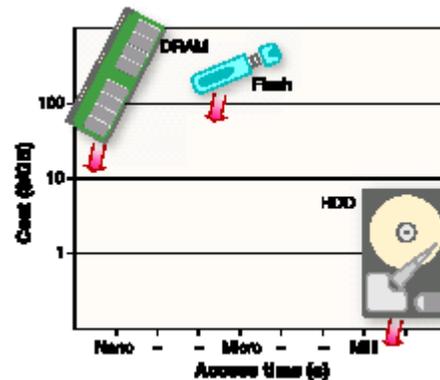
2. Suggested reading

Science, Vol 304, Issue 5667, 62-63 , 2 April 2004

MATERIALS SCIENCE:

Is There an Immortal Memory?

By J. Campbell Scott



Nature **428**, 808 - 809 (22 April 2004)

Applied physics: Speed limit ahead

C. H. Back And D. Pescia

Are there any limits to what science and technology can achieve? When it comes to recording data in magnetic media, the answer is yes: there is a natural limit to the speed at which data can be encoded.

Full text:

Nature **428**, 831 - 833 (22 April 2004); doi:10.1038/nature02438

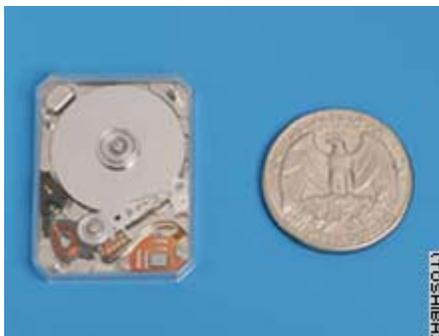
The ultimate speed of magnetic switching in granular recording media

I. Tudosa, C. Stamm, A. B. Kashuba, F. King, H. C. Siegmann, J. Stöhr, G. Ju, B. Lu & D. Weller

3. Disk Drive News

Guinness record for world's smallest disk drive

CNN Tuesday, March 16, 2004 Posted: 11:23 AM EST (1623 GMT) Tuesday, March 16, 2004
Posted: 11:23 AM EST (1623 GMT)



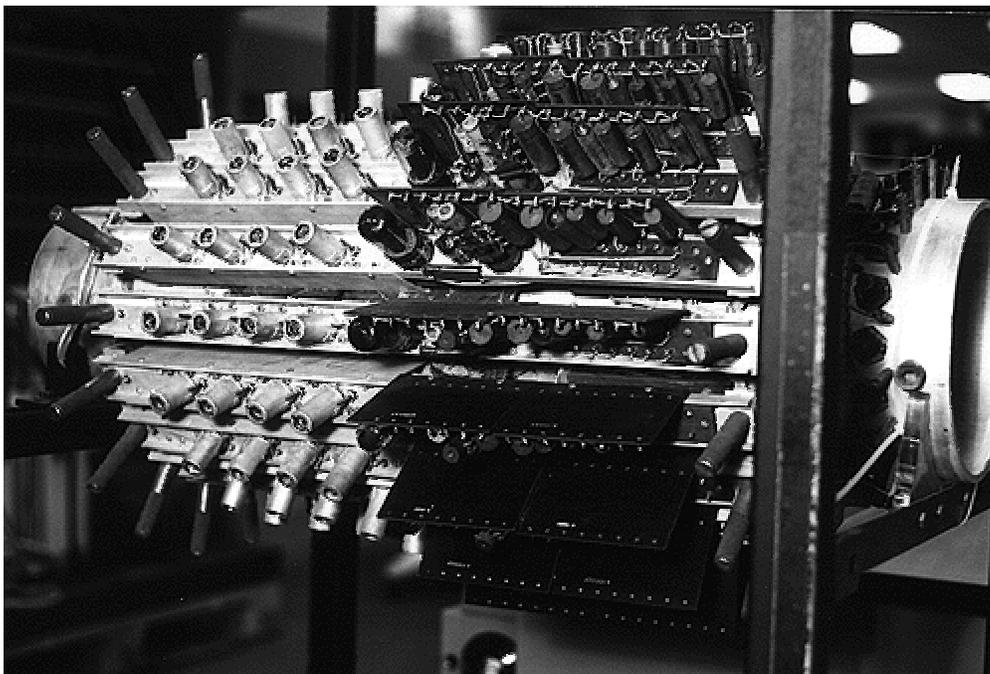
Japan's Toshiba Corp said that Guinness World Records had certified its stamp-sized hard disk drives (HDDs) as the smallest in the world.

The electronics conglomerate's 0.85-inch HDDs, unveiled in January, have storage capacity of up to four gigabytes and will be used in products such as cell phones and digital camcorders. Toshiba is expected to sell the tiny drive later this year.

<http://www.cnn.com/2004/TECH/ptech/03/16/toshiba.record.reut/index.html>

QUIZ

What has this to do with magnetism?



Solution

Go to the

END



Conference announcement 1



MAGNETO- OPTICAL RECORDING INTERNATIONAL SYMPOSIUM (MORIS 2004)

**May 16-19, 2004,
Yokohama Symposia, Yokohama, Japan**

INTRODUCTION

The 9th Magneto-Optical Recording International Symposium (MORIS) will be held from May 16 to 19, 2004 in Yokohama, Japan. The purpose of MORIS 2004 is to provide a forum for information exchange on optical and magnetic recording. A broad range of topics covering materials, physics, and the technology of recording as well as fundamental background studies will be addressed. The latest information on MORIS 2004 can be found on the Conference Web Site:

<http://www.pac.ne.jp/moris2004/>

SCOPE

Papers are solicited on all topics relevant to magneto-optical memory and magneto-optical devices including hybrid recording. The current status of new development of materials, components, measurement and basic theory, as well as their applications will be discussed. In addition to contributed papers, a number of invited papers on important topics will be presented. A list of the subject areas is given below.

- 1. Magneto-optical recording materials and fabrication**
- 2. Magnetism and domain physics**
- 3. Magneto-optical effect and physics**
- 4. High density MO recording**
- 5. Hybrid recording**
- 6. Alternative recording technologies**
- 7. High density mastering and nano-fabrication**
- 8. Near field optics and applications**
- 9. Magneto-optical devices for optical communication system**
- 10. Advances in components and related drive technology**
- 11. Measurements**
- 12. Others**

The symposium will include invited and contributed papers. Some of the invited papers will be selected from those submitted by the deadline of **January 31, 2004**.

FURTHER INFORMATION

E-mail: moris2004@pac.ne.jp

URL: <http://www.pac.ne.jp/moris2004/>

Conference announcement 2

5th Magnetic Microsphere Meeting

Scientific and Clinical Applications of Magnetic Carriers

May 20 - 22, 2004

Lyon, France

Not far from the [Grenoble High Magnetic Field Laboratory!](#)

DEADLINES

Topics:

Preparation and Modification of Magnetic Particles

Characterization of Magnetic Particles

Application in Cell Separation and Analysis

Applications in Molecular Biology

Clinical Applications:

Cancer Treatment

Hyperthermia

Magnetic Resonance Contrast Enhancement

Drug Delivery

Organized by:

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

Urs Häfeli and Maciej Zborowski

hafeliu@ccf.org

For further information, please check as always our website

<http://www.magneticmicrosphere.com/meet2004.htm>

<http://www.magneticmicrosphere.com>

Conference announcement 3



When: June 7 – 11, 2004

Where: **National Institute of Standards and Technology,**
Boulder, Colorado, USA

We wish to inform you of the Metallic Multilayers Symposium to be held in Boulder, Colorado, in June 2004 (MML '04). This upcoming meeting continues the tradition of giving scientists a single-session venue for the presentation of outstanding, cutting-edge research in a relaxed, picturesque setting. Past conferences were held in Kyoto 1992, Cambridge 1995, Vancouver 1998, and Aachen 2001. MML '04 will be held on the campus of the National Institute of Standards and Technology. Topics for the conference include both fundamental and applied aspects of magnetic metallic multilayers. The subject matter spans the range from devices to film properties; from spin injection into semiconductors to spin-dependent tunneling; from magnetization dynamics to exchange bias; from magnetic recording media to patterned structures ... to name just a few exciting topics of research. Please mark your calendars, and we look forward to seeing you in Boulder in 2004!

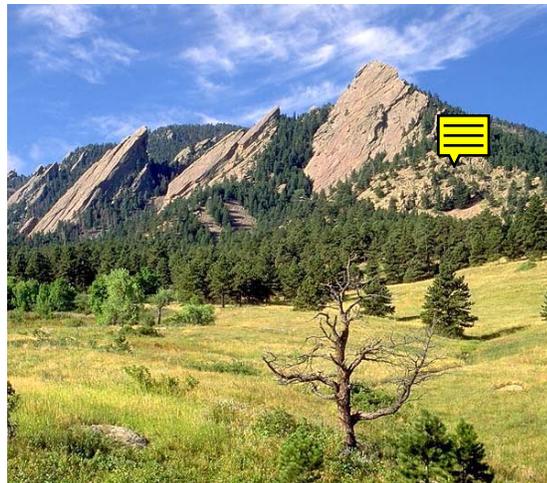
Symposium Co-chairs:

Dr. Thomas J. Silva

Magnetic Technology Division
NIST, US Dept. of Commerce
Boulder, Colorado
USA

Prof. Zbigniew Celinski

Physics Department
University of Colorado at Colorado Springs
Colorado Springs, Colorado
USA



<http://www.mml04.boulder.nist.gov/>

Conference announcement 4

The Eleventh Biennial IEEE Conference on
Electromagnetic Field Computation
June 6 - 9, 2004 / Sheraton Grande Walkerhill Hotel, Seoul, Korea

CEFC 2004

The Eleventh Biennial IEEE Conference on Electromagnetic Field Computation (CEFC 2004) sponsored by IEEE Magnetic Society and Seoul National University will be held **June 6-9, 2004** at the **Sheraton Grande Walkerhill Hotel, Seoul, Korea**. The theme of the conference, Electromagnetic Field Computation, is broad enough to promote wide interactions among researchers in many academic disciplines.

The aims of the IEEE CEFC are to present the latest developments in modeling and simulation methodologies for the analysis of electromagnetic fields and wave interactions, with the application emphasis being on the computer-aided design of low and high frequency devices, components and systems.

Scientists and engineers worldwide are invited to submit original contributions in the areas of static and quasi-static fields; wave propagation; material modeling; coupled problems; optimization; numerical techniques; software methodology; applications of electromagnetic CAD to electrical/ electronic device, component and system prototyping. With broad and active participations from all over the world, we are convinced the CEFC 2004 will be a success. Please come and enjoy exciting moments with us. For further information please contact Secretariat.

General Chairman

Song-yop Hahn,

Seoul National University, Korea

CEFC 2004 Secretariat

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Web Site: [http:// www.cefc2004.com](http://www.cefc2004.com)

Conference announcement 5



Second Seeheim Conference on Magnetism

Seeheim, Germany
June 27- July 1, 2004

SCM is a series of Conferences held every three years under the auspices of the Darmstadt University of Technology. Scientists from 36 countries attended the last Seeheim Conference on Magnetism in 2001. The conference covers the latest developments in the magnetism of nanostructured materials, surfaces, interfaces and nanoparticles.

The location is Lufthansa Training Centre Seeheim. The idyllic climatic resort of Seeheim is situated 43 km south of Frankfurt Airport. The Training Centre is embedded in the Odenwald forest overlooking the Rhine river valley. Here the participants of SCM will find a quiet, natural country environment with everything it takes for concentrated discussions.

CONFERENCE COORDINATORS

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Darmstadt University of Technology

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64287 Darmstadt

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Tel: + 49-6151-16 63 25 Fax: + 49-6151- 16 63 35

scm@tu-darmstadt.de

The complete information on

THE SECOND SEEHEIM CONFERENCE ON MAGNETISM

is now available at:

<http://www.tu-darmstadt.de/magnetism/>

Conference announcement 6

EMSA 2004

5th European Magnetic Sensors and Actuators Conference

July 4 -7, 2004

Cardiff, United Kingdom

Scope and Format

The European Magnetic Sensors and Actuators Conference (EMSA) is already a well known European forum that serves to assess the status, recent progress, and development in the field of magnetic sensor technology and magnetic actuators. It was first held in Iasi–Romania and since then has continued every two years in Sheffield–UK, Dresden–Germany, and Athens–Greece. The aim of the conference is to generate an overview of research in magnetic sensors and actuators, to recognize their relevance in modern industry and to identify potential future collaborations. EMSA 2004 provides an excellent opportunity to bring together scientists and engineers from universities, research institutes and industry to present and discuss their most recent results covering both fundamental and applied aspects of magnetic sensors and actuators.

Conference Topics

- Materials
- Physical phenomena
- Modelling and simulation
- Magnetic Sensors – concepts, designs and applications
- Magnetic Actuators – concepts, designs and applications
- Magnetic MEMS
- Miniaturization
- Nanotechnology
- Integration

Publications

Papers will be published in a special volume of Sensors and Actuators after a regular review process. Details related to abstract formatting, preparation and submission will be announced on the conference

website www.cardiff.ac.uk/engin/ems2004

Important Deadlines

Abstract submission March 01, 2004

Notification of acceptance April 01, 2004

Early registration May 01, 2004

Papers to be submitted July 06, 2004

Conference Office

Cherrie Summers

Wolfson Centre for Magnetism Technology

School of Engineering, Cardiff University

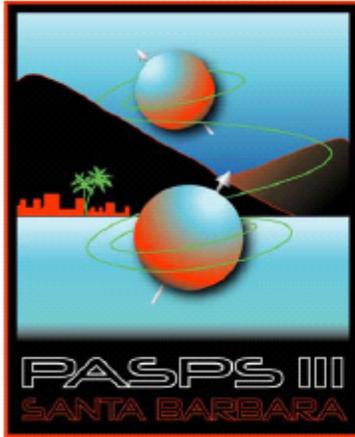
Cardiff CF24 0YF, United Kingdom

Tel / Fax: +44(0)29 2087 4421

E-mail: ems2004@cardiff.ac.uk

www.cardiff.ac.uk/engin/ems2004

Conference announcement 7



The 3rd International Conference on Physics and Applications of Spin-Related Phenomena in Semiconductors (PASPS III)

21-23 July 2004
Fess Parker's DoubleTree Resort
Santa Barbara, CA

Call for Papers

Abstract Deadline March 1, 2004

Please visit the website for complete information:

www.sainc.com/pasps3

Areas of interest include:

- Spin coherence and dynamics in nanoscale semiconductor structures
- Spin entanglement: production, coherence and detection
- Electrical and optical manipulation of nonequilibrium spin orientation and coherence
- Optical and electrical approaches to magnetic resonance (electronic and nuclear pseudomagnetic resonance)
- Spin transport and spin injection in semiconductors
- Magnetization currents, spin conductance and spin Hall effect in magnetic and non-magnetic systems
- Spin effects in quantum dots
- Spintronic devices and applications
- New magnetic semiconductor materials
- Optically induced ferromagnetism
- Magnetic semiconductor heterostructures and superlattices
- Organic semiconductor spintronics
- Challenges for materials modeling from solid-state quantum information processing and quantum computation
- Spin based quantum information processing
- Spin effects in mesoscopic systems

On behalf of the PASPS III organizers and advisory committee, I hope to meet you in Santa Barbara.

Dr. David Awschalom

University of California, Santa Barbara
Conference Chair

Conference announcement 8

Gordon Research Conference on **Magnetic Nanostructures**

August 22 –27, 2004
Big Sky Resort (Montana, USA)

Chair: *P. Bruno* (Halle)

Vice-chair: *J.S. Moodera* (Cambridge, MA)

Topics and invited speakers

Fabrication of nanostructures – top-down / bottom-up: *C. Ross* (Cambridge, MA) / *W.D. Schneider* (Lausanne)

Magnetic tunnel junctions: *S. Yuasa* (Tsukuba)

Magnetic anisotropy of nanoclusters: *H. Brune* (Lausanne)

Magnetic microscopies: *R. Wiesendanger* (Hamburg)

Spin-current induced magnetic excitations: *M.D. Stiles* (Gaithersburg) / *R.A. Buhrman* (Ithaca)

Ultrafast spin dynamics: *Th. Rasing* (Nijmegen) / *C. Chappert* (Orsay) / *H.C. Siegmann* (Stanford) **Spin injection:** *W.W. Rühle* (Marburg)

Spin logic: *R. Koch* (Berlin)

Spin manipulation and quantum computing: *D.D. Awschalom* (Santa Barbara)

Point contacts and nanowires: *G. Tatara* (Osaka) / *W. Rippard* (Boulder)

Magnetic semiconductors: *P.H. Dederichs* (Jülich) / *H. Ohno* (Sendai)

Kondo effect in self-organized nanostructures: *K. Kern* (Stuttgart)

Spin-dependent effects in quantum dots: *J. Martinek* (Poznan) / *D. Goldhaber-Gordon* (Stanford)

Berry phase, spin chirality, and anomalous Hall effect: *Y. Taguchi* (Sendai)

Information and applications:



<http://www.grc.uri.edu/programs/2004/magnano.htm>



Contact: bruno@mpi-halle.de
grc-magn-nano@mpi-halle.de

Conference announcement 9

ICF-9

Ninth International Conference of Ferrites

August 23-27, 2004

Cathedral Hill Hotel, San Francisco, California, U.S.A.

Second Announcement and Call for Papers

Abstract Submission Deadline—March 1, 2004

The 2004 International Conference on Ferrites (ICF) is the ninth in a series of conferences that provide a forum for the presentation and discussion of the latest scientific and technological developments in ferrites (magnetic ceramics) and related materials. The International Advisory Committee and the U. S. Organizing Committee are pleased to announce that for the second time in its history, the conference (ICF9) will be held in San Francisco, California.

The eight previous conferences were held in Kyoto, Japan (1970, 1980, and 2000), Tokyo, Japan (1992), Bellevue, France (1976), San Francisco, U.S.A. (1984), Bombay, India (1989), and Bordeaux, France (1996). The last conference in 2000 attracted over 500 attendees from 30 countries and had a technical program of 312 papers (oral and poster).

Hosted by: The American Ceramic Society; **Sponsored by:** Japan Society of Powder and Powder Metallurgy International Magnetism Association; **Endorsed by:** The American Physical Society; **Cooperating Society:** IEEE Magnetism Society

Scope

The conference will cover all areas of basic science and technology for ferrites and related materials. Special emphasis will be placed on advanced findings and emerging technologies that are expected to open new horizons for ferrites in the twenty first century. Papers on the results of academic, technical, and industrial studies are welcome. The subject areas for ICF9 are as follows:

Science (S)

1. Physics of ferrites and related materials
2. Chemistry of ferrites and related materials
3. Crystal growth, sintering and microstructure
4. Thin films, multilayers, and fine particles
5. Other basic science

Processing and Applications (PA)

6. Raw materials and manufacturing processes/facilities
7. Soft magnetic materials and cores
8. Hard magnetic materials and magnets
9. Magnetic recording media, heads and systems
10. Magneto-optics and applications
11. High frequency and microwave ferrites
12. Bio-magnetics and medical applications
13. Power magnetism
14. Transducers and sensors
15. Other applications

Special Topics (ST)

16. Nano-structured ferrites and related materials
17. Magnetic fluids, magnetorheological fluids, and novel magnetic devices
18. Multilayer chip inductors

19. Other novel emerging technologies
20. Other special topics

Invited Speakers and Special Sessions

In addition to contributed oral and poster papers in the above areas, ICF9 will include a number of invited speakers, symposia, panel discussions, and workshops. The Program Chair (patton@lamar.colostate.edu) welcomes suggestions for invitees, special topic sessions, as well as the names of possible organizers for such sessions. The Program Committee will review all suggestions and assemble a slate of invited speakers and special sessions in key areas of current interest to the ferrite community.

Possible *symposia, panel, and workshop topics* include:

1. Energy conversion using ferrites and related compounds
2. Magnetite bio-mineralization: new developments and current topics
3. New physics, especially of electronic phase transitions in magnetite, perovskites, and other oxides exhibiting Giant Magnetoresistance (GMR), Colossal Magnetoresistance (CMR), and superconductivity
4. Linear and nonlinear microwave processes in thin films
5. Magnetic and magnetorheological properties of novel ferrite films, including amorphous films and multilayered structures
6. Bonded magnets: basic and applied studies, from raw materials in current use to new products
7. Magnetic materials and components for power electronics
8. New raw materials, methods, and equipment for ferrite processing
9. Ferrite applications [Joint with International Magnetism Association (IMA)]

Abstract Submission

Scientists and engineers working in the broad area of ferrite materials, science, and applications are invited to submit abstracts for consideration by the Program Committee. Abstracts for contributed papers must be submitted electronically through The American Ceramic Society Online Conference Management Submission (OCMS) system. Potential submitters as well as prospective attendees are invited to visit the ICF9 Web site at www.ceramics.org/meetings/ferrites.

Abstracts must be 300 words or less in length, not counting the title, author and address by-lines, and references. An acknowledgement of receipt will be sent by e-mail. If acknowledgement is not received, the abstract was not properly submitted. Contact ocms@ceramics.org if you have problems with submission of your abstracts.

Acceptance notices will be sent out in early April, 2003. The web submission software will automatically produce the accepted abstracts in the proper format for publication in the ICF9 Meeting Guide.

The firm cut-off date for the submission of abstracts is March 1, 2004

Sponsorship and Commercial Exhibits

Organizations and companies with ferrite related services and products are invited to serve as industrial sponsors for the conference. These organizations, especially those involved in ferrite production, raw materials supply, production equipment manufacture, and measuring instrumentation, are invited to exhibit their products in a specially designated ICF9 exhibit area. Further information on sponsorship and exhibits will be sent out shortly. Contact Christine Schnitzer at cschnitzer@ceramics.org for more information.

Conference Proceedings

The ICF9 Proceedings will be published by the American Ceramic Society.

ICF- 9 U. S. Organizing Committee

Conference Chairperson

Dr. Alex Goldman, President, Ferrite Technology Worldwide, ferritetec@aol.com

Secretary General:

Prof. Gareth Thomas, University of California at Berkeley garth@uclink4.berkeley.edu

Program Committee Chairperson:

Prof. Carl E. Patton, Colorado State University, patton@lamar.colostate.edu

Publications Committee Chairperson:

Prof. Ronald F. Soohoo, University of California, r2soohoo@aol.com

Corporate Relations Committee Chairperson

Mr. Richard G. Parker, Chairman of the Board, Fair-Rite Products Corp, parkerr@fair-rite.com

Local Committee Chairperson

Mr. Thomas M. Coughlin, President, Coughlin Associates, TmCoughlin@aol.com

American Ceramic Society (ACerS) Conference Coordinator

Ms. Christine Schnitzer, e-mail-cschnitzer@ceramics.org

In order to be placed on the ICF9 mailing list for future announcements, please visit the conference web link indicated above or contact Ms. Schnitzer by email.

www.ceramics.org/meetings/ferrites

Conference announcement 10

Joint European Magnetic Symposia



JEMS'04

September 05 – 10, 2004

Dresden, Germany

SCOPE

The Joint European Magnetic Symposia, **JEMS**, are the unification of the two most important conferences on magnetism regularly organized in Europe, namely EMMA (European Magnetic Materials and Applications) and MRM (Magnetic Recording Materials). JEMS focus on magnetism research and applications as well as new magnetic materials.

Information about the conference is available at:

<http://www.ifw-dresden.de/imw/jems04/>

TOPICS (PRELIMINARY)

- Soft magnetic materials and their applications
- Magnetic recording materials
- Spin electronics and magnetic semiconductors
- Giant magnetoresistive and giant magnetoimpedance materials
- Artificially structured materials, small structures
- Magnetic materials and advanced characterization
- Micromagnetism, magnetization processes and magnetic viscosity
- Sensors and micro-devices
- Numerical modelling, devices and machines
- Imaging and probe techniques
- Permanent magnetic materials and their applications
- Magnetocaloric, magnetostrictive and ferromagnetic shape memory materials
- Magnetic materials in high magnetic fields

IMPORTANT DATES

February 1, 2004

Deadline for abstract submission

March 15, 2004

Notification about abstract acceptance

May 15, 2004

Deadline for advanced registration

June 30, 2004

Deadline for paper submission

CONTACTS

For further information, please contact the organisers at the following address:

A. Kirchner: IFW Dresden, P.O. Box 27 00 16, 01171 Dresden, Germany

Phone: +49 351 4659 405 / 460

Fax: +49 351 4659 541

email: jems04@ifw-dresden.de

<http://www.ifw-dresden.de/imw/jems04/>

Conference announcement 11

EIGHTH INTERNATIONAL SYMPOSIUM ON MAGNETIC MATERIALS, PROCESSES AND DEVICES

Part of the 206th Meeting of The Electrochemical Society
October 3-8, 2004, Honolulu, Hawaii

Call for Papers

Magnetic thin films play important roles in data recording systems, sensors, microelectromechanical systems (MEMS), and other devices. New knowledge continues to be acquired in magnetic film processing including: film nucleation and growth, structure of deposits, stress and micromagnetics of films, thermal and magnetic annealing, electrochemical and electroless plating systems, etching, process chemistry, tool design, process control, etc. Our understanding of the correlations between deposition parameters, film composition, structure, properties and device performance also continues to improve.

The purpose of the symposium is to bring together electrochemists, physicists, engineers, and device designers who are working in the area of magnetic thin-film technology to review the present state of the field and to point out fruitful new areas for research. Materials of interest include Fe, Ni, Co, and their alloys, as well as laterally patterned, laminated or compositionally modulated structures, including nanowires and self-organized films

The symposium will further cover subjects specific to the fabrication of thin-film heads, microelectromechanical systems, micromotors, and other magnetic devices. The symposium will include invited review or tutorial papers and contributed papers.

Publication of a Proceedings Volume to be available after the Meeting is provisionally planned.

Acceptance of a paper in this symposium (oral or poster) obliges the authors to submit a camera-ready copy of the full proceedings volume manuscript at the meeting. Instructions for preparing the manuscript will be sent out by the symposium organizers after the notification of acceptance is distributed by the ECS Headquarters Office. Abstracts, suggestions, and inquiries should be sent electronically to ECS Headquarters and the symposium organizers. **Abstracts must be received at ECS Headquarters by June 1, 2004.**

Symposium organizers:

C. Bonhôte, Hitachi Global Storage Technologies, christian.bonhote@hgst.com;

S.R. Brankovic, Seagate Research, stanko.r.brankovic@seagate.com;

W. Schwarzacher, University of Bristol, w.schwarzacher@bristol.ac.uk;

G. Zangari, University of Virginia, gz3e@virginia.edu;

T. Osaka, Waseda University, osakatet@waseda.jp

Y. Kitamoto, Tokyo Institute of Technology kitamoto@iem.titech.ac.jp

Visit the Symposium website at

<http://researchweb.watson.ibm.com/SymposiumMMPD/>

for updates and to see the Table of Contents of previous Proceedings volumes.

Conference announcement 12



Call for Papers: AVS Magnetic Interfaces and Nanostructures Division Anaheim, CA Nov. 14-19, 2004

The Magnetic Interfaces and Nanostructures Division is assembling a series of sessions for the 2004 American Vacuum Society Conference covering advanced magnetic data storage, magnetic thin film materials, magnetic semiconductors, magnetic spectroscopies and imaging, magnetization dynamics, and spintronic devices. Several invited talks will cover recent advances in magnetic recording and magnetic random access memory. Recent breakthroughs in high-frequency spintronics devices and new spin-based semiconductor device technologies will be presented. A special focus session will be devoted to advances in molecular nanomagnets and their potential application in molecular spintronics. A session will be dedicated to bio-magnetism with invited talks discussing applications using magnetic beads for chemical detection and biological imaging, magnetic assays of blood and liver function, and the potential use of spintronics devices for magneto-cardiograms. The Magnetic Interfaces and Nanostructures Division strongly encourages submissions from graduate students and will be selecting the best graduate presentation for the 2004 Leo Falicov award. The winner of this prestigious award will be selected from six semifinalists and will receive a cash award of \$1000.

- MI1** Advanced Magnetic Data Storage
(*R. Scranton, Hitachi Global Storage Technologies; J. Slaughter, Motorola*)
- MI2** Magnetic Thin Film Processing, High Anisotropy and Ultrathin Films
(*A. Cebalada, Instituto de Microelectrónica de Madrid, Spain; J.A. Katine, Hitachi Global Storage Systems*)
- MI3** Magnetization Dynamics and Spin Momentum Transfer
(*J. Lindner, University of Berlin, Germany; W.H. Rippard, NIST; R. Vollbrecht, Max Planck Institute for Mikrostrukturphysik, Germany*)
- MI4** Spin Injection and Spintronic Devices
(*S.-H. Chung, Argonne National Laboratory; F. J. Argonne National Laboratory; M. Gensch, University of Hannover, Germany*)
- MI5** Magnetic Nanostructures and Self Assembly
(*D. Li, Argonne National Laboratory; Q.K. Xue, Chinese Academy of Science, P.R. China*)
- MI6** Molecular Magnetics
(*K. Dalal, Florida State University; R. Sessoli, Università degli Studi di Firenze, Italy; A. Panapathy, Cornell University*)
- MI7** Magnetic Oxides and Half-Metallics
(*P.A. Dowben, University of Nebraska; J. Shen, Oak Ridge National Laboratory*)
- MI8** Exchange Coupling, Surfaces, Interfaces, and Spectroscopy
(*J. Nogues, ICREA, Universitat Autònoma de Barcelona, Spain; D. Fiaschi, ETH, Switzerland*)
- MI9** BioMagnetism (*H. Wess, National Institute of Health; D. Paulson, Tristan; J. Rife, Naval Research Laboratory; S. San, IBM Yorktown*)
- MI10** Magnetic Interfaces and Nanostructures Poster Session

Submit your abstract at www.avs.org before April 21 (mail) or April 28 (web). (For additional information email S. Russek russek@boulder.nist.gov)

Conference announcement 13

**MMM
2004**

49th Conference on Magnetism and Magnetic Materials

November 7-11, 2004 - Jacksonville, Florida

This conference annually brings together scientists and engineers interested in recent developments in all branches of fundamental and applied magnetism. Emphasis is placed on experimental and theoretical research in magnetism, the properties and synthesis of new magnetic materials, and advances in magnetic technology. The Program consists of invited and contributed papers. Abstract booklets will be made available at the Conference, and Proceedings will be published in the Journal of Applied Physics.

Categories for submission include:

- I. Fundamental Properties and Cooperative Phenomena
- II. Magneto-electronic Materials and Applications
- III. Computational Magnetism 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. Applications and Interdisciplinary Topics

Abstracts must be submitted prior to the **July 2, 2004 deadline**. This deadline will be strictly observed. Advance Registration for the conference will be available by August 1, 2004. More information will be posted on the MMM Homepage. Advance Registration via the web is the most convenient way to register and is highly recommended.

The conference will take place in **Jacksonville, Florida**. Jacksonville was the site of the first European settlement in Florida, and it is now the largest city in Florida and the largest city in the United States by land area. More than a million souls make their home in Jacksonville. It is a major hub of commerce and has extensive freight-handling facilities. Blessed with a deep-water port, the town has prospered from shipyards, automobile imports and naval operations. The area's remarkable natural beauty makes tourism a leading industry. The conference hotel, the [Adam's Mark Jacksonville](#), is the newest premier hotel in Northeast Florida. Located downtown on the St. Johns Riverfront, the hotel is adjacent to the Jacksonville Landing entertainment and shopping area and only 18 miles from the airport. More details, conference rates and a Hotel Room Reservation Form will all be available on the MMM Conference website by this summer. Room reservations can be made beginning in August. <http://www.magnetism.org/>



Magnetism & Magnetic Materials



Conference announcement 15

HMM 2005



5th International Symposium on Hysteresis and Micromagnetic Modeling

May 30 – June 1, 2005

Budapest, Hungary,

Venue: Hungarian Academy of Sciences, Budapest, Hungary, Roosevelt Sq. 9.

<http://www.HMM2005.bme.hu>

Organized by the
Budapest University of Technology and Economics
in cooperation with the
Hungarian Academy of Sciences
Research Institute for Technical Physics and Materials Science
Pollack Mihaly College of Engineering, University of Pecs

Preliminary Call for Papers

The 5th International Symposium on Hysteresis and Micromagnetic Modeling (HMM-2005) will be held at Budapest, Hungary. The previous Symposia were held at The George Washington University, Virginia Campus. Ashburn, VA, USA (1996), University of Perugia. Perugia, Italy (1999), The George Washington University, Virginia Campus. Ashburn, VA, USA (2001), and at the University of Salamanca. Salamanca, Spain (2003). The 5th International Symposium on Hysteresis and Micromagnetic Modeling is devoted to the 100 year anniversary of birth of Hungarian scientist F. Preisach, the creator of the hysteresis model, bearing his name.

The aim of the 5th International Symposium on Hysteresis and Micromagnetic Modeling is intended to be a forum for presentation and discussion of the most recent advancements in the fields of hysteresis modeling and computational micromagnetics. Continuing with the tradition of the previous HMM symposia, HMM-2005 has a strong interdisciplinary character. Our aim is to bring together scientists with a wide range of backgrounds and

interests (physicists, mathematicians, material scientists, engineers, etc) to exchange ideas, methods, and results. Although special emphasis will be on magnetic hysteresis, there will be sessions in the program focused on the universal aspects of hysteresis, independently of its origin. The scientific program of the 3-day symposium will consist of several talks by invited speakers, and a larger number of contributed talks and posters, organized along different thematic sessions.

Topics of the Symposium

- General hysteresis and coupled problems, mathematics of hysteresis, statistical aspects, etc.
- Preisach modeling.
- Vector hysteresis modeling.
- Hysteresis experiments and measurements.
- Barkhausen noise, disorder, chaotic behavior.
- Nonmagnetic hysteresis.
- Classical spin models, random-field models, domain wall models, etc.
- Dynamic hysteresis, thermal relaxation, aftereffects.
- Micromagnetics, theory.
- Micromagnetics, numerical techniques, field calculations, standard problems.
- Micromagnetics, applications, hysteresis properties of nanoparticles, spin dynamics of coherent structures, etc.

Abstract Book

Authors are invited to send 2 pages short contribution to the Abstract Book. After reviewing, the accepted papers will be presented in oral and poster sessions at the Symposium. The full version of the papers after second review will be published in *Physica B*.

Important dates

- **Submission of Abstracts, January 10, 2005.**
- **Notification of acceptance, February 10, 2005.**
- **Pre-registration and hotel reservation, till March 30, 2005.**
- **Submission of full papers, May 30, 2005.**
- **Symposium, 30 May --1 June 2005**

Preisach Memorial Book

As the 5th International Symposium on Hysteresis and Micromagnetics Modeling (HMM-2005) will be devoted to the memory of the 100 year anniversary of the birth of Ferenc Preisach, whose hysteresis model is bearing his name, on this occasion a memorial volume on the Preisach model and its different modifications will be published, where researchers, working in the field of Preisach models are cordially invited to submit manuscripts.. After a peer review process the papers will be published in Preisach memorial book.

The topics are

- Play and stop operator in the Preisach model
- The classical Preisach model
- Extended versions of Preisach model
- Vector formulations in Preisach models
- Dynamic hysteresis aftereffects and disorder in magnetic simulation
- Micromagnetic simulation and Preisach models
- Experimental validation of the Preisach model
- Preisach models in applications.

The accepted manuscripts submitted will be published by the Akadémiai Kiadó, Budapest.

Deadlines

Full paper to the book 10 January, 2005

Review and acceptance of the paper 10 February, 2005.

Corrected version of the paper 10 March, 2005.

International Steering Committee

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A. Visintin, *University of Trento (Trento, Italy).*

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J. M. Muñoz, *Univ. de Valladolid (Valladolid, Spain).*

C. Serpico, *University of Naples "Federico II" (Naples, Italy)*.

O. Tchubykalo, *ICMM (Madrid, Spain)*.

L. Torres, *Univ. de Salamanca (Salamanca, Spain)*.

F. Vajda, *DMS (Boston, MA, USA)*.

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G. Vértessy, Hungary

G. Zimányi, USA

Correspondence

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Executive Secretary, **Mr. Miklos Kuczmann**

Technical Secretary, **Mr. Peter Kis**

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Tel: +36-1-463-2817, + 36 1 463 1049, Fax: +36-1-463-3189

E-mail: secretariat@hmm2005.bme.hu

Updated information at:

<http://www.HMM2005.bme.hu>

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

- For **Classic Re-Issues**, the contact is Stan Charap charap@ece.cmu.edu
- For **new books in data storage**, the contact is "Gordon F. Hughes" gfhughes@ucsd.edu
- For **new books in other areas**, the contact is John T. Scott john.scott@physics.org



IEEE Magnetics Society & The IEEE Press

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If you have identified an area in which you are qualified to write a book and have a clear idea of what you want to write, please send your prepared proposal to the IEEE Press.

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The IEEE Press Proposal Guidelines and more information about publishing with the IEEE Press can be found at:

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

or contact:

Cathy Faduska, Senior Acquisitions Editor
at c.faduska@ieee.org

Sponsored Titles from Wiley-IEEE Press and the IEEE Magnetics Society

Magneto-Optical Recording Materials

Richard J. Gambino, Takao Sasaki
ISBN: 0-7803-1009-4 Price: \$130.00 Pages: 404 Date: 2000

Ferromagnetism

(An IEEE Press Classic Reissue)

Richard W. Seitz
ISBN: 0-7803-1002-2 Price: \$120.00 Pages: 692 Date: 1983

Magnetic Disk Drive Technology

Heads, Media, Channels, Interfaces, and Integration

Kenneth E. Johnson and James C. Salts
ISBN: 0-7803-1063-7 Price: \$ 105.00 Pages: 386 Date: 1998

Magnetic Hysteresis

Edward Della Torre
ISBN: 0-7803-4719-6 Price: \$115.00 Pages: 230 Date: 1998

The Physical Principles of Magnetism

(An IEEE Press Classic Reissue)

Allen R. Morrish
ISBN: 0-7803-8026-X Price: \$108.00 Pages: 680 Date: 2001

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QUIZ – Solution

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UNIVAC I Delay Line Memory

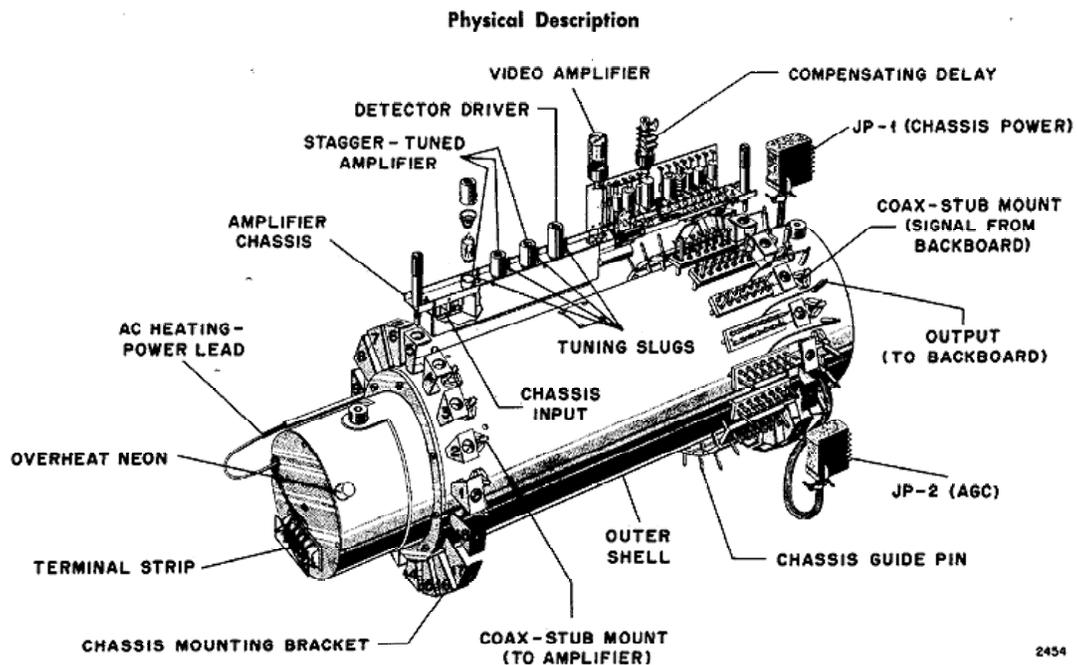
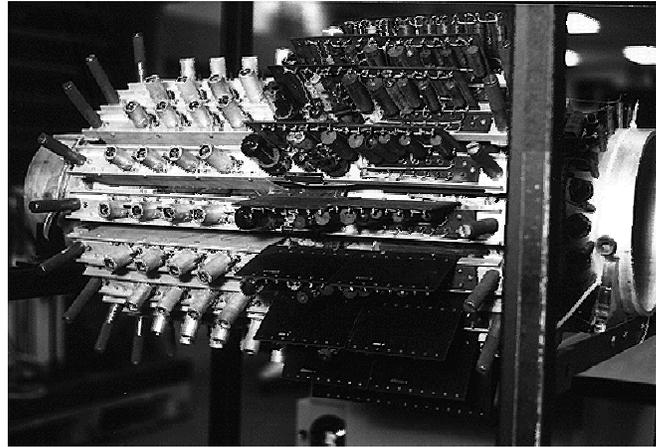


Figure 1-20. Tank Exterior, One Chassis Mounted

Computer designers in the late 1940s and early 1950s didn't ask *how much* memory, but simply *how*. An early random-access memory system used *sound waves*!

A cylindrical tank filled with mercury had piezoelectric quartz crystals mounted at each end. The crystals at the sending end of the tank converted electric pulses to sound waves that traveled relatively slowly to the receiving end of the tank, where the crystals there reconverted the waves to electric pulses that were then amplified, reshaped, and fed back to the sending end. Thus, values were kept in memory by circulating them in the tank.

The UNIVAC I contained seven memory tanks, each with 18 channels. A channel could circulate ten 12-character words. 100 channels were used for data, so the total memory capacity was 1,000 words. The computer randomly accessed each channel and then waited for the desired word circulating within it.

This was the high-speed memory of its day — average access time was 222 microseconds.

Sources: *UNIVAC I Maintenance Manual*, Sperry-Rand Corporation, NY
 J. Presper Eckert, Jr., et al., "The UNIVAC System", reprinted in *Computer Structures: Readings and Examples*, NY: McGraw-Hill, 1971
 Michael R. Williams. *A History of Computing Technology, 2nd ed.*, Los Alamitos, CA: IEEE Computer Society Press, 1997. pp. 306-307, 362
 William D. Bell, *A Management Guide to Electronic Computers*, NY: McGraw-Hill, 1957. pp. 74-75

UNIVAC I MAINTENANCE MANUAL

