IEEE Magnetics Society Newsletter

July 2001

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Martha Pardavi-Horvath, Newsletter Editor
Romney Katti, Publicity

Table of Contents:

Chapters Corner

by Dr. Richard H. Dee,
Magnetics Society Chapters Chair

For your information there are 19 Magnetics Society Chapters in existence.
They are as follows:

In the USA --

- NEW ENGLAND (Boston Area)
- CHICAGO
- ROCKY MOUNTAIN (Denver)
- HOUSTON
- LOS ANGELES
- MILWAUKEE
- PHILADELPHIA
- PITTSBURGH
- ST. LOUIS
- SAN DIEGO
- SANTA CLARA VALLEY/SAN FRANCISCO
- TWIN CITIES (Minneapolis/St. Paul)
- WASHINGTON/NORTH VIRGINIA

Worldwide --

- CENTRAL & SOUTH ITALY
- JAPAN
- POLAND
- SINGAPORE
- SWEDEN
- UNITED KINGDOM/REPUBLIC OF IRELAND

I highly recommend that Magnetics Society members get in touch with the local chairman and get on his email list for news of meetings etc. in your area. It can be quite enlightening and often entertaining to meet engineers and scientists with similar interests in your area rather than only those from afar at a national or international conference.

News
from the Rocky Mountain Chapter reported by Randy Rannow:

> On June 11, 2001, the IEEE Magnetic Society Denver Section held a one-day workshop on Magnetics and High-Speed Interconnects at the Broker Inn in Boulder. The workshop attendance included individuals from university, industry, and governments. Heracio Mendez, Executive Director, Data Storage Systems Center at Carnegie Mellon University, provided a keynote presentation on "Investing in Research." Other topics included "Magnetization Reversal in Thin-Films", "Thermal Stability of Thin-Films", "High-Frequency Characterization of Magnetic Thin-Films & Devices", "Self-Assembled Nano-Structures", "High Speed Noise Measurements", "HDI and Microvia Design", and "Measurement- based High Bandwidth Models of Interconnects".
>
> Our thanks to all of those individuals who presented and made this an overwhelmingly successful event.
>
> **Alejandra Lukaszew**, University of Toledo
> **Ron Indeck**, Washington University - St. Louis
> **Steven Russek**, NIST - Boulder
> **Supriyo Bandyopdahyay**, University of Nebraska - Lincoln
> **Douglas Smith**, D.C. Smith Consultants
> **Happy Holden**, Westwood Associates
> **Eric Bogatin**, GigaTest Labs
>
> by Randy K. Rannow,
> Denver Section Magnetics Society Chair

The *Denver section* also holds regular monthly meetings sharing speakers and space with the University of Colorado in Boulder.

If you are the local chapter chairman and would like to share what's happening in your chapter and local area (e.g. talks, people activity, magnetics news, company or university news etc.), please forward a paragraph (or two), a picture, a reference to a 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.

Back to Table of Contents

Nominations Sought for 2002 Achievement Award of the Magnetics Society

The Magnetics Society of the IEEE honors one of its outstanding members each year for his or her lifelong professional achievement. This is the highest award of the Magnetics Society and is given for scientific, technical and service contributions to the society. The award is presented at Intermag each year and consists of a diploma with citation and a cash prize.

The past award winners were:

- Fred Luborsky, 1981
- Herb Storm, 1982
- Harold Lord, 1984
- Joe Suozzi, 1985
- Fritz Friedlaender, 1986
- Andrew Bobeck, 1987
- Floyd Humphrey, 1988
- Paul Biringer, 1989
- Daniel Gordon, 1990
- Emerson Pugh, 1991
- Yoshifumi Sakurai, 1992
- William Doyle, 1993
- Richard Barker, 1994
- Mark Kryder, 1995
- Koosuke Harada, 1996
- Gordon Slemon, 1997
- Stanley Charap, 1998
- David Thompson, 1999
- Dennis Mee, 2000
- Fred Hagedorn, 2001

Nominations are requested. For your convenience, please use the Achievement Award nomination available by clicking HERE. Any member of the Magnetics Society may nominate a candidate at any time. To be considered for the 2002 award, nominations should be received before November 1, 2001. Please send nominations to:

Floyd B. Humphrey
Chairman, Achievement Awards Committee
P.O. Box 722
Meredith, NH 03253-0722
Voice/FAX (603) 279-3395
E-mail FBH@BU.EDU

Back to Table of Contents

IEEE Elections - Candidates' Statements

Elections for the most important positions in the IEEE are approaching.

An opportunity was offered to the candidates to use the forum of Division IV Newsletters for an extended program statement.

The following persons were nominated -

for President Elect

- Mike Adler - m.adler@ieee.org
- Paul Kostek - p.kostek@ieee.org
- Art Winston - a.winston@ieee.org

for TAB VP

- Leah Jamieson - l.jamieson@ieee.org
- Barry Johnson - b.johnson@ieee.org

for Division IV Director

- Stan Charap - s.charap@ieee.org
- Harold Flescher - h.flescher@ieee.org
- Andrew Podgorski - a.podgorski@ieee.org

Selecting officers for the top-level leadership positions in the IEEE begins 15 March when the candidate slates are submitted to the IEEE Board of Directors by the Nomination Committee. The duties of the Nominations Committee include providing nominees to the Board of Governors for board positions, society offices of president-elect, first vice president, second vice president, ombudsman and secretary, and the IEEE division delegate-director-elect. The Board then announces its list of nominees for each office on 1 May.

These include:

- president-elect
- delegate/director
- delegate-elect/director-elect
- other officers to be elected by voting members for the coming year

Ballots are mailed on or before 1 September and must be returned before 12:00 noon on the first business day following 31 October. While election results are announced by the IEEE Tellers Committee, these results are unofficial until the IEEE Board of Directors accepts the Tellers Committee report at its last meeting of the year. For more information about the election process see IEEE Bylaw I-310.

In the following see the extended statements from the candidates, who submitted those to the Magnetics Society Newsletter. Hope that this will help you in making your important decision about IEEE officers.

- for President Elect

- Mike Adler - m.adler@ieee.org
- Paul Kostek - p.kostek@ieee.org
- Art Winston - a.winston@ieee.org

- for TAB VP

- Leah Jamieson - l.jamieson@ieee.org

- for Division IV Director

- Stan Charap - s.charap@ieee.org
- Harold Flescher - h.flescher@ieee.org

Back to Table of Contents

MAGNEWS

Please, share with us the news!

This is the place to inform the magnetics community about a new discovery, great achievement, theoretical or experimental breakthrough in magnetism that's worth sharing.

Submit a max. 100-word-long description about your new results, of what might be worthy of note, to the Editor: pardavi@ieee.org

Sorry, this is NOT the place for product descriptions, or advertisements.

Back to Table of Contents

"Classics in Magnetism" to appear in IEEE Transactions on Magnetics

from Ron Goldfarb: goldfarb@boulder.nist.gov

The IEEE Transactions on Magnetics will begin to republish, occasionally, selected articles under the heading "Classics in Magnetics." The Transactions will draw from papers appearing in the non-archival proceedings of the first two (1956 and 1957) meetings of the Conference on Magnetism and Magnetic Materials, published by the American Institute of Electrical Engineers, one of IEEE's predecessor organizations.

As part of the selection process, the papers will be reviewed for suitability. The papers will be newly typeset and the figures scanned. The object is to make selected classical articles more easily available to the magnetics community and to enter these articles into the archival literature.

The first article in the series will be
"**A New Magnetic Anisotropy**,"
by **W. H. Meiklejohn and C. P. Bean**, on the discovery of exchange anisotropy.

Members of the Magnetics Society may nominate classical articles to be republished by contacting Transactions Editorial Board members
Martha Pardavi-Horvath pardavi@seas.gwu.edu or
Bill Doyle wdoyle@mint.ua.edu, or
Editor-in-Chief Ron Goldfarb goldfarb@boulder.nist.gov.

Back to Table of Contents

New Books

from

- **WILEY-IEEE PRESS**
- **SPRINGER VERLAG**
- **OXFORD UNIVERSITY PRESS**

WILEY-IEEE PRESS

Magnetics Society members are reminded that IEEE Press, with Magnetic Society sponsorship, has published several books that are of special interest to Society members. The following list includes all that are currently available, with IEEE Member prices (a substantial discount from normal list prices):
http://shop.ieee.org/store/HelpDesk/pwcategory.asp - elec

The Physical Principles of Magnetism
by **Allan Henry Morrish**
2001;ISBN 0-7803-6029-X; Product No.: PC5877-TBR, 704 pages, $85 (softcover)

Magnetic Hysteresis
by **Edward Della Torre**
1999; Hardcover; 1999;ISBN 0-7803-4719-6; Product No.: PC5766-TBR

Magnetic Disk Drive Technology: Heads, Media, Channel, Interfaces, and Integration
by **Kanu G. Ashar**
1997;ISBN 0-7803-1083-7; Product No.: PC4374-TBR , 368 pages, $85 (hardcover)

The Story of Electrical and Magnetic Measurements: From 500 BC to the 1940s
by **Joseph F. Keithley, Keithley Instruments**
1999;Softcover;1999;ISBN 0-7803-1193-0; Product No.: PP5664-TBR

Ferromagnetism
by **Richard Bozorth**
1994;ISBN 0-7803-1032-2; Product No.: PC3814-TBR, 992 pages, $93 (hardcover)

Magnetic Recording: The First 100 Years
by **Eric D. Daniel, C. Dennis Mee, and Mark H. Clark**, (editors),
1998, 360 pages, $51 (softcover)

Magneto-Optical Recording Materials
by **Richard J. Gambino, Takao Suzuki**,
1999, 464 pages, $102 (hardcover)

Planned re-issue:
Revised second edition of **Magnetic Recording**, by **H. Neal Bertram**.
The first edition of this book was published in 1994 by Cambridge Press.

How to purchase Wiley-IEEE Press books:
http://shop.ieee.org/store/HelpDesk/pwcategory.asp - elec

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Fax: +1 732 302 2300
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Hours of operation: 8:30 a.m. to 5:30 p.m. US Eastern time.

SPRINGER VERLAG
http://www.springer.de/phys/books/index.html

Veciana, J., (Ed.): (2001)
Pi Electron Magnetism · From Molecules to Magnetic Materials
ISBN: 3-540-41680-3, DM 238,00 *

.Plumer, M.; Ek, J.van; Weller, D., (Eds.): (2001)
The Physics of Ultrahigh-Density Magnetic Recording
ISBN: 3-540-42370-2, DM 139,90 *

Hillebrands, B.; Ounadjela, K., (Eds.): (2001)
Spin Dynamics in Confined Magnetic Structures

ISBN: 3-540-41191-7, DM 258,00 *

Lehndorff, B.R.: (2001)
High-Tc Superconductors for Magnet and Energy Technology · Fundamental Aspects
ISBN: 3-540-41231-X, DM 228,00 *

Watanabe, K.; Motokawa, M., (Eds.): (2001) in print
Materials Science in Static High Magnetic Fields
ISBN: 3-540-41995-0, DM 159,90 *

Pepperhoff, W.; Acet, M.: (2001)
Constitution and Magnetism of Iron and its Alloys
ISBN: 3-540-42433-4, DM 139,90 *

Sugano, S.; Kojima, N., (Eds.): (2000)
Magneto-Optics
ISBN: 3-540-65961-7, DM 149,90 *

Hubert, A.; Schäfer, R.: (2000)
Magnetic Domains · The Analysis of Magnetic Microstructures
ISBN: 3-540-64108-4, DM 208,00 *

Levy, L.-P.: (2000)
Magnetism and Superconductivity
ISBN: 3-540-66688-5, DM 99,90 *

Vlaardingerbroek, M.T.; Boer, J.A.de: (1999)
Magnetic Resonance Imaging · Theory and Practice
ISBN: 3-540-64877-1, DM 208,00 *

Yosida, K.: (1998)
Theory of Magnetism
ISBN: 3-540-60651-3, DM 109,90 *

Marinescu, M.: (1996)
Elektrische und magnetische Felder · Eine praxisorientierte Einführung
ISBN: 3-540-60646-7, DM 46,64 *

Hartmann, U., (Ed.): (2000)
Magnetic Multilayers and Giant Magnetoresistance · Fundamentals and Industrial Applications
ISBN: 3-540-65568-9, DM 159,90 *

Ziese, M.; Thornton, M.J., (Eds.): (2001)
Spin Electronics
ISBN: 3-540-41804-0, DM 169,90 *

Manuscripts are currently in print:

Sakakima/Hirota/Inomata: ***GMR Devices***

The following manuscripts are in preparation and will be released in 2001:

Awschalom: ***Spintronics***
Berthier: ***Higher Magnetic Fields*** (LNP)
Wada: ***High Magnetic Field Physics***
Plumer/Weller/van Ek: ***High Density Magnetic Recording***

To be published in 2002:

Bland/Heinrichs: ***Ultrathin Magnetic Layers***
Gradmann: ***Epitaxial Ferromagnets***
Singh: ***Electronic Structure and Magnetism of Complex Materials***

Contact SPRINGER about their magnetism program:
Elke Sauer
Assistant to Dr. Claus Ascheron, Editor
Springer-Verlag
Tiergartenstr. 17
69121 Heidelberg
Tel.: (0 62 21) 4 87 - 6 75 or 3 67
Fax.: (0 62 21) 4 87 - 6 12
e-mail: ascheron@springer.de or
e.sauer@springer.de
http://www.springer.de/

OXFORD UNIVERSITY PRESS

Introduction to the Theory of Ferromagnetism
Second Edition
by **Amikam Aharoni**
International Series of Monographs on Physics No. 109
2001, 332 pp, line figures
0-19-850808-5, £49.50, US$85.00, Hardback
0-19-850809-3, £26.95, US$45.00, Paperback
http://www.oup.co.uk/isbn/0-19-850809-3

Magnetism in Condensed Matter
by **Stephen Blundell**
Oxford Master Series in Condensed Matter Physics
2001, 272 pp, 158 line figures
0-19-850592-2, £39.50, US$70.00, Hardback
0-19-850591-4, £19.50, US$35.00, Paperback
http://www.oup.co.uk/isbn/0-19-850591-4

Physics of Ferromagnetism
Second Edition
by **Soshin Chikazumi**
International Series of Monographs on Physics No. 94
1997, 668 pp, halftones, numerous line figures, tables
0-19-851776-9, £155.00, US$225.00, Hardback
http://www.oup.co.uk/isbn/0-19-851776-9

Electrodynamics from Ampere to Einstein
Olivier Darrigol
2000, 552 pp, 13 halftones, numerous line figures
0-19-850594-9, £75.00, US$130.00, Hardback
http://www.oup.co.uk/isbn/0-19-850594-9

Theory of Nonequilibrium Superconductivity
Nikolai Kopnin
International Series of Monographs on Physics No. 110
2001, 342 pp, numerous figures
0-19-850788-7, £59.50, US$105.00, Hardback
http://www.oup.co.uk/isbn/0-19-850788-7

Theory of Itinerant Electron Magnetism
by **Jurgen Kubler**
International Series of Monographs on Physics No. 106
2000, 440 pp, tables and graphs
0-19-850028-9, £69.50, US$120.00, Hardback
http://www.oup.co.uk/isbn/0-19-850028-9

Stellar Magnetism
by **Leon Mestel**
International Series of Monographs on Physics No. 99
1999, 656 pp, 3 plates, 3 halftones, 120 line figures
0-19-851761-0, £87.50, US$145.00, Hardback
http://www.oup.co.uk/isbn/0-19-851761-0

Back to Table of Contents

IEEE Transactions on Magnetics Online for Members of the Magnetics Society

IEEE Xplore http://www.ieee.org/ieeexplore/ provides online access to all IEEE publications. If your institution subscribes, you probably can access Xplore from your office computer.

Now, all members of the Magnetics Society can access the IEEE Transactions on Magnetics using any Web connection. Go to http://www.ieee.org/ieeexplore/ and click on "Establish IEEE Web Account." Once you have a username and password, click on "Journals and Magazines" on the Xplore home page. Click on "Magnetics, IEEE Transactions on" and select the volume of interest. When you choose to view a full-text article, you will be asked to enter your username and password. (Before you do, make sure cookies are enabled on your Web browser.) You will need Adobe Acrobat Reader.

You may also:

Browse the complete collection of tables of contents of all IEEE transactions, journals, magazines, conference proceedings, and standards;

Search and view all IEEE abstract/citation records starting from 1988;

Browse, search, and view full-text articles of IEEE Spectrum magazine.

Currently, Xplore has articles going back to 1988. In future years, we expect to add additional back volumes to the Xplore system.

For additional information, refer to the Frequently Asked Questions on the IEEE Xplore home page.

Back to Table of Contents

HMM01:
The Third International Symposium on Hysteresis and Micromagnetics Modeling

HMM 2001, took place at the George Washington University Virginia Campus in Ashburn, Virginia on May 21-23, 2001. The Symposium addressed recent theories, measurements, and other developments in hysteresis, with the primary focus on magnetics, from macroscopic and microscopic points of view. Keynote speeches on micromagnetics were presented by A. Aharoni and by A.S. Arrott. In addition, there were presentations on hysteresis in nonmagnetic systems, for example in

economics. The Symposium provided an occasion for engineers, mathematicians and physicists to present and exchange ideas, methods and results. The proceedings from the symposium will be published in Physica B, Condensed Matter.

The International Steering Committee was chaired by L. H. Bennett, The George Washington University. The Organizational Committee was chaired by Edward Della Torre. The Program Committee was co-chaired by Can E. Korman and Isaak D. Mayergoyz. The Symposium was sponsored by: the School of Engineering and Applied Science (SEAS), the Institute for Magnetics Research (IMR) and the Virginia Campus of The George Washington University (GWU); the IEEE Magnetics Society; The National Institute of Standards and Technology (NIST); the A. James Clark School of Engineering of the University of Maryland; and Universita degli Studi di Perugia.

The symposia series on Hysteresis and Micromagnetics Modeling was established with the first conference held in Ashburn, VA on The George Washington University Virginia Campus, May 2022, 1996. This symposium was sponsored by: NIST, The National Science Foundation (NSF), and GWU. The proceedings were published in Physica B: Condensed Matter, 233, no. 4, June 1, 1997.

The second symposium was held in Perugia, Italy on the University of Perugia Campus, June 79, 1999. It was sponsored by: Associazione Elettrotecnica ed Elettronica Italiana (AEI), IEEE Magnetics Society, The Institute of Electrical and Electronic Engineers, Central and South Italy Section. The proceedings from this symposium are published in Physica B, Condensed Matter, 275, no. 1, Jan. 1, 2000.

The Fourth International Symposium on Hysteresis and Micromagnetics Modeling, HMM 2003, will take place on the University of Salamanca, Spain on May 28-30, 2003. For further information, please visit
http://mumag.usal.es/hmm2003.htm

Future Hysteresis and Micromagnetics Modeling Symposia are planned for 2005 at the University of Budapest, Hungary; and for 2007 at the University of Naples, Italy.

For further information, please contact:
Larry Bennett
Phone: (301)975-5966
FAX: (301)975-5963
NIST
Gaithersburg, MD 20899

Back to Table of Contents

TMRC to be held August 20-22, 2001 at University of Minnesota

TMRC 2001, AN INTERNATIONAL CONFERENCE ON MAGNETIC RECORDING HEADS

The Twelfth Magnetic Recording Conference (TMRC 2001) will be held at the University of Minnesota in Minneapolis, MN on August 20-22, 2001. This conference continues the tradition of topical meetings covering in depth the recent developments in a single segment of recording technology. Rotated on a three-year cycle, the topics are recording media, recording systems, and, this year, recording heads.

The focus for the entire three-day conference will be MAGNETIC RECORDING HEADS. Approximately 36 invited papers will be presented orally in a format which allows thorough coverage of experimental findings, theory, and other topics related to recording heads. Speakers will also be encouraged to participate in further discussion at poster sessions and to submit their papers for publication in the IEEE Transactions on Magnetics.

The following list of recording head topics suggests the scope of the conference, but other topics relating to recording heads may be included:

1. SPIN VALVE/GMR HEADS (stack materials and issues, modeling, theory, experimental results, processing)
2. RECORDING PHYSICS AND SYSTEMS TOPICS (characterization, thermal noise, channels, preamps, data rate issues)

3. TMR AND NOVEL MAGNETIC SENSORS (CCP, semiconductor sensors, modeling)
4. MECHANICAL INTEGRATION AND TRIBOLOGY (head/media interface, microactuators, flexures, servo)
5. WRITE HEADS (high moment materials, heads for flexible media, optically assisted writers, high data rate, processing)
6. PERPENDICULAR RECORDING HEADS

Poster sessions will follow the oral presentations and will include contributed posters in addition to those given by the invited speakers. Poster contributors should send a one page abstract to the Posters Chair by August 3, 2001 for selection purposes. The full program booklet of TMRC 2001 will be posted on the web site and will be distributed to members of the IEEE Magnetic Society in June 2001. Current information on TMRC 2001 can be found at http://www.iist.scu.edu/

Back to Table of Contents

Update on the 46th MMM Conference In Seattle, November 12 - 16

The 46th MMM Conference will be held in the Westin Hotel in beautiful Seattle from the 12th to 16th of November 2001. Complete information about the conference can be found at the conference website http://www.magnetism.org.

With the submission of 1676 abstracts via the new all-electronic format, the program promises to be a great success. Following the abstract deadline in early July, Janis Bennett of AIP indicated, "I lost a lot of sleep this week worrying because this is the first time we have used the system exclusively. Worrying was for naught. Everything has gone better than I dreamed." The program committee was pleased with the capabilities of the web-based system and was able to coordinate the program in record time. For the first time, the full program of the meeting will be available on-line by early August!

The program Co-chairs, Julie Borchers and Marcos Lederman are putting together an excellent program. The ***invited sessions and symposia*** include:

- ***Spin Transfer Torques***, Luc Berger, Frank Albert, Jean-Eric Wegrowe, Hans Christof Siegmann, Maxine Tsoi, Mark Stiles
- ***Novel Superconductivity and Magnetism***, Siddharth Shanker Saxena, Warren E. Pickett, Young Lee, John M. Tranquada, Paul Canfield
- ***Spin Polarization in Half Metals***, R. A. de Groot, Boris E. Nadgorny, Yasuhide Tomioka, J. M. D. Coey, Marc Raphael, Randall Victora
- ***Spin Injection in Ferromagnetic/Semiconductor Materials***, Michael Flatte, Can-Ming Hu, Klaus H. Ploog, Paul Crowell, Roland K. Kawakami
- ***Thermal Magnetic Stability of Nano-Sized Magnetic Devices***, Neil Smith, Roger H. Koch, Nick Rizzo, Jian-Gang Zhu, Jing Shi
- ***Perpendicular Recording*** **(Panel Discussion)**, Mark Kryder, Pantelis Alexopoulos, H. Neal Bertram, Mark Re, Mike Russak, Kazuhiro Ouchi, Norio Ota
- ***MRAM*** - Overview and New Developments, Saied Tehrani, William Gallagher, Yoshiaki Saito, Romney Katti

In addition the preliminary list of ***invited speakers*** chosen to complement various areas of the program are:

- "*Geometrical Frustration*", **Art Ramirez** (Los Alamos National Laboratory)
- "*Finite-temperature Nucleation and Growth Phenomena in Magnetization Reversal and Hysteresis: Dynamic Phase Transitions and Switching in Nanoparticles*", **Mark Novotny** (Florida State University)
- "*Noise Imaging using Magneto-optic Sampling Techniques*", **Mark R. Freeman** (University of Alberta)
- "*Fluctuating Charge/Orbital Ordering, Nested Fermi Surface Segments and a Pseudogap in Colossal Magnetoresistive (CMR) Oxides*", **Dan Dessau** (University of Colorado)
- "*Search for uncompensated spins in the exchange coupled LaFeO3 / Co thin film systems*", **Jean-Pierre Locquet** (IBM)
- "*Spin polarization decay in magnetic tunnel junctions*", **Henk Swagten** (Eindhoven University of Technology)

- "*Ferromagnetic III-Mn-V Semiconductor Multilayers: Manipulation of Magnetic Properties by Proximity Effects and Interface Design*", **Jacek Furdyna** (University of Notre Dame)
- "*Wind-up and recoil of an exchange-spring magnet*", **Kevin O'Donovan** (NIST)
- "*Shape and size control of colloidal magnetic nanoparticles*", **Kannen Krishnan** (Lawrence Berkeley National Laboratory)
- "*Soft X-Ray Resonant Magnetic Scattering from FePd Stripes and Co/Pt Lines*", **Gerrit Van der Laan** (Daresbury Laboratory)
- "*Magnetic behavior of lithographically patterned particle arrays*", **Caroline Ross** (MIT)
- "*Thermal stability and recording performance comparisons between AFC and advanced conventional media*", **Geon Choe** (MMC Technology)
- "*Dissipation and Fluctuations in Individual Nanomagnets Measured using Ultrasensitive Cantilever-based Techniques*", **Daniel Rugar** (IBM Almaden)
- "*New Electromagnetic Methods for the Evaluation of Prosthetic Heart Valves*", **Satish Udpa** (Iowa State University)

Additional invited speakers and the finalists for the student award competition will be announced on-line in early August.

Another special activity associated with the conference will be the social event. This year there will be a half-hour boat ride to Tillicum Village on an island in the Puget Sound. There a group will put on a show of native activities and culture to be followed by a sit-down barbequed salmon dinner. Bret Heinrich, the local has visited the facility and raves about the program and the food. The facility is limited in size so be sure to order your tickets early.

Everything is pointing to a meeting that will be active and stimulating. We look forward to seeing all of you in Seattle and chatting at the Bierstube!!!

Philip Wigen
General Chairperson, 46th MMM

Back to Table of Contents

IEEE Magnetics Society Distinguished Lecturers for 2001-2002

Advanced Magnetic Materials and Transducers:
Enabling Factors for the Digital Storage Explosion

Shan X. Wang
Stanford University

Advanced Magnetic Materials and transducers are critical building blocks in numerous electromagnetic devices such as magnetic hard disk drives. They are essential for the explosive growth in the storage capacity of hard drives at least by two orders of magnitude in the 1990s. However, conventional magnetic information storage technology is approaching the perceived superparamagnetic limit at which the stored bits may self-erase in less than ten years. This requires new magnetic materials and transducers, and even a departure from the old paradigm of magnetic storage technology.

One approach is to use new magnetic media with high anisotropy, but this requires write heads to deliver more intense magnetic field, which in turn requires higher saturation magnetization of the soft magnetic material used in write heads. As an example, the talk will describe films of a new soft magnetic material based on Fe-Co-N with a saturation magnetization of 24 kG, exceeding that of any currently available soft magnetic material, with a superior permeability of over 1000 up to 1.2 GHz. The films have a hard-axis coercivity of 0.6 Oe and an in-plane uniaxial anisotropy. They are very promising for extending the superparamagnetic limit in magnetic recording while achieving a data rate of over 2.4 Gbit/s, as well as for applications in gigahertz integrated inductors and other electromagnetic devices. The soft magnetism of Fe-Co-N films will be discussed based on their microstructures, stress, magnetostriction, and magnetic ripple structures. In addition, sub-nanosecond spin-dynamic data of these materials are of great interest and will be presented.

Rapid development in giant magnetoresistive materials and novel spin-dependent devices has enabled read heads to detect ever-smaller bits written in hard disk drives. In search of new magnetoresistive materials, we encounter many interesting

scientific questions. As an example, the talk will describe work on electron specular reflection and specular spin valves using an in-situ resistance and magnetoresistance probe and semiclassical transport models.

Shan Wang (S'88-M'94) received the B.S. degree in physics from the University of Science and Technology of China in 1986, the M.S. in physics from Iowa State University in 1988, and the Ph.D. in electrical and computer engineering from Carnegie Mellon University in 1993. He is an associate professor in the Department of Materials Science and Engineering and the Department of Electrical Engineering at Stanford University. He is also associated with the Center for Research on Information Storage Materials (CRISM) and the Geballe Laboratory for Advanced Materials. He was a Frederick Terman Faculty Fellow at Stanford University (1994-1997). His current research interests include magnetoresistive materials and spin electronics, magnetic inductive heads and soft magnetic materials, and magnetic recording physics. He has published over 60 papers on these subjects. He is co-author, with Alex Taratorin, of Magnetic Information Storage Technology (Academic Press).

Prof. Wang served as a member of IEEE Magnetics Society Administrative Committee (1998-2000) and chair of the Santa Clara Valley Chapter of the IEEE Magnetics Society (1999-2000).

Contact: Prof. Shan X. Wang, Geballe Laboratory for Advanced Materials, McCullough Building, 476 Lomita Mall, Stanford University, Stanford, CA 94305-4045; telephone: 650-723-8671; fax: 650-736-1984; e-mail: sxwang@ee.stanford.edu.

Advanced Magnetic Materials:
Development and Micromagnetics

Josef Fidler
Vienna University of Technology

The increasing information density in magnetic recording, the miniaturization in magnetic devices, the trend towards nanocrystalline magnetic materials, and the improved availability of large scale computer power are the main reasons why micromagnetic modeling has been developing extremely rapidly. Nanofabrication, offering unprecedented capabilities in the manipulation of material structures and properties, opens new opportunities for engineering innovative magnetic materials and devices and for developing ultra-high-density magnetic storage and magnetic microsensors.

Hard magnetic materials have become key components in information and transportation technologies, machines, sensors, and many other systems. The increase in the operating temperature of motors, generators, and other electronic devices will lead to an improvement in their efficiency.

A key problem encountered in the improvement and development of advanced magnetic materials is the influence of the real microstructure on the magnetization reversal process. Besides micromagnetic simulations, both advanced microstructural characterization and magnetic measurement techniques with high spatial and temporal resolution are necessary. Computational micromagnetism leads to a deeper understanding of hysteresis effects at an intermediate length scale between magnetic domains and atomic distances by visualization of the magnetization reversal process.

The numerical solution of Brown's equations can be effectively performed using finite-element and related methods that easily handle complex microstructures and take into account the long-range magnetostatic interactions and short-range exchange coupling between the grains. Dynamic finite-element simulations successfully predict the influence of microstructural features like grain size, particle shape, intergranular phases, and surface irregularities on the magnetic properties. Theoretical limits for remanence, coercive field, switching behavior at short time scales, and other properties have successfully been calculated for a large number of materials.

The lecture will review the physics and the recent development of advanced magnetic materials. Topics will include the switching dynamics of patterned mesoscopic and nanoscopic elements including the thermal activation process; the remanence enhancement in exchange-coupled, nanocrystalline magnets; the nucleation field of highest energy density magnets; and the domain wall pinning in magnets for high temperature applications. In particular, the influence of the granular microstructure of the materials on their magnetization reversal processes will be illustrated with experimental data and numerical results. Emphasis will be given to the limits and trends of the micromagnetic simulations.

Josef Fidler (M'82) received the Dipl.-Ing. degree in physics in 1973 and the Dr. Techn. degree in 1976 from the Vienna University of Technology, Austria.

In 1982 he became a Lecturer (Dozent) and in 1991 a Professor in physics at the Vienna University of Technology. His main research interests are the relations between the microstructure and the properties of magnetic materials and the application of computational micromagetics to magnetization processes. He established the Working Group on Magnetic Materials and Micromagnetism at the Institute of Applied and Technical Physics. He has published over 180 papers on magnetic materials, especially on high coercivity magnets, electron microscopy, and numerical micromagnetism.

Dr. Fidler is member of the German Physical Society, the Austrian Society of Electron Microscopy, and the Materials Research Society.
Contact: Prof. Dr. J. Fidler, Vienna University of Technology, Institute of Applied and Technical Physics, Wiedner Hauptstrasse 8-10, A-1040 Wien, Austria; telephone: 43 1 58801 13714; fax: 43 1 58801 13798; e-mail: fidler@tuwien.ac.at; http://atp6000.tuwien.ac.at/MAGNET/.

Ferromagnetic Resonance Force Microscopy:
Probing Ferromagnets at the Micrometer Level

Philip E. Wigen
Ohio State University

With the evolution of fabrication methods to produce materials and devices with nanoscale dimensions, there is a need for the development of new techniques to characterize the materials of miniaturized devices at these scales. In the field of magnetic materials, such innovative devices include spintronic elements and submicrometer memory storage elements. Magnetic resonance force microscopy (MRFM) is a new technique with a projected sensitivity sufficient to enable single spin detection (electron or nuclear) at atomic resolution. It combines the principles of magnetic resonance with those of scanned-probe force detection to detect the spin resonance through mechanical, rather than inductive, means. MRFM achieves high sensitivity by means of a mechanical resonator that sensitively detects the force between a small probe magnet mounted on the resonator and the precessing spin moment in the sample.

Ferromagnetic resonance force microscopy (FMRFM) is a variant of MRFM developed for the investigation of microscopic ferromagnets. Ferromagnetic systems pose unique challenges for microscopic imaging due to the strong interactions between the moments which causes the resonances to be non-local excitations. In the present stage of development, FMRFM is able to probe the spatial features and the relaxation properties of excited modes at the micrometer level. FMRFM takes advantage of the strength of the magnetic field of the microscopic probe magnet to determine three distinct regimes of interaction with the local ferromagnetic moment: (1) the weak field limit, where ferromagnetic dynamics are solely determined by the sample dimensions and internal energies, (2) an intermediate regime, where the local perturbation of the probe field alters the intensities of the ferromagnetic modes but not their resonant frequencies, and (3) the strong interaction limit, where the ferromagnetic resonance mode is entirely determined by the probe field and independent of the sample geometry. Examples of FMRFM applied to each of these regimes will be demonstrated and discussed in this lecture.

Philip Wigen (M'90) received the B.S. degree in chemistry from Pacific Lutheran University in 1955 and the Ph.D. in Physics from Michigan State University in 1960. He was a research scientist with the Lockheed Research Laboratories in Palo Alto, California, from 1960 to 1965 where he initiated his work on ferromagnetic resonance in magnetic metal films.

In 1965 he joined the physics faculty of the Ohio State University where he continued his work on the dynamical properties of ferromagnetic materials including ferromagnetic resonance, magnetic domain wall resonance, and chaos in magnetic systems. His recent work in magnetic resonance force microscopy has been pursued in collaboration with Prof. Roukes' group at California Institute of Technology, where he holds a visiting professorship, and Prof. Hammel's group at Los Alamos National Laboratory. Prof. Wigen is a fellow of the American Physical Society.

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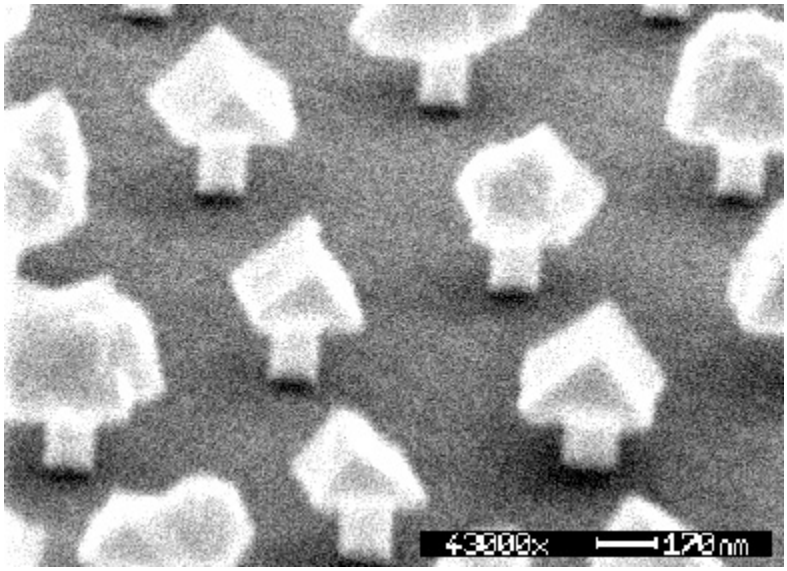
Back to Table of Contents

Visual Magnetics

A picture is worth...
What is this?



Breakthrough in nanotechnology: Housing project at the University of Regensburg?
Or?

A PICTURE IS WORTH...
WHAT IS THIS?

Click here for the answer.

Back to Table of Contents

Conference Calendar

Related Events

- **August 5-11, 2001**
  Eight International Conference on Composites Engineering
  Tenerife Island, Spain
  www.uno.edu/~engr/composite

- **August 20-22, 2001**
  Minneapolis, MN
  The twelfth Magnetic Recording Conference (TMRC 2001)
  An international conference that will focus on magnetic recording heads.
  www.iist.scu.edu

- **August 28 - September 1, 2001**
  1st Joint European Magnetism Symposia (JEMS '01)
  New joint conference that replaces European Magnetic Materials and Applications (EMMA) meeting and Magnetic Recording Materials (MRM) meeting.
  Grenoble, France
  http://www.polycnrs-gre.fr/JEMS01/

- **September 5 - 7, 2001**
  15th Soft Magnetic Materials Conference
  Bilbao, Spain
  For information:
  15th SMM Conference (Secretary)
  Departamento de Electricidad y Electr=F3nica UPV/EHU,
  P.O. Box 644, E-48080 BILBAO (Spain)
  FAX : +34-946013071
  e-mail: smm@we.lc.ehu.es
  http://www.ehu.es/smm/

- **September 9-13, 2001**
  SEEHEIM CONFERENCE ON MAGNETISM, SCM-2001
  Lufthansa Trainig Center
  Germany
  For information:
  M. Ghafari , H. Hahn, J.Kuebler
  Darmstadt University of Technology
  Petersenstr. 23
  64287 Darmstadt, Germany
  Tel: + 49-6151-16 63 25 Fax: + 49-6151- 16 63 35
  email: scm@tu-darmstadt.de
  http://www.tu-darmstadt.de/magnetism/

  October 28-30, 2001
  IEEE Workshop on Nanotechnology
  Outrigger Wailea Resort
  Maui, Hawaii, USA
  For information: Fumihito ARAI
  Associate Professor
  Dept. of Micro System Engineering
  Nagoya University
  1, Furo-cho, Chikusa-ku
  Nagoya 464-8603
  JAPAN
  Phone: +81-52-789-3116, FAX: +81-52-789-3909 or -3115
  arai@mein.nagoya-u.ac.jp
  http://www.mein.nagoya-u.ac.jp/IEEE-NANO

- **November 13-16, 2001**
  46th Conference on Magnetism and Magnetic Materials
  Seattle, Washington USA
  For information:
  Janis Bennett
  American Institute of Physics
  2 Huntington Quadrangle
  Suite 1N01
  Melville, NY 11747 USA
  TEL: 516-576-2403
  FAX: 516-576-2223

email magnet@aip.org
http://www.magnetism.org

- **November 25-29, 2001**
  GLOBECOM 2001 Conference
  Special Session in Signal Processing for Storage
  San Antonio, TX USA
  http://hrl.harvard.edu/commlab/GC2001.html

- **January 7-9, 2002**
  2002 1st North American Perpendicular Magnetic
  Recording Conference
  University of Miami
  Coral Gables, FL
  Information Contact
  Dr. Dmitri Litvinov
  Seagate Technology
  2403 Sidney St., Ste. 550
  Pittsburgh,PA 15203
  (+1 412 918 7028
  +1 412 918 7010 (Fax)
  dmitri.litvinov@seagate.com
  Conference Web Site URL: http://www.physics.miami.edu/napmrc/

- **April 28 - May 2, 2002**
  Intermag Europe 2002
  RAI Congress Center
  Amsterdam, The Netherlands
  For information:
  Courtesy Associates
  2000 L Street NW, Suite 710
  Washington, DC 20036
  TEL: 202 973-8668
  FAX: 202 331-8722
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  http://www.intermag2002.org

Back to Table of Contents

Answer

Pictures of the electrodeposited Fe-pillars with nanocrystalline caps, presented at the 8th Joint MMM-Intermag Conference.

Technical description:

On top of some electrodeposited Fe-pillars appeared, once the holes in the PMMA were filled, nanocrystals. Not all of the devices investigated exhibited this type of nanocrystalline growth. Up to now it is not clear which deposition parameters are relevant for crystal formation. It is reasonable to assume that the pillar itself is single-crystalline and epitaxially coupled to the substrate. It is known that the (110) plane of iron grows epitaxially (lattice mismatch 0.7~\%) on the (111) plane of Au. Since the pillars are grown on a polycrystalline Au-underlayer with the grains predominantly aligned such that they form Au(111)-surfaces, the `roofs' of the crystals could be (100) planes. The `roofs' are not expected to be oriented in the same direction.

Submitted by:

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Do you have an interesting picture, related to magnetism, to share with your fellow society members?
Send mail to pardavi@ieee.org, or pardavi@seas.gwu.edu

Back to Table of Contents