

IEEE Magnetics Society Newsletter

April 2001

Volume 38. No. 1

[John Nyenhuis](#) and [Richard Dee](#), Editors

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8th Joint Intermag-MMM Conference Held January 8-11 in San Antonio



Attendees enjoyed the River Walk and the balmy Texas weather



A most appropriate souvenir stand!



A poster session at the conference.



The San Antonio River and the surrounding stores, restaurants and hotels.



IEEE Magnetics Society Awards Chair Dave Thompson (left) and awardees, Fritz Friedlaender, Gordon Hughes, Shoogo Ueno, Fred Hagedorn, Tu Chen and Teck-Seng Low.

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Chen Receives Reynold B. Johnson Information Storage Award



The 2000 IEEE Reynold B. Johnson Information Storage Award was presented to Tu Chen by IEEE Magnetics Society President Bob Fontana at the awards session of Joint Intermag-MMM Conference in San Antonio, Texas. The citation which accompanies Dr. Chen's award reads:

"For leadership in the advancement of thin-film materials, tools, and processes used for magnetic information disks, and their commercialization as products".

Dr. Tu Chen's impact on magnetic information disks has been comprehensive and weighty. In addition to leading many of the key technological developments of the hard-drive industry, he also designed processes suitable for large-scale manufacturing, while creating and leading some of the industry's top corporations.

Dr. Chen led groundbreaking approaches to the low-temperature production of isotropic thin films, and helped in the discovery of solutions to complex materials issues like overcoat protection, lubrication of film disks, and corrosion protection. He holds numerous patents for his work, which was vital to the development of the industry decades ago and promises to be important for many years to come.

Born on 19 March 1935, in Taiwan, Dr. Tu Chen obtained his B.Sc. in Metallurgical Engineering from Cheng Kung University in Taiwan, in 1958. He earned M.Sc. and Ph.D. degrees in Metallurgical Engineering from the University of Minnesota in 1964 and 1967, respectively.

After a year with IBM in New York, Dr. Chen joined the Northrop Corporation in California, in 1968. In 1971, he joined Xerox PARC, where he eventually became principal scientist. He left Xerox in 1993, to found Komag, Inc., which quickly became the leader in producing high-quality thin film disks.

Dr. Chen pioneered the synthesis of isotropic, high-coercivity magnetic films utilizing an ambient temperature sputtering system capable of mass production, the necessary substrate technology, and a key process to apply carbon overcoat and lubrication that overcame difficult tribological problems encountered by the disk-drive industry.

Until his retirement in August 1999, Dr. Chen served as chairman of the board of Komag, Inc. He also is a co-founder of Headway Technologies, Inc., a film head company, and served as vice chairman of the board.

A Fellow of the IEEE, Dr. Chen has chaired several conferences of the Institute. Dr. Chen has co-authored more than 115 technical publications and presentations. He holds twenty-five patents, and twelve more are pending. The many distinguished awards he has won include his being named Entrepreneur of the Year by Arthur Young and Venture magazine, important honors from the University of Minnesota, and the Entrepreneurial Excellence Award of the Asian American Manufacturing Association.

The IEEE Reynold B. Johnson Information Storage Award was established by the Board of Directors in 1991 and may be presented annually "for outstanding contributions to the field of information storage, with emphasis in the area of computer storage." Recipient selection is administered by the Awards Board through its Technical Field Awards Council.

The Award consists of a bronze medal, certificate and five thousand dollars, and is sponsored by IBM Corporation. It is named in honor of Reynold B. Johnson, who is renowned as a pioneer of magnetic disk technology and was founding manager of the IBM San Jose Research and Engineering Laboratory, San Jose, California in 1952.

Past recipients of the award are:

1993 - John M. Harker
1994 - C. Dennis Mee
1995 - James U. Lemke
1996 - Nobutake Imamura
1997 - Alan F. Shugart
1999 - David A. Patterson, Randy H. Katz and Garth A. Gibson
2000 - Mark H. Kryder

Prior to the establishment of the IEEE Reynold B. Johnson Information Storage Award, the IEEE Magnetics Society presented the Magnetics Society Information Storage Award. Winners of this award were Sidney M. Rubens (1987), Jay W. Forrester (1988), Reynold B. Johnson (1989), M. Camras (1990), Charles H. Coleman (1991), and Claude Shannon (1992).

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Fred Hagedorn Receives IEEE Magnetics Society Achievement Award



The 2001 IEEE Magnetics Society Achievement Award was presented to Fred Hagedorn at 8th Joint Intermag-MMM Conference by IEEE Magnetics Society Awards Chair David Thompson.

Fred B. Hagedorn was born in Boone, Iowa, in 1928. He received his BS in Physics from Iowa State in 1952, and a PhD in Physics from Cal Tech in 1957. Most of his career was at Bell Labs, from which he retired in 1985, but he served as an independent consultant until 1998.

Dr. Hagedorn has 10 patents and more than 70 technical papers. His principal research topics included the high speed flux reversal mechanisms in ferrite and permalloy films, magnetic domain wall motion in YIG single crystal window frames, domain wall motion and properties of canted antiferromagnets, exchange anisotropy in oxidized permalloy films at low temperatures, exchange coupling in multi-layered magnetic thin films, uniaxial anisotropy in rare-earth-iron garnet single crystals, magnetic bubble domain wall motion in epitaxial garnet films, dynamic conversion of bubble domain walls in epitaxial films, the instability of a straight domain wall supported by a field gradient, and the testing and characterization of magnetic bubble memory devices.

He has a long history of service to the MMM Conference and the Magnetics Society. A partial list includes the MMM Advisory Committee (3 terms), the MMM Program Committee Co-Chairman (1969), the MMM Steering Committee, General Chairman of the MMM Conference (Boston, 1972), Chairman of the MMM Advisory Committee (1973), Magnetics Society Conference Executive Committee (17 years), Chairman of that committee (4 years), the Magnetics Society AdCom (3 terms), General Chairman of Intermag (Hamburg, 1984), and as the IEEE Representative on MMM Boards (4 years).

Dr. Hagedorn is the 20th recipient of the Achievement Award. Previous winners are: F.E. Luborsky, H.W. Lord, H.F. Storm, J.J. Suozzi, F.J. Friedlaender, A. Bobeck, F.B. Humphrey, P.P. Biringer, D.L. Gordon, E.W. Pugh, Y. Sakurai, W.D. Doyle, R.C. Barker, M. Kryder, Koosuke Harada, G. Slemon, S. Charap, D. Thompson, and D. Mee.

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New Magnetics Society Fellows Honored at Joint Conference

The new Magnetics Society Fellows for 2001 were honored at the plenary session of Joint Intermag/MMM 2001 conference. Award certificates were presented by Awards Chair David Thompson to Fellows who were at the Conference. The following are the new Fellows and the contributions for which they were selected.

Alan Edward Bell
IBM Internet Division
For developments in optical data storage applications and technology.

Bharat Bhushan
Ohio State University
For pioneering contributions to, and dissemination of knowledge of, the tribology and mechanics of magnetic storage devices.

David B. Bogy
University of California, Berkeley
For leadership and contributions to the mechanics of magnetic recording disc drives.

Gordon Frierson Hughes
University of California, San Diego
For contributions to magnetic recording physics and for pioneering work in thin film disc media.

Teck-Seng Low
National University of Singapore
For leadership in the development of technology for magnetic data storage.

Charles William Trowbridge
Vector Fields Ltd.
For contributions to computational electromagnetics.

Shoogo Ueno
University of Tokyo

For contributions to biomedical research in localized magnetic stimulation of the brain, impedance MRI, and imaging of brain functions.

Award certificates were presented by Awards Chair David Thompson to Fellows who were at the Conference.



Gordon Hughes



Teck-Seng Low



Shoogo Ueno

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Fritz Friedlaender Receives Special Recognition from the Magnetics Society



Fritz Friedlaender was honored for his service to the IEEE Magnetics Society and technical accomplishments at the awards ceremony of the 2001 Joint Intermag-MMM conference.

Fritz Friedlaender was born in Freiburg, Breisgau, Germany. He received his BS, and MS degrees in Electrical Engineering from Carnegie Institute of Technology (now CMU), and his PhD under Professor Leo Finzi from that institution in 1955. He also holds the honorary degree of Dr.-Ing.E.h. from Ruhr-Universitaet Bochum in Germany.

He is a member of Eta Kappa Nu, Phi Kappa Phi, Tau Beta Pi, Pi Mu Epsilon, and Sigma Xi. He is a Fellow of the IEEE and APS, a Life Member of the Swiss Electrical Engineering Society, and an Honorary Member of the Magnetics Society of Japan.

Among his many awards are the Humboldt Award (Senior Award of the Special Program for the Promotion of Scientific Cooperation between German and American Research Institutes 1972), a Japanese Society for the Promotion of Science Research Fellowship (1980), the IEEE Centennial Medal (1984) and IEEE Third Millennium Medal (2000), the IEEE Magnetics Society Achievement Award (1986), the J. Fred Peoples Award (1989), a Myerhoff Visiting Professorship at the Weizmann Institute of Science (1990), and the International Conference on Ferrites Special Award (2000).

The Magnetics Society is presenting this special award on the occasion of his retirement after many years as a Professor at Purdue, and from his final office with the Administrative Committee of the Magnetics Society. Fritz has been an active member of this governing body since the society was founded in 1965. He has held almost every office in the society, including President, Vice President, Secretary-Treasurer, Reviews Editor, Editorial Board Member, Awards Chairman, General Chairman of the Intermag Conference, Program Chairman of the Intermag Conference. He has held numerous other offices with Magnetics Society sponsored conferences and within the IEEE itself.

In recognition of his superb leadership in the IEEE Magnetics Society, the Magnetics Society is pleased to have granted him this special award at MMM-Intermag 2001.

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Student Authors of Best Papers Recognized at Joint Conference



This year, there was a competition for the best student presentation at the 8th Joint MMM-Intermag Conference to recognize and to encourage excellence in graduate studies in the field of magnetism. The award consists of a one-year fellowship of \$1000 for the winner and a one-year fellowship of \$250 to each of the remaining finalists.

Finalists were selected from abstracts submitted to the conference. Presentations made by the finalists were evaluated at the conference by the Student Award Subcommittee.

Finalists competing for the award were recognized by program co-chair Randall Victora at the conference. The finalists and the titles of their presentations are:

- Yaroslav Bazaliy, Stanford University, "Current induced magnetization switching in small domains of different anisotropies"
- Lars English, Cornell University, "Nano-scale intrinsic localized modes in an antiferromagnetic lattice"
- Atsufumi Hirohata, University of Cambridge, "Observation of ballistic spin-polarized electron transport in spin-valve structures"
- Hiroshi Kanazawa, Toyota Technological Institute, "Magnetic and magneto-optical properties and structure of ordered (Co_{100-x}Fe_x)₅₀Pt₅₀ alloy thin films"
- Patrick LeClair, Eindhoven University of Technology, "Role of the interfacial density of states in magnetic tunnel junctions"
- Dirk Orgassa, University of Alabama, "Spin transport in carbon nanotubes contacted by ferromagnetic electrodes"

This year's winner is Patrick LeClair.

The winner of the Best Student Presentation Award for MMM '99 is William H Rippard for the presentation "Ballistic electron magnetic microscopy: Imaging magnetic structure with nanometer resolution."

Congratulations to all!

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Student Travel Awardees Recognized at Joint Conference

The following students received funding from the IEEE Magnetics Society and the MMM Conference to attend the 2001 Joint Intermag-MMM conference. Congratulations to all! Louisa Bokacheva, Karine Chesnel, Silviu Colis, Amir Companieh, Lee Holloway, Yikun Huang, Reza Jafari-Shapoorabadi, Hiroshi Kanazawa, Hiroaki Kikuchi, Joo-Von Kim, Amei Li, Xiaomin Liu, George Loisos, Wenbin Peng, He Ping, Marius Rosu, Alex Slepoy, Aleksandr Syshchenko, Vasyl Tyberkevych, and Jason Wolfson.

The Education Committee of the IEEE Magnetics Society is pleased to announced student travel support for future conferences. As approved by AdCom, the Magnetics Society will provide a total of \$35,000 for conference student support this fiscal year. The funds will be used to support student travel for the Intermag (~\$15 k), MMM (~\$10k), TMRC (\$5k) and CEFC (\$5k) conferences. Students interested in receiving travel support should contact the organizing committee of the conference they wish to attend.

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Tribute to Louis Neel



A tribute to Louis Neel was given by Jacques Miltat at the awards session of the 2001 Joint Intermag-MMM conference.

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Chapters Corner

by Dr. Richard H. Dee,

Magnetics Society Chapters Chair

As the new chapters chair I thought I would take a time out to tell members what's happening with local magnetics society chapters and to solicit news and comment from the chapter chairmen. There are approximately 19 Magnetic Society chapters worldwide, with 13 of them being in the United States. The most recently formed chapter is in Poland, which was approved by the IEEE in February 2001! I would like to personally welcome the participants in Poland and hope they have fruitful and rewarding gatherings.

To quote the IEEE on local chapters.....

"Chapters are ideal vehicles for informative technical meetings and for networking. Chapters can receive funding from both the parent technical Society and the parent Section. " IEEE web page.

From my experience the formation of a chapter, holding regular meetings and participating in those meetings provides opportunities for:

- Members to meet people of similar technical backgrounds in their local area.
- To meet, network and discuss both professional and technical activities and subjects outside the normal corporate or academic environment/atmosphere.

- Communicate and hear about industry activity at other times rather than solely at the two major conferences that the society sponsors.
- Hear presentations from notables in the magnetics industry via the distinguished lecturer program.
- Inform non-members of the Magnetics Society of the benefits of joining the IEEE and the Magnetics Society in improving their technical knowledge and skills to further their careers.
- If you need any information about chapters, the chapter in your local area or are considering forming a chapter please contact me at r.dee@ieee.org or the IEEE directly.

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.

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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.

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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 in 2000 and Fred Hagedorn in 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

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Call for Nominations for 2002-2004 Administrative Committee

In accordance with Article 4.3 of the By-Laws of the Magnetics Society, the Nominations Committee (NomCom) hereby solicits nominations for the Administrative Committee (AdCom) from all members of the Magnetics Society. This year eight positions on the AdCom, for a three- year term beginning January 1, 2002, will be filled. The NomCom -- consisting of G. Bertotti, S. H. Charap, G. Fish, Y. Sugita, D. Thompson, and W. D. Doyle (Chairman) -- will consider all names submitted and compose a ballot from these inputs.

Please submit a short biography (250 words or less) with each of your nominations. 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 have served two consecutive 3-year terms are not eligible for election without taking a one-year break. 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. [See reverse side for AdCom members.]

The Nominations Committee will work according to the following timetable:

May 4 : Call for Nominations will be received by all eligible Magnetics Society members

June 11: Deadline for receipt of nominations (with biographies) by the NomCom Chairman

July 9 Selection of nominees for AdCom ballot completed

July 20 Ballots for election of eight AdCom members \ mailed to 2000 AdCom members

Sept. 3 Deadline for receipt of AdCom ballots by the NomCom Chairman

Sept. 17 Election of eight new AdCom members completed

Sept. 28 Ballots for election of 2001 officers mailed to 2000 AdCom members

Nov. 5 Deadline for receipt of official ballots by the NomCom Chairman

Nov. 19 Notification of results to Magnetics Society President and IEEE Technical Activities Board Chairman

Please mail all nominations and biographies to the Chairman early enough so that they are received by the deadline date (June 11, 2001). His address is:

Bill Doyle, Nominations Committee Chairman Phone: (205) 348-2508

The University of Alabama, MINT Center Fax: (205) 348-2346

P.O. Box 870209, Tuscaloosa, AL 35487-0209 E-mail: wdoyle@mint.ua.edu

Administrative Committee Members, 1992-2003

Term Ends

1992

J.D. Adam F.B. Hagedorn P.P. Biringer J.E. Opfer G.E. Fish C.E. Patton R. Gerber P.E. Wigen

1993

R.E. Fontana H. Jouve K. Harada M.H. Kryder R. Indeck H.A. Leupold T.M. Jagielinski R. Wood

1994

J. Christner E. DellaTorre W.D. Doyle F. Friedlander C. Perlov B. Shula D. Stancil T. Suzuki

1995

P.P. Biringer R.F. Hoyt R.M. Josephs J.H. Judy D.N. Lambeth M. Pardavi-Horvath S. Uchiyama P.E. Wigen

1996

G.E. Fish H.S. Gill R.B. Goldfarb R.S. Indeck R.A. Johnson F.E. Luborsky J.A. Nyenhuis Y. Sugita

1997 (* = replacement for R. Fontana)

G. Bertotti(1) S.H. Charap(1) W.D. Doyle(2) R. Marcelli(1) R. Gerber(1) R.R. Katti(1) C.M. Perlov(2) T. Suzuki(2)

1998

A. Chaiken (1) F.J. Friedlander (1) R.F. Hoyt (2) D.C. Jiles(1) J.H. Judy (2) D.N. Lambeth (2) M. Pardavi-Horvath (2) P.E. Wigen (2)

1999

G.E. Fish (2) T. Jagielinski (1) F.E. Luborsky (2) I. Mayergoyz (1) E. Murdock(1) J.A. Nyenhuis (2) K. O'Grady (1) J. Zhu (1)

2000

G. Bertotti (2) S.H. Charap (2) E.D. Dahlberg (1) R. Gerber (2) R.S. Indeck (1) R. Katti (2) Y. Miura (1) S.X. Wang (1)

2001 (Jiles not eligible for re-election)

C. Patton(1) C. Perlov(1) D. Jiles(2) W. Cain(1) T. Suzuki(1) K. Mohri(1) B. Gurney(1) R. Dee(1)

2002

H. Fujiwara(1) T. Howell(1) T. Jagielinski(2) D. Lambeth(1) I. Mayergoyz(2) K. O'Grady(2) R. O'Handley(1) P. Wigen(1)

2003

D. Dahlberg(2) G. Fish(1) R. Indeck(2) M. Kryder(1) D. Lavers(1) C. Lodder(1) Y. Sugita(1) R. Victora(1)

2004

Eight to be elected.

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IEEE Press Re-issues the 1965 "Physical Principles of Magnetism" by Allan Morrish

The IEEE press has reissued the 1965 text by Allan Morrish, "The Physical Principles of Magnetism" as part of the Magnetics Society's program of reissues of classic works in magnetism. This follows the reissue of Bozorth's classic text, "Ferromagnetism". Other reissues are planned.

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):

- Kanu G. Ashar, Magnetic Disk Drive Technology 1996, 368 pages, \$85 (hardcover)
- Richard Bozorth, Ferromagnetism (reissue of the 1951 original publication) 1993, 992 pages, \$93 (hardcover)
- Eric D. Daniel, C. Dennis Mee, and Mark H. Clark, (editors), Magnetic Recording: The First 100 Years 1998, 360 pages, \$51 (softcover)

- Edward Della Torre, Magnetic Hysteresis 1999, 240 pages, \$59 (a few copies available in hardcover; then, softcover)
- Richard J. Gambino, Takao Suzuki, Magneto-Optical Recording Materials 1999, 464 pages, \$102 (hardcover)
- Allan H. Morrish, The Physical Principles of Magnetism (reissue of the 1965 original) 2001, 704 pages, \$85 (softcover)
- Order from:

IEEE Customer Service Center
 445 Hoes Lane, P.O. Box 1331
 Piscataway, NJ 08855-1331

Phone toll free: 1 800 678 IEEE (4333)
 Outside US and Canada: 1 732 981 0060
 Fax: 1 732 981 9667
 E-mail: customer-service@ieee.org
 World Wide Webb: <http://shop.ieee.org/store/>

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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>

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MMM 2001 to be held November 13-16, 2001 in Seattle

The Magnetism and Magnetic Materials 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 will consist of invited and contributed papers. Selection of contributed papers is based on abstracts which are due July 9, 2001. Abstract submission will be handled exclusively via the conference web site, www.magnetism.org. Abstract submission opens June 1, 2001. Abstract booklets will be made available at the conference, and proceedings will be published in the Journal of Applied Physics.

Individuals who are not on the Conference mailing list may obtain Conference information from:

Janis Bennett
American Institute of Physics
2 Huntington Quadrangle, Suite 1N01
Melville, NY 11747 USA
Phone (516) 576-2403, Fax (516) 576-2223
magnet@aip.org

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IEEE Magnetics Society

Distinguished Lecturers for 2001-2002

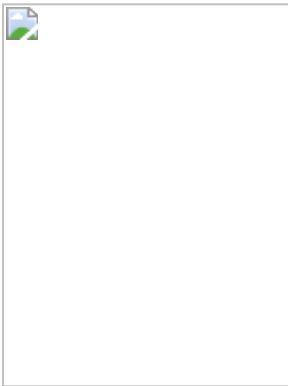
Advanced Magnetic Materials and Transducers: Enabling Factors for the Digital Storage Explosion

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

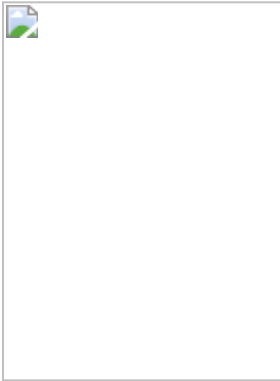
THE INCREASING INFORMATION density in magnetic recording, the miniaturization in magnetic devices, the trend towards nanocrystalline magnetic materials, and the improved availability of large scale computer power are the main reasons why micromagnetic modeling has been developing extremely rapidly. Nanofabrication, 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 micromagnetics 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.

Contact: Prof. Philip Wigen, Department of Physics, Ohio State University, 174 West 18th Ave., Columbus, OH 43210, USA; telephone: 614-292-7439; fax: 614-292-7557; e-mail: wigen.1@osu.edu.

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New Editor for IEEE Magnetics Society Newsletter

This is the last issue of the Newsletter for which Richard Dee and John Nyenhuis are serving as co-editors. Both editors are moving to new volunteer positions in the Magnetics Society. Richard is the new Chapters chair and John is now the Membership chair.

The new Newsletter Editor is Prof. Martha Pardavi-Horvath from the Department of Electrical and Computer Engineering at The George Washington University in Washington, D.C. Please forward contributions and suggestions to her at pardavi@seas.gwu.edu

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Conference Calendar

- **April 21-27, 2001**
International Society for Magnetic Resonance in Medicine 9th Annual Meeting
Glasgow, Scotland, UK
ISMIRM
2118 Milvia Street, Suite 201
Berkeley, CA USA 94704
FAX: +1-510-841-2340
- **May 13-18, 2001**
The 1st International Conference and School on
Spintronics and Quantum Information Technology
Maui, Hawaii
For information, visit:
www.sainc.com/spintech1
- **May 14-16, 2001**
[Twentieth Annual Conference on Properties and Applications of Magnetic Materials](#)
Illinois Institute of Technology
Chicago, Illinois USA
For information:
Bonnie Dow
Illinois Institute of Technology
TEL 312-567-6809
FAX 312-567-8976
bonnie@ece.iit.edu
- **May 21-23, 2001**
3rd International Symposium on Hysteresis and Micromagnetic Modeling
George Washington University Virginia Campus, Ashburn, Virginia
For information:
Larry Bennett
TEL 701-726-8299 FAX: 703-726-8251
hmm01@va.gwu.edu
<http://www.seasva.gwu.edu/magnetics/workshop.htm>
- **June 11-15, 2001**
International Conference on Communications 2001
Featuring special session on coding and signal processing techniques for magnetic and optical data storage systems
Helsinki, Finland
<http://www.wsccc.com/alison/coding.txt>

- **June 20-22, 2001**
International Workshop on Magnetic Wires (IWMW-2001)
San Sebastian, Spain
<http://www.sc.ehu.es/IWMW-2001>
-
- **June 24-29, 2001**
Fourth International Symposium on Metallic Multilayers (MML '01)
Aachen, Germany
<http://www.ep4.ruhr-uni-bochum.de/fk/mml/>
- **July 1-6, 2001**
International Conference of Materials for Advanced Technologies
Symposium E: Advanced Data Storage Materials
Singapore
Contact:
Thomas Liew
Data Storage Institute
5 Engineering Drive 1
Singapore 117608
Tel: (65) 874 8519 Fax: (65) 777 2406
http://www.dsi.nus.edu.sg/tracks/farcac/icmat_sympE.htm
- **July 2-5, 2001**
Compumag Conference on the computation of electromagnetic fields (13th biennial)
Evian, France
For information:
John Brauer
TEL 414-276-0042 FAX 414-276-3828
jbrauer@execpc.com
<http://compumag.ec-lyon.fr/home.html>
- **August 5-11, 2001**
Eight International Conference on Composites Engineering
Tenerife Island, Spain
www.uno.edu/~enr/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 Electrónica 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:

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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

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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>

- **April 28 - May 2, 2002**

Intermag Europe 2002

RAI Congress Center

Amsterdam, The Netherlands

For information:

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