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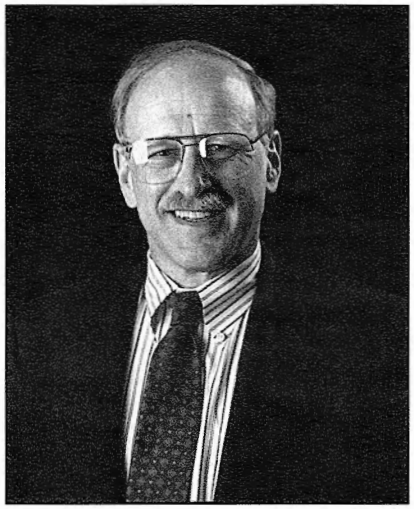
JODIE CHRISTNER, EDITOR

President's Letter



Jim Opfer

This is my first contribution to the Newsletter since becoming president of the Magnetics Society in January. In March I attended one of three IEEE Technical Activities Board (TAB) meetings held each year, and I have just returned from a very successful Intermag technical conference in San Antonio.

From those experiences a common theme emerges. There is an urgent need to bring expenses in line with revenues and to rebuild the reserves of the Magnetics Society. An ad hoc committee chaired by Magnetics Society Vice-president, Dan Stancil, has recommended that the society increase its reserves over an interval of several years to a level approximately equal to the annual budget. While this condition in fact existed several years ago,reserves projected for the end of 1995 are a fraction of the targeted amount.

Already in 1994 income derived from reserves was very low because of low interest rates and small returns on investments. Now that income will be low for several years because of reduced principal. Income from other sources has not risen enough to offset the loss of income deriving from reserves and the general increase of expenses. Furthermore, reserve levels are not high enough to allow the society to take certain appropriate risks such as sponsoring conferences in locations where attendance and revenue cannot be predicted with confidence.

At Intermag the officers of the society, department chairpersons responsible for financial matters, and member of the Magnetics Society Administrative Committee (ADCOM) were apprised of the financial status of the society. With this information available, various decisions were taken and will be taken that in the future will affect society members. The budget to be submitted to the IEEE for 1996 is break even - no further reduction of reserves. Priority is given to maintaining the important services affecting members. Through this Newsletter, responsible individuals will inform you of the status of various affected activities. Please give us your support as we implement necessary changes. I will endeavor to consider member inputs as we proceed.

At the recent ADCOM meeting Ron Goldfarb was appointed chairperson of the publications department replacing Bill Lord who gave more than eight years of tireless service to the society as Reviews Editor and then Editor-in-Chief of the IEEE Transactions on Magnetics. Dan Stancil and Harry Gill were appointed chairpersons of the Planning and Membership Committees, respectively. Other department and committee chairpersons remain in place to retain continuity of policy and capability of execution.

In 1995 we need to renew our efforts to increase transnational activities in the Magnetics Society. We hope that nominations of ADCOM members will reflect the need for members from outside the United States. Further, we need to facilitate the process of planning for conference locations that reflect the international makeup of our membership. I solicit your ideas and possible contributions to these efforts.

Jim Opfer, President
IEEE Magnetics Society

INTERMAG '96 CHANGES

The 1996 Intermag Conference scheduled for April 22-25 in Budapest, Hungary, has been rescheduled and relocated to April 9-12, in Seattle, Washington, USA. This decision as made with great reluctance, since it breaks a long-standing tradition of holding every third Intermag outside North America. It also negates the very substantial effort made by our Hungarian colleagues in site selection, planning, and negotiation for a meeting in Budapest.

The reason for the change was financial. As reported elsewhere in this issue, the reserves of the Society are dangerously low. A significant financial loss on this (or any other) conference would be intolerable — a threat to continued existence of our Society. The Conference Executive Committee, which is responsible for all our conference activities, felt that the costs of a meeting in Hungary at this time were unusually difficult to predict and control, and that the number of fully-paid registrants might be low. We believed that there was a serious danger of financial loss in Budapest, and very little such danger at a North American location. No suitable hotel space was available in Canada (our first choice for an alternate location), so Seattle was chosen. We believe that a meeting in Seattle can and will be successful, both technically and financially. The Program and Publication Committees, already largely selected, will remain in place. Ed Della Torre will continue as General Chairman, as will the other Conference Officers.

I would like to emphasize that this is a one-time change, taken under special conditions. It remains the policy of the Society to hold every third Intermag outside North America, with the foreign meetings alternating between Asia and Europe. The 1999 meeting will be in Seoul, Korea, and we expect the meeting in 2002 to be once again in Europe.

I would also like to express the thanks of the Society to our Hungarian colleagues for their efforts in planning the meeting in Budapest. They are deeply disappointed that the meeting has been moved, especially since it has been forced upon them through no fault of their own.

C. D. Graham, Jr.
Chairman, Conference Executive Committee

MAGNETICS SOCIETY FINANCE REPORT

The financial status of the Magnetics Society was a predominant focus of the April ADCOM meeting. Over the past three years, increasing costs and decreasing revenue have depleted a once-healthy $650,000 reserve account to about $200,000. ADCOM worked diligently to make some very difficult decisions to eliminate a pattern of deficits and keep the Society on a fiscally responsible course. We expect over time to rebuild the reserve to a level of about one year's expenses.

About 90% of the Society's approximately $1 million annual budget goes to publications and conferences. ADCOM strongly supports these endeavors as central to the Society's mission. The small surplus coming from these functions, along with member dues, must fund other activities such as the Distinguished Lecturer Program, student travel grants for conferences, and a very modest level of general overhead.

However, the Society has mirrored trends common to other professional organizations. Over the past five years, membership has remained steady, but subscriptions to the Transactions on Magnetics have dropped 10-20%. At the same time, publishing costs have escalated rapidly. In the last year alone, paper alone (~20% of the Transactions budget) has increased 50% and postage is up by 20%. To help cover the shortfall, ADCOM with great reluctance voted to increase 1996 member dues from $10 to $20; non-member subscriptions, held for several years at $263, will rise to $280 for 1995 and $335 for '96. Even so, Trans Mag. remains far less expensive than many of its competitors. As previously announced, The Translation Journal on Magnetics in Japan has ceased publication with the 1994 volume. While a valuable service in making work in Japan accessible to the English-speaking world, translation and other expenses made TJMJ very costly. ADCOM saw no feasible way to continue it in the present financial climate. Furthermore, an increasing fraction of the Magnetics Society of Japan publications are now appearing directly in English.

Conference costs have likewise risen substantially. The growth of Intermag and the increasing ratio of papers to registrants (now about equal, compared to 1:3 in Intermag's early days) have driven up costs and limited potential sites to large, generally expensive hotels. ADCOM is encouraging conferences to explore creative means to reduce overhead, e.g. by use of e-mail for Calls for Papers and other communications. As explained more fully in C. D. Graham s report, cost uncertainties and our depleted reserves were the crucial factors in moving Intermag '96 to Seattle.

Gordon E. Fish
Finance Chairman

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The objective of the **IEEE Magnetics Society Newsletter** is to publicize activities, conferences, workshops and other information of interest to the Society membership and technical people in the general area of applied magnetics. Copy is solicited from the Magnetics Society membership, organizers of conferences, officers of the Society and local chapters and other individuals with relevant material. The Newsletter is published in January, April, July and October. Submission deadlines are December 1, March 1, June 1, and September 1, respectively.

Please send contributions to:

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NEW MAILING LIST FOR INTERMAG CONFERENCES

A new mailing list now exists for Intermag Conferences, which was first used for mailing the Program Books for the 1995 Intermag. Previously, Intermag used a list maintained by the American Institute of Physics for the Conference on Magnetism and Magnetic Materials. This list contained 14,000 names, including some persons who never attended Intermag. The new list has been pruned to about 8,500 names, which allows a significant saving in printing and mailing cost for each Intermag. The list will be "purged" each year, dropping those who have shown no Intermag or Society activity for the previous two years.

Mailing lists are subject to errors of various kinds. They result from bad handwriting, bad proofreading, computer coding errors, multiple addresses, confusion in dealing with non-European names, and variety of other causes. Our aim is to make the Intermag list as accurate as possible. If you know of errors, either omissions or duplications, please let us know. Write to C. D. Graham, Jr., Dept. of Materials Science, Univ. of Pennsylvania, Philadelphia PA 19140-6272, USA. Or send e-mail to cgraham@lrsm.upenn.edu.

CALL FOR NOMINATIONS: 1996 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 and Mark Kryder 1995.

Nominations are requested. For your convenience, please use the Achievement Award nomination form obtainable from Fritz Friedlaender, Floyd Humphrey or the IEEE. Any member of the Magnetics Society may nominate a candidate at any time. To be considered for the 1996 award, nominations should be received before November 1, 1995.

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@ENGA.BU.EDU

CONFERENCE ANNOUNCEMENT: CEFC '96

The Seventh Biennial IEEE Conference on Electromagnetic Field Computation (CEFC '96) will be held in Okayama, Japan, on March 18-20, 1996. The aim of CEFC '96 is to present recent developments in the design and analysis of low and high frequency electromagnetic devices. Topics of interest include:

(1) Numerical techniques for 2-D and 3-D electromagnetic field computation, low and high frequency applications,
(2) Parallel computing in electromagnetic field analysis,
(3) Material modelling,
(4) Automatic mesh generation, visualization
(5) Field analysis of electrical machines and electronic apparatus,
(6) Coupled problems with thermal or mechanical phenomenon,
(7) Inverse problems, optimization
(8) Expert systems.

Both oral and poster sessions will be held. The TEAM Workshop will follow the conference on March 21, 1996. Prospective authors are expected to submit a one-page digest to the Conference Secretariat by September 29, 1995. Note that the digest summarizes the presentation and is not an abstract. The selected papers will be published in the January, 1997 issue of the IEEE Transactions on Magnetics. This conference is sponsored by the IEEE Magnetics Society.

To receive further information on CEFC '96, please contact Dr. Koji Fujiwara, Department of Electrical and Electronic Engineering, Okayama University, Okayama 700, Japan, Tel: +81-86-251-8114, Fax: +81-86-253-9522, e-mail: cefc@eplab.elec.okayama-u.ac.jp

WORLD WIDE WEB PAGE FOR THE MAGNETICS SOCIETY

A World Web Page for the Magnetics Society is now operational. The URL is http://yara.ecn.purdue.edu/~nyenhuis/ieeesmag.html. You can also access this page via a link from the IEEE Home Page at http://www.ieee.org/.

The World Wide Web is a relatively new system for transfer of text, graphical and even sound data over the Internet. A Web browsing program such as NCSA Mosaic or Netscape is required to make use of WWW. Once set up, these programs are easy to use and one can interactively visit web sites all over the world.

The IEEE Magnetics Society Home Page will contain new and archival information of interest to our members. Look to this page for the latest conference and other announcements. We also plan to include electronic versions of the Newsletter on this page. The Webmaster John Nyenhuis (nyenhuis@ecn.purdue.edu) invites Society members to visit our home page. Let him know your comments and submissions.

TECHNICAL COMMITTEE UPDATE: PRML RECORDING CHANNELS AND BEYOND

By N. H. Yeh
Samsung Semiconductors, Inc.
San Jose, CA 95134

The recent requirement of combined digital audio/video and computer datastorage has greatly pushed up the capacity and data rate of hard disk drives. As the conventional peak detection channel reaches its limit, new read/write channels employing a priori knowledge of the signal are being developed. Partial Response Maximum Likelihood (PRML) channels have been introduced in more and more new products since the early 1990's.

In a peak detection channel, data bit "1" is decoded directly from a series of alternating positive and negative transitions. At high recording densities, inter-symbol interference (ISI) and poor signal-to-noise ratio (SNR) may produce erroneous extra and missing pulses. When two consecutive positive peaks are detected without a negative peak in between, it is evident that an error has occurred. However, the peak detection can give no indication of such an error. Much of the information regarding the intrinsic recording channel characteristics is not effectively utilized in conventional peak detection.

The signal differentiation by the playback head allows the recording channel to be treated approximately as a 1-D channel, which is a polynomial representation of a one clock cycle delayed signal subtracted from the original signal. A 1-D channel possesses controlled ISI and is thus called a partial response channel. This controlled ISI results in alternating positive and negative pulses in the playback. A PRML channel makes use of this ISI to correct many errors that otherwise will be passed through in peak detection. A PRML channel compares the amplitudes of all the positive peaks between two negative peaks and only decodes the highest peak as "1" and the others as "0". A similar detection scheme is applied to all the negative peaks between two positive peaks. This ensures the data integrity conforming to a 1-D channel.

More rigorously speaking, a PRML channel measures the mean square deviation of the incoming signal from all the possible signals constructed with valid bit streams. The maximum likelihood detection corresponds to the bit stream with the minimum mean square deviation. The bit decision is based on not only the current transition but also the strength of all the nearby transitions. A Viterbi algorithm offers a systematic mathematical approach to calculate the metric in the trellis diagram, eliminate unfavorable data paths, and find the surviving path. The surviving path corresponds to the maximum likelihood sequence. Unlike error correction code (ECC), the Viterbi algorithm improves the channel performance without additional channel overhead.

When two 1-D channels are interleaved, the resulting channel is $1\text{-}D^2$ and has a null response at the Nyquist frequency. Here, D^2 is a two clock cycle delay operator. The $1\text{-}D^2$ channel belongs to class 4
partial response (PR4). This class number was assigned by Kretzmer in 1966 for convenience and has no obvious correlation with the actual channel response. The signal from head and disk usually rolls off exponentially with frequency due to spacing loss and finite transition length in the disk. A null response at Nyquist frequency reduces the need for high frequency signal boost in the equalizer and thus lowers the high frequency noise. The equalized signal bandwidth is narrower in PR4 compared with peak detection. The PR4 channel in conjunction with a Viterbi decoder offers a 3 to 5 dB effective SNR advantage over peak detection at the current user densities.

Signals in a PR4 channel exhibit three sampling levels. Two separate Viterbi decoders designed for 1-D channels are usually employed for the even and the odd bit streams. Additional encoding in a PRML channel can limit the maximum delay of decision making and aid the clock recovery. In the case of PR4, (8/9) code, which maps 8 bits to 9 bits and imposes maximum run-length limit on both the interleaved and the combined channel bits, is most commonly used. In addition, data recovered from a PR4 channel needs an inverse transform $1/(1\text{-}D^2)$ to restore the original bit stream. This inverse transform is usually accomplished in a pre-coder before writing to avoid error propagation.

PR4 can be extended to higher order by using a more generalized polynomial representation $(1\text{-}D)\ (1+D)^n$, where PR4, EPR4, and EEPR4 are named for n=1, 2, and 3, respectively. Although higher order PR channels achieve some SNR gain by shifting the target spectra toward lower frequency, they require much finer signal quantization steps and more complex Viterbi algorithms to
deal with the increased number of signal levels. Even with all the implementations made possible, the overall channel performance improvement in higher order PR4 may not be fully realizable due to disk speed jitter, transition shift noise, slight signal mis-equalization, track mis-registration, etc.

Other developments beyond the current PR4 channel include fixed-delay tree search (FDTS) [1] and matched spectral null (MSN) code [2]. The former employs a relaxed feed forward equalization and relies on DFE and a maximum likelihood detector to enhance the data detection. The latter introduces a code spectral null at the Nyquist frequency in PR4 to increase minimum code word separation during maximum likelihood detection.

As recording densities go up, a transition in the disk has a tendency to be shifted and partially erased by the adjacent transitions. Most of today's PRML channels employ precompensation to compensate only the transition shift. Future recording channels may require more sophisticate schemes to handle system nonlinearities. Nonlinear distortions can be removed by a Volterra equalizer [3], or a nonlinear Viterbi detector [4]. Furthermore, a multilayer perceptron or a feed-forward neural network [5] may also effectively counter such distortions.

Advance of semiconductor technology has made the implementation of PRML channel within the reach of the hard disk drive industry. A single chip PRML channel is

soon becoming a standard product. The use of modern CAD tools would allow further development of the channel chips with short design cycles at a affordable cost. The hard disk drive industry in the past has maintained an annual 60% areal density increase. Development of new channel concepts to detect data reliably from signals with reduced SNR and higher nonlinearities will be one of the key challenges to sustain this growth into the twenty-first century.

[1] L. R. Carley, "Comparison of computationally efficient forms of FDTS/DF against PR4-ML" IEEE Trans. Mag-27, p. 4567, 1991.

[2] H. Thapar et al., "On the performance of a rate 8/10 matched spectral null code for class 4 partial response", IEEE Trans. Mag-28, p. 2883, 1992.

[3] W. Ryan and A. Gutierrez, "Performance of adaptive Volterra equalizers on PR4-equalized recorder channels with partial erasure" (To be presented in INTERMAG 1995, San Antonio, TX)

[4] I. Lee et al., "Performance comparison of receivers in a simple partial erasure model", IEEE trans. Mag-29, p.1465, Jul. 1994.

[5] S. K. Nair, and J. Moon, "Nonlinear equalization for data storage channels", Proc. 1994 Int. Conf. Comm., New Orleans, Vol. 1, p. 250, 1994.

Call For Nominations for Administrative Committee Members

In accordance with Article 4.3 of the By-Laws of the Magnetics Society, the Nominations Committee (NomCom) hereby solicits nominations for the Administrative Commitee (AdCom) from all members of the Magnetics Society. This year eight positions on the AdCom for a three-year term beginning 1 January 1996 will be filled. The NomCom – consisting of C.D. Graham, R.M. Josephs, J. Judy, F.E. Luborsky, and D.I. Gordon (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 sent along with the biography. Also please be advised that a petition for a nominee duly signed by a minimum of 25 society members will automatically place that nominee on the ballot.

The deadline for receipt of nominations is 15 June 1995.

Please send all nominations including biographies and IEEE membership numbers by regular mail or e-mail early enough so that they reach the Nominations Committee chairman by the deadline date (15 June 1995). The address is:

Daniel I. Gordon, Nominations Committee Chairman
2711 Colston Drive
Chevy Chase, Maryland 20815 U.S.A.
Tel: (301) 565-0608
e-mail: dgordon@wam.umd.edu

CONFERENCE ANNOUNCEMENT: INFORMATION STORAGE TECHNOLOGY SYMPOSIUM, ISTS-95

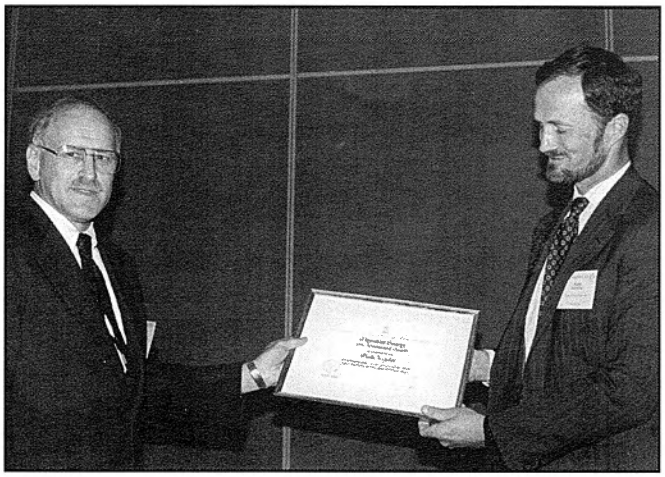
ISTS-95 will be held on September 11-14 in Kalamata, Greece. The objective of the conference is to bring together scientists and engineers to review the current status and define the road map for components, technologies, and systems for very high density data storage to the end of the century and beyond. The program will focus on magnetic recording (disk and tape media, heads, substrates, head-media interface, signal processing, servotracking and transports), alternative technologies (optical, holographic and solid state), and limits to areal density (10 to 100 Gbit/sq.in.). Following in depth presentations by invited speakers, there will be informal discussions and debates in which all attendees are expected to participate and contribute. The registration deadline is May 31, 1995.

More details are available by contacting Dr. Dennis Speliotis, Advanced Development Corp., 18 Ray Avenue, Burlington, MA 01803, USA, Tel: (617) 229-8992, Fax: (617) 229-8997, E-mail: astc@aol.com

NEW EDITORIAL BOARD PLANNED FOR IEEE TRANSACTIONS ON MAGNETICS

Members of the Magnetics Society who are interested in serving on a new editorial board for the IEEE Transactions on Magnetics are invited to write to the publications chairman, Ron Goldfarb, NIST, 325 Broadway, Boulder, CO 80303. Members of the new editorial board will be expected to review several regular Transactions manuscripts per year and provide expert guidance in the event of disagreements among authors and referees. The renewable appointments will be for one year. Send Ron a list of your areas of expertise and a list of your publications.

KRYDER HONORED WITH ACHIEVEMENT AWARD



The 1995 Magnetics Society Achievement Award was given to Prof. Mark Kryder during the Plenary Session at the 1995 INTERMAG Conference in San Antonio, Texas.

Mark Kryder was born in Portland, Oregon. He received his B.S. degree in Electrical Engineering from Stanford University, and his M.S. degree in Electrical Engineering and Ph.D. degree in Electrical Engineering and Physics from the California Institute of Technology. For more than 28 years, he has been involved in research and development of magnetic storage materials and devices, and during this time has benefited by an association with many colleagues. Mark is Professor of Electrical and Computer Engineering and Director of the Engineering Research Center in Data Storage Systems at Carnegie Mellon University. He has worked on magnetic storage technologies including magnetic thin film memories, magnetic bubble memories, magneto-optic recording and magnetic recording.

Mark Kryder is considered to be a leading authority in the world in the area of magnetic and magneto-optical data storage. This is evidenced in part by his growing list of invited talks, encyclopedia and review articles. He has just been honored as a Magnetics Society Distinguished Lecturer for the second time.

His technical accomplishments include development and use of high speed (<10 nsec time resolution) Kerr magneto-optic microscopy for the study of dynamic phenomena in magnetic thin films and devices. He was the first to apply these techniques, to the study of magnetic thin film memory devices. Subsequently he applied these techniques to study magneto-optic recording in MnBi, to the study of dynamics in magnetic bubble memory devices, and finally to the study of magneto-optic recording and magnetic thin film recording and magneto-resistive read heads.

The scanning Kerr effect microscope which he pioneered at CMU for the study of dynamics in thin film heads was the first product manufactured by PhaseMetrics Corporation, which is now a major supplier of test equipment for the magnetic recording industry.

Using these high speed Kerr imaging systems, he has studied the effects of ripple on high speed flux reversal in Permalloy thin films, and was the first to collect data on the dynamics of bubbles in GdCo and GdCoMo bubble domain materials and devices. He was also the first to image the actual recording and erasure processes in magneto-optic recording, and studies which he and his graduate student, Dave Shieh, carried out with this system led to the first direct overwrite process for magneto-optic recording materials. Studies which he and his graduate students carried out on thin film recording heads have identified the causes of popcorn noise in thin film heads and the most comprehensive understanding of dynamic phenomena in thin film heads yet available.

Mark also contributed heavily to the development of rare earth-transition metal thin films for magneto-optic recording media and recently has developed high magnetization FeAlN thin film heads for ultrahigh density recording.

In 1983 he established the Magnetics Technology Center at CMU, building on existing strength in magnetics research. This was the first major university center dedicated to research in magnetic data storage. In 1990, the Center became an NSF Engineering Research Center (ERC) and changed its name to the Data Storage Systems Center. Under Mark's leadership, it has grown to be the largest academic data storage research center in the world. The near-term goals of this Center are to demonstrate 10 Gbit/in^2 recording density in magnetic and magneto-optic recording and 1 TByte/in^3 on tape.

Mark has also played a key leadership role in the data storage industry. He was one of the driving forces behind the founding of the National Storage Industry Consortium, and continues to play an important role in the organization.

Until recently, the federal government has not been a major source of research support in magnetics technologies. Recognizing this as a strategic mistake, Mark and others have worked hard to persuade federal authorities of the importance of magnetics to the national economy. As a result of these efforts, agencies such as the NSF, ARPA and NIST/ATP have increasingly viewed magnetic data storage as a critical technology. In addition to funding the ERC at CMU, NSF, for example, has funded centers at the University of Alabama and the University of California at San Diego. Mark was the leader in persuading ARPA to fund a large consortium of industries and universities under NSIC to pursue ultrahigh density magnetic and magneto-optic recording, and was a key player in helping persuade NIST/ATP to provide $125 million in funding for work in digital data storage over the next five years.

He has been very active in serving the IEEE Magnetics Society service on several committees , conferences and on the Editorial Boards of the IEEE Proceedings and Data Storage Magazine. Professor Kryder has over 240 publications, 14 patents and several patents pending. He is a member of the American Physical Society, a Fellow of the IEEE, and a member of the National Academy of Engineering.

Prof. Kryder is the 14th 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 and R. C. Barker.

JAMES U. LEMKE HONORED WITH INFORMATION STORAGE AWARD

The 1995 IEEE Reynold B. Johnson Information Storage Award was presented to James U. Lemke by 1994 IEEE President, H. Troy Nagle, at the plenary session of Intermag '95 in San Antonio, Texas. This award is one of the 21 Technical Field Awards of the Institute. It is presented by the Board of Directors, upon recommendation of the Awards Board. The citation which accompanies Dr. Lemke's award reads: "for contributions to advancing the science and technology of high density magnetic data storage."

The award was established by the IEEE Board of Directors in 1991. It is named in honor of Reynold B. Johnson, a pioneer of magnetic disk technology, who was founding manager of the IBM San Jose Research Engineering Laboratory in California. The award consists of a bronze medal, certificate, and $5000. It is sponsored by IBM Corporation.

Dr. Lemke was born in Grand Rapids, Michigan. He received the B.S. in Physics from the Illinois Institute of Technology in 1959; the M.S. in Physics from Northwestern University in 1960; and the Ph.D. in Theoretical Physics from the University of California, Santa Barbara in 1966.

Dr. Lemke has worked in the field of research and development of magnetic information for all of his professional life. As a student in 1948, he joined the new IBM Watson Scientific Computing Laboratorym at Columbia University, where he worked on memory devices for the IBM PAC computer. He served as coordinator of magnetic recording research at the Armor Research Foundation, and later as director of magnetics research at the Bell and Howell Research Center.

In 1968, Dr. Lemke founded Spin Physics, Inc., a major developer and supplier of high density magnetic recording heads, unique magnetic materials, and high-speed electronic camera recorders. SPI became a subsidiary of Eastman Kodak Company in 1982, and Dr. Lemke was named a vice president of Eastman Technology, Inc. and a Fellow of the Eastman Kodak Research Laboratories. In 1986, Dr. Lemke founded Recording Physics, Inc., a research company devoted to developing novel computer peripheral technologies and products.

In cooperation with Dr. Albert Hoagland, Dr. Lemke was instrumental in forming the Center for Magnetic Recording Research at the University of California, San Diego, an industrially funded and internationally acclaimed research center in the field of information storage. He serves as Adjunct Professor of Electrical and Computer Engineering at UCSD.

Dr. Lemke's pioneering research and inventions have resulted in many patents and publications in the field of information storage. He pioneered the exploration of Vector field recording, utilizing both the longitudinal and perpendicular components of fields in constructive interference for enhanced recording. He invented and patented a non-Newtonian liquid interface for disk drives wherein the head is supported by a highly sheared liquid rather than air. Dr. Lemke developed a new scan tape drive that permits very high areal density and search rate in tape peripheral drives.

He is a Fellow of the IEEE, a member of the National Academy of Engineering. He has been recognized with a number of awards for his contributions, and has served as distinguished lecturer of the IEEE Magnetics Society in 1992 and has been active in Magnetics Society conference activities. He has been an avid pilot for many years and travels widely in his planes, including South America.

Past winners of the award are John M. Harker in 1993 and C. Dennis Mee in 1994.

MILWAUKEE CHAPTER MEETINGS

By John R. Brauer

The Milwaukee Chapter of the IEEE Magnetics Society held five meetings during the 1994-5 year. Dates, topics, and speakers were:

Oct. 24 "Three dimensional finite element analysis of magnetic devices" Dr. Nabeel Demerdash, Marquette U., Milwaukee

Dec. 19 "Analysis of magnetoresistive devices" Dr. John Brauer, MacNeal-Schwendler Corp., Milwaukee

Feb. 16 "Magnetic resonance gradient fields and potential bioeffects" Dr. D. J. Schaefer, GE Medical Systems, Milwaukee

Mar. 23 "Giant magnetoresistance materials and applications" Dr. James Daughton, Nonvolatile Electronics Inc. Eden Prairie, MN

April 25 "Introduction to superconductivity and its applications" Dr. Moises Levy, Univ. of Wisconsin-Milwaukee

The Milwaukee Chapter is planning another year of interesting meetings starting in September. If you would like to receive meeting notices by e-mail, please e-mail your request to john.brauer@macsch.com. Magnetics Society members throughout Wisconsin, Illinois, Minnesota, Michigan, etc. have often attended the meetings in Milwaukee and are cordially invited.

IEEE MAGNETICS SOCIETY NEWSLETTER CONFERENCE CALENDAR

JULY 10-12, 1995

The Magnetic Recording Conference (TMRC 95).
Pittsburgh, PA. Mardi Geredes, IIST, School of Engineering, Santa Clara Univ., Santa Clara, CA 95053 Tel: (408) 554-5478; Fax: (408) 554-5474; Email: mgeredes@bigbird.scu.edu

JULY 17-19, 1995

6th International Conference on Magnetic Recording Media (MRM).
Oxford, UK. MRM 1995, The Institute of Physics, 47 Belgrave Square, London SW1X8QX, UK; TEL: +44 71 235 6111; FAX: +44 71 823 1051; Email: iopconf@ulcc.ac.uk

SEPTEMBER 11-14, 1995

Information Storage Technology Symposium (ISTS-95)
Kalamata, Greece. Dr. Dennis Speliotis, Advanced Development Corp., 18 Ray Avenue, Burlington, MA 01803, USA TEL: +617-229-8992; FAX: +617-229-8997; E-mail: astc@aol.com

SEPTEMBER 12-14, 1995

12th International Conference on Soft Magnetic Materials (SMM12).
Krakow, Poland. Dr. Marek Gutowski, Scientific Secretary of the SMM12, Institute of Physics, Polish Academy of Sciences, A1.Lotnikow 32/46, 02-668 Warszawa, Poland, TEL: (+48 22)43-5212, FAX: (+48 22)43-0926, E-Mail: smm12@gamma1.ifpan.edu.p1.

SEPTEMBER 17-20, 1995

International Symposium on Non-Liniar Electromagnetic Systems (ISEM).
Cardiff, Wales, UK. ISEM 95 Secretariat, Cardiff School of Engineering, University of Wales College of Cardiff, P.O. Box 917, Newport Road, Cardiff CF2 1XH Wales, UK; TEL: +44 222 874070; FAX: +44 222 874420

NOVEMBER 6-9, 1995

40th Annual Conference on Magnetism and Magnetic Materials (MMM'95).
Philadelphia, Pensylvannia, USA. Diane Suiters, Courtesy Associates, 655 15th Street NW, Suite 300, Washington, DC 20005; TEL: (202) 639-5088; FAX: (202) 347-6109.

APRIL 9-12, 1996

Intermag '96
Seattle, Washington USA Diane Suiters, Courtesy Associates, 655 15th Street NW, Suite 300, Washington, DC 20005; TEL: (202)639-5088; FAX: (202) 347-6109

APRIL 29- MAY 2, 1996

4th Magneto-Optical Recording International Symposium (MORIS'96).
Noordwijkerhout, The Netherlands. J.C. Lodder, MESA-Research Institute, University of Twente, P.O. Box 217, 7500 AE Enschede, The Netherlands, TEL: +31 53 892750, FAX: +31 53 309547, E-Mail: lodder@el.utwente.nl.