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JODIE CHRISTNER, EDITOR

National Science and Technology Medals Awarded



President Clinton presented IEEE Members Jerome J. Cuomo (left) and Richard J. Gambino with National Medals of Technology, and Hermann A. Haus with the National Medal of Science.

President Bill Clinton presented three U.S. IEEE members with National Medals of Science and Technology at a White House ceremony on Oct. 18. IEEE Fellow Dr. Hermann A. Haus and Senior Members Dr. Jerome J. Cuomo and Richard J. Gambino received the awards, the highest presidential honors for science and engineering, for accomplishments which have directly contributed to long-term economic growth and improved standards of living.

The 16 1995 medalists "have stretched our horizons, expanded the frontiers of knowledge, peeled away the secrets of nature, cured disease, and created new industries such as that of optical storage," said the President. "All of them have performed research that will pay off richly for the United States in the 21st century," he added.

Haus earned the National Medal of Science for his fundamental and seminal contributions to the field of quantum electronics, noise and ultra-fast optics, and for his service to the engineering profession through teaching. He is an Institute Professor at the Massachusetts Institute of Technology, where he has conducted studies in modelocking, integrated optics and nonlinear optics since 1974. He

was named an IEEE Life Fellow in 1991.

Cuomo and Gambino were honored with National Medals of Technology for their work as part of an IBM research team that discovered and developed amorphous magnetic materials, which are the basis of erasable, read-write, optical storage technology. Their achievements laid the foundation for today's worldwide magneto-optic disk industry.

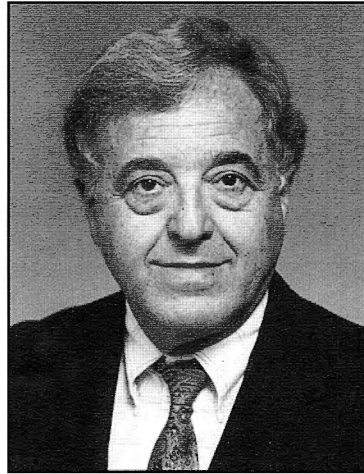
Following a 30-year career in IBM's Research Division, Cuomo joined the faculty of North Carolina State University's Department of Materials Science and Engineering in 1991, where he established and directs the Center for Advanced Manufacturing Processes and Materials. Gambino retired from IBM Research in 1993, and is presently Professor of Materials Science and Engineering and director of the Laboratory for Magneto-Optical Materials at the State University of New York at Stony Brook. He was co-recipient of the IEEE's Morris N. Liebmann Award in 1992.

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IEEE Magnetics Society member Richard J. Gambino receives the National Medal of Technology from President Clinton at on Oct. 18 White House ceremony. Gambino was honored for his work as a member of an IBM team that helped develop the magneto-optic disk.

MAGNETICS SOCIETY DISTINGUISHED LECTURER FOR 1996



Prof. Stanley Charap

Magnetic Reversal at Low Speed - Long Term Stability of Magnetic Storage

As the areal density of magnetic hard drives advances toward 10 Gbit/in² and beyond, the present design paradigm requires that the individual grains of the storage layer be ever smaller and well segregated from each other. Thermally assisted switching of the grain magnetizations, which is related to magnetic viscosity and ultimately to superparamagnetism, thus becomes a greater threat to the long term stability of storage as areal density increases. This talk will review the subject of magnetic viscosity, focussing particularly on the speaker's own work. In particular, it includes the micromagnetic simulation of the long term behavior of stored magnetic transitions. The implications for future magnetic storage systems will be discussed.

Biography

Stanley H. Charap is Professor of Electrical and Computer Engineering and Associate Director of the Data Storage Systems Center at Carnegie Mellon University in Pittsburgh, Pennsylvania. His major research areas are micromagnetic modeling of magnetic recording media, vector Preisach modeling of magnetic media, magnetic aftereffects and thermal stability limitations for high density recording. Professor Charap received a B.S. from Brooklyn College in 1953 and a Ph.D. from Rutgers University in 1959, both in Physics. He spent a total of 9 years with IBM and American-Standard before joining CMU. Since then he has consulted with companies such as Magnetic Peripherals, Bell Laboratories, and Westinghouse. He has published about 60 papers and is well-known as the editor of Chikazumi's text, "Physics of Magnetism". His professional activities have included service as IEEE Magnetics Society Past President, President, Vice President, Secretary/ Treasurer, and Member of the Administrative Committee. He was also Editor-in-Chief and Reviews Editor of the IEEE Transactions on Magnetics, as well as holding positions on the IEEE Publications Board and the IEEE Press Editorial Board. He was the General Chairman of the 1986 MMM Conference in Baltimore and of the 1994 Joint Intermag-MMM Conference in Albuquerque.

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ADDITIONAL SESSION SUMMARIES FOR INTERMAG'95

Session EC—GMR III

By Alison Chaiken, Lawrence Livermore National Laboratory

Session EC at the Intermag '95 conference was one of several concerned with recent developments in giant magnetoresistance (GMR). The talks concerned three types of systems: permalloy/silver multilayers, granular composites, and spin-valve trilayers.

Russek of NIST/Boulder and Kirschenbaum of University of Colorado, Boulder described new features that arise in the magnetic properties of NiFe/Ag multilayers when they are patterned into micron-scale devices. Russek explained how magnetostatic fields in micron-scale devices can broaden the magnetoresistive response, thereby lowering the sensitivity. Kirschenbaum was able to obtain an estimate for the size of domains in the multilayers by studying the field dependence of $1/f$ noise. Sanders of NIST presented an account of how thermal annealing impacts magnetostriction in these multilayers.

Jarratt of Alabama reported a crossover from granular behavior to multilayer behavior as a function of CoFe thickness in CoFe/Ag layered films. Kubinski of Ford Research Laboratory described systematic trends in a large number of granular alloy films, comparing the resulting composition dependence of the MR to the Slater-Pauling curve. O'Grady of the University College of North Wales explained why time-dependent resistivity changes due to magnetic relaxation in NiFe/Ag granular films appear to be anomalously low.

Several talks gave accounts of efforts to increase the sensitivity of spin-valve trilayer devices. Joo of Caltech studied the dependence of MR in spin valves on their crystalline orientation and interfacial mixing. Nishioka of Alabama varied the underlayer thickness and composition in order to optimize spin-valve performance. He identified misalignment between the exchange bias direction and the easy axis of the free permalloy layer as a key issue for further study. Tanuma of Sanyo Electric Company presented the results of calculations on the effect of possible biquadratic interlayer coupling on spin-valve behavior, and compared the results of the calculations to experimental data.

Session EP—Thin Film Media II

By Jack H. Judy, University of Minnesota

Tsuboi et al. reported that higher track-edge noise for CoCrTa longitudinal thin film media correlates with amplitude fluctuations which are due to a higher remanent magnetic flux density. Okamura et al. reported an increase of 600 Oe to a maximum radial coercivity of 2400 Oe for a 450 Å double-layer film of CoCrPt on a 50 Å CoCrTa film deposited on a Cr underlayer-coated textured NiP/AlMg and glass disk substrates. O'Grady and Greaves described measurements of a positive magnetic viscosity and increasing area of minor hysteresis loops with increasing Cr under-

layer thickness for a negative applied field in CoNiCr/Cr films which is associated with an increase in the dipolar coupling. Allegranza and Wu reported that precoatings of Ti, C, and NiP on glass substrates before deposition of Cr underlayer and magnetic layer to prevent surface contamination were necessary for obtaining soft error rates 2 to 4 orders lower than NiP/AlMg substrates above 100 Kbpi. Suzuki et al. reported that an in-plane component of magnetic anisotropy of CoCrTa/Cr films increases with increased deposition rate and decreases positive magnetic interactions indicating that factors other than exchange coupling exist in the films. Cavallotti et al. reported high in-plane coercivities (200-1000 Oe) of electrodeposited Co-rich (50-80 at.%Co) Co-Pt alloy films on 10 µm of polished electroless-plated NiP on CuSn₆ substrates and higher coercivities (1000-4500 Oe) of (65-75%Co) Co-Pt-P films with up to a maximum at 4% P. Sohn et al. reported increasing the coercivity of DC magnetron sputtered CoCrPt/Cr films to 1550-1900 Oe on NiP/Al (up to 11.5% P) and to 1410-2170 Oe on glass substrates; the P was shown to decrease the (0002) Co orientation and increase the (1010) texture and enhance the isolation of the grains. Kemner et al. reported that polarization-dependent X-ray absorption fine structure studies of 300 Å thick CoCrTa films sputtered on Cr at room temperature and 260 °C showed that Ta is incorporated in the hcp structure randomly or segregated to Co rich regions and that Ta atoms have vacancy bonds which decrease diffusion of Cr within the grains. Choe reported on effects of film morphology and thermal annealing on grain-boundary-induced coercivity of CoCrPt films deposited on 2000 Å thick Cr by RF sputtering: low Ar pressure (2 mtorr) and high substrate bias (-200 volts) refined grain size, enhanced grain size uniformity, decreased void density, and reduced intergranular interactions, and annealing at 300-500 °C for 30 minutes increased coercivity by 1000-3000 Oe for voided microstructure and 1600-3600 Oe for 60% dense films. Hirono et al. reported that electron cyclotron resonance plasma sputtering deposition of 1000 Å thick Co₇₈Cr₂₂ films in 0.6 mtorr Ar and 200 °C possessed 1800 Oe perpendicular coercivity and minimum 200 Å grain size with enhanced composition segregation into Co-enriched and Cr-enriched regions of less than 50 Å length which is expected to reduce media noise. Kyusik et al. reported that when the hard axis of the magnetic anisotropy of a NiFe keeper layer is oriented circumferentially on longitudinal CoCrTa/Cr thin film media, the readback amplitude is maximized and the noise is minimized. Schlott et al. reported that heat treatment of CoCr(Pt)Ta alloy targets for DC magnetron sputtering reduces the permeability of the targets which results in enhancement of the pass-through magnetic flux thereby increasing target utilization and making use of thicker magnetic targets possible.



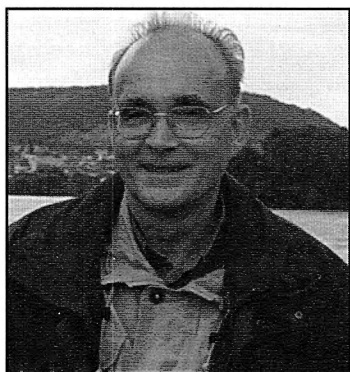
ENGINEERS
Turning Ideas
Into Reality.

CONFERENCE CALENDAR

- March 18-20, 1996** **Seventh Biennial IEEE Conference on Electromagnetic Field Computation (CEFC '96)**
Okayama, Japan. CEFC '96 Secretariat, 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.
- 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;
<http://www.seas.gwu.edu/seas/institutes/INTERMAG96/index.html>.
- April 27 - May 3, 1996** **Society of Magnetic Resonance Fourth Scientific Meeting and Exhibition.**
Society of Magnetic Resonance, 2118 Milvia Street, Suite 201, Berkeley, California 94704
USA; TEL: 510-841-1899; FAX: 510-841-2340; email: info@smr.org.
- 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; email: lodder@el.utwente.nl.
- May 13-15, 1996** **Conference on Properties and Applications of Magnetic Materials.**
Illinois Institute of Technology, Chicago, Illinois USA.
Bonnie Dow, Illinois Institute of Technology, TEL: (312)567-6809.
- August 19-21, 1996** **TMRC '96 - Media, Santa Clara University, Santa Clara, California USA.**
Mardi Geredes, IST, mgeredes@bigbird.scu.edu; TEL: 408-554-5478;
<http://www-iist.scu.edu/IIST/tmrc/tmrc96.html>.
- September 3-6, 1996** **7th International Conference on Ferrites**
Bordeaux, France. Bordeaux Congress Service, 33300 Bordeaux LAC, France,
TEL: (33) 56 11 88 88; FAX: (33) 56 43 17 76.
- November 12-15, 1996** **41st Annual Conference on Magnetism and Magnetic Materials**
(MMM '96)
Atlanta, Georgia USA. Diane Suiters, Courtesy Associates, 655 15th Street NW, Suite 300,
Washington, DC 20005, TEL: 202 639-5088; FAX: 202 347-6109;
email: magnetism@mcimail.com.



IN MEMORIUM: Dr. Eberhard Koster



Dr. Eberhard Koster
Dec. 20, 1935 - Aug. 26, 1995

It is with great sadness that we report the death of Dr. Eberhard Koster of a heart attack while on vacation in Holland on August 26. Dr. Koster was a research scientist in the field of magnetic and optical media at BASF Ludwigshafen for 27 years. Since 1978 he served as manager of a variety of developmental groups in BASF Magnetics. He had retired recently and was still actively engaged in the area of teaching quality manufacturing in Germany and Eastern Europe.

Dr. Koster was born and raised in Stuttgart, Germany. He attended the Max Plank Institute where he received his Ph.D. in 1966. From 1966 to 1968 he was a scientist at the Franklin Institute in Philadelphia, PA where he performed research on interaction phenomena in particulate tape media. In 1968 he joined the Magnetic Tape Division of BASF in Ludwigshafen and continued his work on particulate media with particular emphasis on CrO₂. He became manager of the Audio Tape Development Group in 1978, and simultaneously was responsible for all media development testing. In 1985 he became manager of the Magneto-Optics and Optics Materials Development Group and in 1989 became manager of the newly established BASF test center for all recording media. In 1992 he was given responsibility for total quality management for BASF Magnetics products until his retirement in 1994. Dr. Koster was a superb experimentalist, and during his career at BASF he was engaged in and directed research on a variety of advanced media, including metal evaporated tape, magneto-optic films, thin film rigid disk as well as advanced particulate media. After retirement he taught quality management at the University of Mannheim and in Eastern Europe. In 1992 he was chairman of the MRM conference on magnetic recording materials in Perugia, Italy.

During his long career in applied magnetism Dr. Koster published numerous contributions to the state of knowledge of magnetic recording media, focusing particularly on particulate media. Of these publications several represent seminal works in this field. In the paper entitled "Temperature Dependence of Magnetic Properties of Chromium Dioxide and Cobalt-Doped Gamma-Ferric Oxide" (IERE Conf. Proc., vol. 26, 213, 1973), the role of the temperature dependence of the crystalline anisotropy on signal stability was measured and analyzed. In 1980 he wrote (with D. Pfefferkorn) "The

Effect of Remanence and Coercivity on Short Wavelength Recording" (IEEE Trans. Magn. vol. MAG-16, pp. 56-58, 1980), in which for the first time the role of these quantities on the short wavelength signal were carefully measured, and a determination of the effective spacing made. He contributed a chapter on particulate media for the "Magnetic Recording Handbook" (eds. Mee and Daniels, McGraw-Hill, 1989) in which he drew on his many years of experience to give an excellent in-depth review.

He is mourned by his devoted family: his wife Marion, his daughters Dr. Sabine Westphal and Sibylle Rocken, and sons-in-law Hans-Jugen Westphal and Dr. Michael Rocken; his grandchildren Teresa, Rebecca, Sophie, and Samuel; and by his sister Helma Lehner and brother Albrecht Koster, and by brother-in-law Professor Dr. Gunter Lehner and sister-in-law Erika Koster. He will also be deeply missed by many friends and colleagues.

Those of us who were fortunate enough to know Eberhard valued him for his intelligence and creativity, his integrity, his strength, and his energy. We cherish memories of an unusually generous, friendly and exuberant man. Eberhard was exceptional because he combined depth and nobility of feeling, sweetness of nature, and lightness of spirit. For all of us who loved him, he is irreplaceable not only for his graces but because we were at our best in his presence.

Submitted By: H. Neal Bertram - Sept. 9, 1995

OFFICER AND ELECTED ADMINISTRATIVE COMMITTEE MEMBERS FOR 1996

Election of officers for calendar year 1996 and one third of the Administrative Committee for a three year term beginning on January 1, 1996 was completed on November 1, 1995. The officers and elected AdCom members who will serve in 1996 are the following:

Officers

President: J.E. Opfer (ex-officio)
Vice President: D.D. Stancil (ex-officio)
Secretary/Treasurer: E. Della Torre (ex-officio)
Past President: D.A. Thompson (ex-officio)

Elected Administrative Committee Members

Terms Expire December 31, 1996

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

Terms Expire December 31, 1997

G. Bertotti	S.H. Charap	W. D. Doyle
R.E. Fontana, Jr.	R. Gerber	R. R. Katti
C.M. Perlov	T. Suzuki	

Terms Expire December 31, 1998

A. Chaiken	F. J. Friedlaender	R. F. Hoyt
D. C. Jiles	J. H. Judy	D. N. Lambeth
M. Pardavi-Horvath	P. E. Wigen	

The Nominations Committee which conducted the elections consisted of C.D. Graham, R. M. Josephs, J.H. Judy, F. E. Luborsky, and D.I. Gordon (chairman).

SEVENTH BIENNIAL IEEE CONFERENCE ON ELECTROMAGNETIC FIELD COMPUTATION

Okayama, Japan
March 18-20, 1996

The Seventh Biennial IEEE Conference on Electromagnetic Field Computation (CEFC '96) will be held in Okayama, Japan. 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 modeling,
- (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. Oral and poster sessions will be held.

The TEAM Workshop will follow the conference on March 21, 1996.

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

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e-mail: cefc@eplab.elec.okayama-u.ac.jp

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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Rochester, MN 55901
TEL: (507) 286-7642
E-Mail: j.christner@ieee.org

FACULTY POSITION ANNOUNCED

The Department of Electrical Engineering at Washington University in St. Louis invites applications for a either a junior or senior tenure-track faculty position primarily in the area of magnetic information storage. Candidates must demonstrate a strong capability for and dedication to research and teaching excellence, and have an earned doctorate in electrical engineering or a closely related field. More information about the university and department can be found at web site <http://www.wustl.edu>.

Applicants should send curriculum vitae or resumes, including the names of at least three references to:

Search Committee
Washington University
Department of Electrical Engineering
One Brookings Drive
Campus Box 1127
St. Louis, MO 63130-4899

The appointments will begin in the Fall of 1996. Washington University is an equal opportunity/affirmative action employer.

IEEE FELLOW NOMINATIONS

The Fellow Nominating Subcommittee of the Magnetics Society has established a "clearing house" for nominations for the IEEE Fellow Awards.

If you intend to nominate a Magnetics Society member for this award, please let me know about it. Hopefully, this information will avoid duplication of effort and will prevent worthy candidates from being overlooked.

Fellow Nominating Subcommittee
c/o Richy Josephs
Innovative Instrumentation Inc.
220 Limestone Lane
Willow Grove, PA 19090
215-659-6719 (office)
215-646-3272 (factory voice/fax)

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