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NEWSLETTER

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RICHARD M. JOSEPHS, EDITOR • SPERRY UNIVAC • P.O. BOX 500 • BLUE BELL, PA 19424

NEW S-MAG OFFICERS & AD-COM MEMBERS

The Magnetics Society members listed immediately below have been elected to a three year term on the Administrative Committee from 1 January 1983 to 31 December 1985.

Geoff Bate	Fred Hagedorn
Neal Bertram	Ken Lee
Paul Biringer	Y. Sakurai
Dan Gordon	Jack Shilling

Our new officers take office on 1 January 1983, their terms end on 31 December 1983. They are:

President:	Clark E. Johnson, Jr.
Vice-President:	Bill D. Doyle
Secretary/Treasurer:	Al B. Smith

Congratulations to all those elected.

R. O. "Tex" McCary
Chairman
Nominating Committee

1982 FINAL REPORT OF THE DIV. IV DIRECTOR—ALLAN C. SCHELL

One of the activities that I am delighted to see move forward is the creation of the Journal of Lightwave Technology. This is a joint enterprise of the IEEE and the Optical Society of America, and it has taken some time and effort to gain agreement on the partnership. However, with the able leadership of Henry Kressel, the representatives of nine IEEE Societies (four of which are in Division IV) have developed a suitable organizational structure. Tom Giallorenzi, the editor of the new journal, is off and running with what will soon be the premier publication in the area of fiber optics technology and applications.

One aspect of the vitality of the IEEE technical structure is the ability to form new entities to address emerging technology areas. At the November meeting, TAB approved the formation of the Oceanic Engineering Society. Don Bolle has made an outstanding contribution to the profession through his leadership of this activity, which has previously been organized as a Council.

Over the past decade, the IEEE PRESS has published about eight books annually. Most of these have been selections of reprints, although there are some volumes of specially written material. Now there is to be a substantial expansion of the IEEE PRESS so that it can serve as the consolidated book publishing arm of the Institute. There are to be book series based on reprints, tutorials, and special issues of the Transactions and Proceedings. Both the volunteer and staff structure will be expanded, and a simpler and better royalty system will be used. Only hardcover books will be published, with a significant discount to the price for members.

The subject of conference activity has generated considerable debate at the Board meetings over the past two years. As the number of conferences increases, the perceived conflicts multiply by overlaps in time, location and technical area. The large regional shows have highlighted these problems. At the November Board of Directors meeting, the recommendation was made that an IEEE Conference Board be established, with appropriate staff support. With this mechanism, professional support to conference and symposium organizers could be provided, and conflicts could be arbitrated, with uniform treatment of all entities.

A major concern of those engaged in scientific and engineering disciplines is the transfer of technology. Recent actions by the U. S. government have generated debate on the effect of limiting the flow of information. In June 1982 IEEE Spectrum magazine held a round-table meeting on this subject with participants from industry and government. A report of this meeting is now available. It is titled Managing the Flow of Technical Information, and you can obtain a copy by writing to Ellis Rubenstein, senior editor, IEEE Spectrum, 345 East 47th Street, New York, NY 10017.

Several of the Societies are well along with their special activities for the IEEE Centennial year, 1984. Among the plans are histories of the Societies, plenary sessions at the annual conferences, special sessions on notable achievements, and historical exhibits. This is an excellent opportunity to involve the Life Members of the Societies as a resource to develop Centennial programs; very often they were at the birth of the Society or of some of the major technical accomplishments. I encourage you to aid your Society in our Centennial activities.

Congratulations are in order for the IEEE Fellows that have been selected this year. Looking toward next year, it is time to plan the submission of candidates for consideration in 1983. It takes a lot of time, so don't put off the start.

I have enjoyed serving as your Division Director for the last two years. I've met a lot of dedicated and talented individuals who devote an extraordinary amount of time and effort to IEEE activities. I appreciate the help I've been given, and I hope that I have contributed to furthering the interests of the Institute and its members. Thanks for the opportunity.

WILLIAM FULLER BROWN TO GIVE TUTORIAL AT INTERMAG

The Education Committee of the Magnetics Society will again sponsor a tutorial session to be held in conjunction with the INTERMAG Conference to be held in Philadelphia on Wednesday, April 6, 1983. The tutorial will be held at 8 p.m. in the evening.

The subject of the session will be "Units and Dimensions." Dr. William Fuller Brown, Jr. will begin the session with a talk on the subject. This will be followed by a panel discussion and questions from the floor. Dr. Brown has agreed "to include enough controversial remarks to insure that somebody will disagree..."

E. Della Torre, Chairman
Education Committee
IEEE Magnetics Society

IEEE AWARDS

Important and urgent request to members to members of the Magnetics Society to consider to submit nominations for the various awards of IEEE.

The date for receipt of nominations for the various awards is:

Field Awards	-	before April 1, 1983
Medal of Honor	-	before June 1, 1983
Major Annual Medals	-	before June 1, 1983
IEEE Service Award	-	before June 1, 1983
Prize Paper Awards	-	before July 1, 1983

It is suggested that the IEEE AWARDS GUIDE be studied carefully to ascertain that each potential nominee fulfills the specific requirements of the award for which a nomination is submitted. Similarly, the furnishing of complete information describing a nominee's accomplishments is of substantial advantage to the nominee.

Award nomination forms are obtainable from the Staff Secretary of the Awards Board at IEEE Headquarters.

P. P. Biringer
Chairman
Awards Committee

ADDITIONAL SESSION SUMMARY, 1982 JOINT INTERMAG-MMM CONF., MONTREAL, JULY 20-23, 1982

Session EC. MICROWAVE DEVICES AND MAGNETOSTATIC WAVES. J. D. Adam.

Invited paper EC-01, "The Present Status of Microwave Ferrite Materials and Devices in China," was presented by Zhang Xi. Polycrystalline ferrite compositions such as $Y_{2.42}Ca_{0.58}In_{0.6}Ge_{0.58}Fe_{3.82}O_{12}$ have been investigated and linewidths (ΔH) of as low as 4 Oe and $4\pi M$ in the range 600 to 1400 gauss obtained. There is an optimum annealing time required to achieve the minimum ΔH. Structural studies have shown that in $Y_{2.78}Ca_{0.25}In_{0.6}Ge_{0.25}Fe_{4.11}O_{12}$ approximately $Y_{0.03}$ is on (a) sites.

Lithium ferrite with E_r in the range 15 to 17 are being produced, and work is ongoing on LiZn ferrites and LiTiZn ferrites. It was found that annealing Li ferrite in O_2 at 980°C reduced tan δ from 3×10^{-3} to 3×10^{-4}. Single crystal YIG is also grown and effects of mechanical and chemical polishing and annealing are being studied. Some of the effects observed are attributed to magnetostriction. YIG is grown by slow cooling from a flux, float zone, and liquid phase epitaxy techniques.

Magnetic circuit design studies have resulted in circulators operating over the -35°C range, and devices with insertion loss less than 0.1 dB and isolation of 40 dB have been designed. Edge guide mode isolators with 0.5 dB insertion loss and 18 dB isolation over the 3.5 to 4.5 GHz range have been achieved. Further improvements in the performance of edge guided mode isolators are being sought by shaping of the Li-ferrite and use of a coaxial field probe to measure the microwave field distribution in the device. Magnetostatic wave propagation in multiple dielectric layered structures is being studied and losses of 26 dB for 1 μS delay achieved.

Paper EC-02, "Millimeter Wave Ferrite Devices," was presented by R. W. Babbit and described ferrite devices which were compatible with dielectric waveguide and operated at 35 GHz and 94 GHz. Mg titanate with E_r of 16 and tan δ of 0.0002 at X-band closely matches the dielectric properties of both lithium and barium ferrites and is thus an ideal waveguide material. Note that using this material, the dielectric waveguides are much smaller than the equivalent metal waveguide.

Y-junction circulators at 35 and 94 GHz were demonstrated using LiZn and NiZn ferrite. These devices were biased below resonance, and high $4\pi M$ material gives wideband device operation. In these devices, the dielectric waveguide formed a butt joint to the ferrite section, and it was found that this was a potential source of loss if the contact was imperfect. Typical characteristics were less than 1 dB insertion loss, isolation 18-20 dB and VSWR < 1.4:1 over the 31.9 to 34.7 GHz band.

Reggia Spencer phase shifters were fabricated using LiZn ferrite and NiZn ferrite with the latter giving lower loss. At 35 GHz, phase shift of 320°/inch and 0.5 dB insertion loss was obtained with a coil current of less than 1 amp. Again the ferrite-dielectric interface was important and resulted in higher losses at 94 GHz. Isolators were demonstrated using thin plates of hexagonal ferrite bonded to the side of a dielectric waveguide. The 35 GHz device using NiCoW-type material showed a 1 dB forward loss and more than 20 dB isolation. Strontium aluminum hexaferrite with a uniaxial anisotropy field of 33.5 kOe and thickness < 0.07 mm was used at 94 GHz. The ferrite dielectric interface was not critical in this device. Work is also proceeding on antennas and t/r multipliers as well as the circulators, phase shifters, and isolators described.

Paper EC-03, "The Design and Performance of High Quality Microstrip Ferrite Phase Shifters," was, in the absence of the authors, presented by B. J. Guo. Design theory was based on (1) normal modes, (2) image impedance of $\lambda/4$ coupled meander lines, (3) calculations of microstrip λ_o and Z_o of the ferrite substrate, and (4) the normalized propagation constant Γ. In practice, devices with 20% bandwidth and insertion loss of 1.4 ± 0.3 dB and VSWR < 1.4 have been obtained. Over a 17% bandwidth, the rms phase shift error was <6° with a maximum error of 11°. Switching time was < 3 μS at a drive power of <100 μwatt. At present, a 4 bit device has an insertion loss of 2 dB, but the authors predict less than o.5 dB insertion loss from 5 to 6.2 GHz with a 3 strip device giving 66° phase shift and insertion loss in the range 0.5 dB to 1 dB from a 7 strip device with a phase shift of 180°.

Paper EC-04, "Investigation of Magnetostatic Waves in Uniform and Nonuniform Magnetic Bias Fields with a New Induction Probe," was presented by N. P. Vlannes. Two different probes were used; one consisted of a 50 μm thick gold wire wrapped around a plexiglass bar. The other was defined photolithographically in 1 μm thick aluminum and comprised a "U" shaped loop with legs of length 5 mm separated by 100 μm. The probe was mounted on a rod which was balanced on a knife edge, reminiscent of the "pick-up" arm of a record player. Measurements were performed on a surface wave delay line which had input and output transducers each 3 mm long and separated by 7.5 mm. The field amplitude distribution across the delay line width was obtained from the detected probe output. Phase information was also obtained when a mixer was used in place of a crystal detector. Results show that the MSSW beam focuses at a certain distance from the input transducer and then defocuses. It is planned to apply this technique to delay lines with nonuniform internal fields produced by permalloy field shapers.

Paper EC-05, "Influence of Ion Implantation on Magnetostatic Volume Wave Propagation," was given by G. Doriath. The ion implantation dose levels used here of approximately 10^{16} $^4He^+/cm^2$ resulted in a quasi amorphous layer. The depth of this layer was determined experimentally by chemical etching and was found to be in good agreement with predictions based on projected range for $^4He^+$. Energies in the range 30 to 150 keV and a dose of 1.5×10^{16} $^4He^+/cm^2$ were

The IEEE Magnetics Society Newsletter is published quarterly by the Institute of Electrical and Electronics Engineers, Inc., 345 East 47 Street, New York, New York 10017. The objective of the Newsletter is to publicize activities, conferences, workshops, and other information of interest to the membership of the Society and technical people in the general area of applied magnetics. Copy is solicited from the S-MAG membership, organizers of conferences, officers of the Society and local chapters, and other individuals or organizations with potentially relevant material. Copy should be sent to Dr. R. M. Josephs, Editor, Magnetics Society Newsletter, Sperry Univac, P. O. Box 500, Blue Bell, Pennsylvania 19424.

used in these measurements and resulted in implanted layer depths in the range 0.1 to 0.7 μm. The group velocity (V_g) of magnetostatic forward volume waves is proportional to the film thickness (d). The effect of the implanted layer is to produce an effective reduction in thickness of the YIG so that

$$(V_{go} - V_{gimp})/V_{go} = (d_o - d_{imp})/d_o$$

where d_o and d_{imp} are the unperturbed YIG film thickness under the implanted layer, respectively. It was found that in a 23 μm thick film, a double implantation (60 + 200 keV) 1.5 x 10^{16} $^4He^+/cm^2$ gave a group velocity perturbation of +3%, which is in good agreement with +3.1% predicted by theory.

Magnetostatic wave propagation through an array of implanted strips was analyzed by assuming it can be represented as a repetitively mismatched transmission line (Sittig and Coquin). Based on this, the variation of reflection coefficient from an implanted strip was found to be proportional to the magnetostatic wave number.

Paper EC-06, "Magnetostatic Forward Volume Wave Propagation in YIG Strips," was presented by J. D. Adam and described both experimental and theoretical results which show the effects of the finite delay line width on the propagation characteristics of the magnetostatic wave. Calculated data on the effects of the finite sample width on the radiation resistance of a microstrip transducer was also presented. The radiation resistance results behaved as expected apart from a pole at zero k, the significance of which has yet to be determined.

Paper EC-07, "Forward and Backward Magnetostatic Volume Waves in Multiple Layer Ferrite Films," was presented by L. R. Atkins. Propagation in a YIG film/dielectric/YIG film/dielectric/metal structure was most extensively studied, and dispersive delay line characteristics were in good agreement with calculations.

Paper EC-08, "A Multipole Magnetostatic Volume Wave Resonator Filter," was presented by G. Doriath and described a two-port structure consisting of two orthogonal forward volume wave reflective array resonators which were coupled by a 45° reflective array. This arrangement allowed coupling between the two resonators only at the resonance frequency and thus removed the transmission of low wave number magnetostatic waves which have troubled other forward volume wave reflective array resonators. Etched grooves 0.06 μm deep were used as the reflective elements, and the resonator was designed to operate at 300 μm wavelength. Q's of approximately 1000 were obtained at 4 GHz. The variation of the resonance frequency and Q with magnetic bias field was described and was well behaved apart from a splitting of the resonance. This splitting was probably due to the path length between the resonators (which includes the 45° reflector) which represents a third resonator whose behavior was not included in the design.

Paper EC-09, "Microwave Tunable Filter Using Ultra-Thin Magnetic Film," was presented by M. S. Chang. Here narrowband pass filter characteristics were obtained with surface wave propagation in thin YIG films ($\sim$ 1 μm thick) and relatively broad microstrip input and output transducers (200 μm). Midband insertion loss was typically 25 dB at 3 GHz, with a 3 dB bandwidth of 2 MHz.

Paper EC-10, "Insertion Loss for Magnetostatic Volume Waves," was given by I. J. Weinberg. In this paper, calculated results on transducer characteristics, i.e., radiation resistance and reactance, for both backward and forward volume waves were discussed. Single strips and apodized multistrip transducers were considered.

Paper EC-11, "MSFVW Dispersion Control Utilizing A Layered YIG-Film Structure," was presented by J. P. Parekh. Here group delay calculations for both forward volume waves and backward volume wave propagation in a structure comprising two YIG films, with different $4\pi M$, in contact were described. Calculations on a structure consisting of a YIG film of $4\pi M$ = 1750 gauss and thickness 10 μm, and a ferrite film with $4\pi M$ = 2000 gauss and thickness 60 μm showed that delays of 65 nS constant to within $\pm$ 0.5 nS could be obtained over a 350 MHz bandwidth.

Paper EC-12, "Current Distributions on Gratings and Meander Lines: with MSW Applications," was given by J. C. Sethares. Here the method of images was applied to the calculation of the current distribution in magnetostatic wave transducers. Insertion loss curves were presented for a variety of transducer configurations. This technique was extended to calculate the circulating currents over a magnetic half space (μ very large), assuming no a priori knowledge of the current distribution. Recent work showed that this technique can be modified further to include the case of a finite thickness YIG film.

DISTINGUISHED LECTURERS

The Magnetics Society is pleased to announce the Distinguished Lecturers for 1982-83. They are W. D. Doyle, I. S. Jacobs, and S. Foner. The Distinguished Lecturer Program is intended to provide tutorial overviews of topical subjects in magnetics, to expose students to the excitement, challenge, and methods of technical innovation, and to introduce developments in magnetics to the non-technical community. It is an opportunity for local chapters, universities, and other technical, educational, and business groups to hear outstanding members of the magnetics community. The cost will be borne by the society. Any group interested in scheduling a Lecturer should contact the program coordinator, Fred E. Luborsky, General Electric Corporate Research and Development, P. O. Box 8, Schenectady, NY 12301.

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BUBBLE MEMORY IN PRODUCTION

Technology's child prodigy of the 70s, after a difficult time in puberty, is performing very well as it approaches adolescence. Four strong vendors are supplying megabit devices in system products and major strides towards standardization have been made. Prototype four megabit devices could be sampled in 1983.

An eyewitness account of the turbulent history of bubble devices will be presented. The technology now used to manufacture products will be reviewed with emphasis on the wide variety of magnetic and electromagnetic problems which have been addressed. Key application areas will be identified. Finally, a road map to cheaper, faster and larger capacity devices will be drawn.

William D. Doyle was born in Dorchester, Massachusetts on June 5, 1935. He received the B.S. and M. S. degrees from Boston College in 1957 and 1959 respectively, and the Ph.D. degree from Temple University in 1964, all in Physics. He joined the Franklin Institute Laboratories in 1959, working on magnetic and structural properties of evaporated magnetic films. From 1964 to 1979 he was employed at Sperry Univac where he carried out research on the properties of plated wire memories, magneto-optic memories and bubble devices. In 1970-71, he was a Senior Visiting Fellow at the University of York, England. In 1979, he joined the Motorola Corporation to initiate a new program on bubble memories. He is presently Manager of Bubble Memory Components.

Dr. Doyle is a senior member of the IEEE and a member of the American Physical Society. He has been active in the organization of the major magnetics conferences. He is presently Chairman of the S-MAG Conference Executive Committee and a founder member of the Organizing Committee of the International Thin Film Conference and the International Conference on Magnetic Bubbles. He has served on the Editorial Board of the IEEE Transactions on Magnetics since its inception. He is the author of more than thirty papers in the field of magnetic materials and devices.

S. Foner
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REVIEW OF MAGNETIC MEASUREMENT METHODS

Although there are more methods for measurements of magnetic moment than there are magneticians, the various methods reduce to measurements of magnetic induction, force or indirect methods. Both classic and "modern" techniques are useful. Measurements by ac and dc force, magnetic induction, SQUID detectors, moving sample, and selected indirect methods will be examined. Old methods applied to new problems, new methods applied to old and new problems, and novel methods for approaching (or even surpassing) the sensitivity of superconducting quantum interference devices (SQUIDS) are discussed.

- or -

HIGH FIELD SUPERCONDUCTORS - STATUS AND PROMISE

For the last 100 years our modern technology was based on the iron age - the saturation magnetization of 2 tesla of iron allowed efficient generation of magnetic fields for motors, generators, transformers, relays, and other means of electric power generation and transmission. Very large volume and very high field applications suggest use of high field superconductors which improve on the flux density of iron by a factor of 10 or more. The basic properties, high-field limits, and prospects for the future of high field superconductors will be discussed and near-term large (and small) scale practical applications will be reviewed.

Simon Foner is a solid state physicist who was born in Pittsburgh August 13, 1925. He received his B.S. (1947), M.S. (1948) and D.Sc. (1952) from the Carnegie Institute of Technology.

He joined Lincoln Laboratory at the Massachusetts Institute of Technology in 1953 where he developed pulsed high magnetic field technology, invented the vibrating sample magnetometer and carried out research in magnetism, millimeter wave resonance in paramagnetism and antiferromagnetics, and pulsed and cw millimeter wavelength MASERS. He is a founding member of the Francis Bitter National Magnet Laboratory which he joined in 1961 and is currently the Chief Scientist and Head of the Research Division of the Laboratory.

Dr. Foner is a Fellow of the American Physical Society, was elected to the Executive Committee of the Division of Condensed Matter of the American Physical Society as a Member at Large, as Chairman, and recently to the Office of Divisional Council (1982-1986). He is Consulting Editor of the Review of Scientific Instruments, and serves on the editorial board of IEEE Transactions on Magnetics and the Journal of Magnetism and Magnetic Materials. He has edited four books, and is the author of more than 200 publications in magnetism, superconductivity, high field physics, magnetometry and resonance, and holds patents on magnetometry and superconducting materials. He has directed four NATO Advanced Study Institutes on magnetism and superconductivity and has served on national and international organizing committees on magnetism and low temperature physics.

I. S. Jacobs
General Electric Corporate Research & Development
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MAGNETISM AND COAL SCIENCE

We are used to thinking of magnetism as important for energy applications in the traditional roles of electric power generation, transmission and electromechanical conversion. The idea that it can contribute to coal science is more recent. It derives from the prominence of iron compounds among the natural impurities in coal and their role as hosts for much of the sulfur pollutants. Using such "iron-specific" tools as magnetization and Mössbauer spectroscopy, one can identify and measure the types, amounts and transformation of iron impurities in coal through the various stages of coal utilization and treatment. These methods will be shown to be useful for evaluating or understanding precombustion coal cleaning and high gradient magnetism separation/desulfurization of raw coal. Recent investigations include the effects of microwave treatment of coal. Desulfurization of solvent-refined coal liquid, and the transformations of iron-bearing phases during coal gasification.

Israel S. Jacobs joined the General Electric Research Laboratory (now Corporate Research and Development) in 1954, having received his Ph.D. in physics from the University of Chicago in 1953 and his B.S. from the University of Michigan. He has worked widely in the field of magnetism and magnetic materials, with research interests in high magnetic field phenomena, antiferromagnetism, low-dimensional model systems and industrial applications of magnetism research. In 1965-66 he was a visiting scientist in Grenoble, France at the High Magnetic Field Laboratory of the CNRS.

Dr. Jacobs has played major roles in the organization of many of the annual AIP-IEEE Conferences on Magnetism and Magnetic Materials, and the International Conference on Magnetism (1967) held in Boston. He has served on the Board of Editors of the Journal of Applied Physics, the International Journal of Magnetism, and currently the Journal of Magnetism and Magnetic Materials. He is also active on a number of committees of the American Physical Society. Dr. Jacobs is the author of more than 80 publications, holds four patents and has presented over 80 invited talks. He is a Fellow of the American Physical Society, a Senior Member of IEEE and a member of the AAAS.

NOMINATION OF FELLOWS

1. The Chairman of the Awards Committee invites the active participation of members of the Magnetics Society in submitting nominations for the Fellow grade.

2. The IEEE Bylaws define the Fellow grade as one of unusual professional distinction to be conferred only by invitation of the Board of Directors upon a person of outstanding qualifications and extraordinary experience in the fields of electrical engineering, electronics, radio, allied branches of engineering or the related arts and sciences, and who has made important individual contributions to one or more of these fields. A nominee must be a Senior Member of the Institute, and have been a member in any grade for at least five years prior to January 1 of the year of election.

3. New IEEE Fellow nomination kits are available upon request from the Staff Secretary, IEEE Fellow Committee, 345 E. 47th Street, New York, NY 10017 USA.

Paul P. Biringer
Chairman, Awards Committee
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IEEE FELLOW COMMITTEE ACTIVITIES

The IEEE Bylaws define the Fellow grade as one of unusual professional distinction to be conferred only by invitation of the Board of Directors upon a person of outstanding qualifications and extraordinary experience in the fields of electrical engineering, electronics, radio, allied branches of engineering or the related arts and sciences, and who has made important individual contributions to one or more of these fields. A nominee must be a Senior Member of the Institute and have been a member in any grade for at least five years prior to January 1 of the year of election.

The Fellow Committee, appointed by the Board of Directors, has the responsibility of making recommendations to the Board of Directors for nominees to be conferred the grade of Fellow.

The Fellow Committee acts as a guardian of IEEE Fellow grade standards and works carefully and faithfully to maintain these standards uniformly throughout the IEEE. In the performance of its duties, the Committee is concerned with determining whether the applicants meet the requirements of the IEEE Bylaws and it seeks assistance from many sources in adjudicating the nominations.

The Fellow Committee depends upon the nominator of a candidate to furnish all of the basic necessary information requested on the nomination form, and to point out the unique contributions of the candidate in a concise and succinct statement.

The Fellow Committee depends upon the Society evaluations of the technical contributions of the candidates, and their ranking of the candidates.

The Fellow Committee depends upon the Fellow grade references to comment on the candidate's specific achievements with which they are personally familiar. References by hearsay or third party are considered inappropriate.

The Fellow Committee will consider brief letters of endorsement from IEEE Sections, Chapters and Committees.

In the processing by the Fellow Committee, the candidates' dossiers are evaluated on a basis of eight criteria:

(1) Individual contributions as engineer, scientist, originator, technical leader, or educator;
(2) Evaluation by an IEEE Society (or more than one of them;
(3) Evidence of technical accomplishment, such as publications, patents, peer recognition, etc.;
(4) Opinions of confidential Fellow references who know of the work of the candidate personally (where possible, these should be associated with other than the candidate's own organization);
(5) Service to IEEE and its predecessors, the AIEE or IRE;
(6) Professional engineering service other than IEEE;
(7) Opinions of endorsers;
(8) Total years in the profession.

Having considered all of the valuable information supplied from these many sources, a consensus of Committee judgments is reached on the nominees to be recommended to the Board of Directors for elevation to the IEEE Fellow grade, taking into account the maximum number of recommendations permitted by the IEEE Bylaws which can be submitted annually.

7 S-MAG MEMBERS ELECTED IEEE FELLOWS

The following Magnetics Society members were elected to Fellow grade as of January 1, 1983.

Dr. William D. Doyle 2223 East Hale Mesa, Arizona 85203	For contributions to the development of advanced magnetic memories.
Mr. Eric Herz 14 Magnolia Drive Rye Town, NY 10573	For contributions to the development and management of information systems for testing aerospace vehicles and for valuable services to the Institute.
Mr. Nobutoshi Kihara 10-14 Koyama 7-chome Shinagawa-ku Tokyo, Japan 142	For contributions to magnetic video tape recording.
Prof. Toru Maruhashi Dept. of Electrical Engineering Kobe University Kobe, Japan 657	For research on the analysis, and simulation of high frequency inverters and other power electronic circuits.
Dr. Tsuneo Nakahara Sumitomo Electric Industries, Ltd. 1-3 Shimaya 1-chome Konohana-ku Osaka, Japan 554	For contribution to the development of microwave transmission lines, traffic control systems, and fiber optics.
Dr. Takashi Sugiyama Yokogawa Electric Works, Ltd. 2-9-32 Nakacho Musashino-shi Tokyo, Japan 180	For developments in precision power measurement techniques and for leadership in electronic measurement and control industries.
Dr. David A. Thompson IBM Corporation Thomas J. Watson Research Center P. O. Box 218 Yorktown Heights, NY 10598	For developing techniques for thin-film magnetic recording heads.

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21st INTERMAG CONF. PHILA., APRIL 5-8, 1983

The 21st International Magnetics Conference sponsored by the Magnetics Society of the IEEE will be held at the Franklin Plaza Hotel in Philadelphia, PA from Tuesday, April 5 to Friday, April 8, 1983. The purpose of the 21st International Magnetics Conference is to provide a forum for presentation of new developments in applied magnetics, related magnetic phenomena, and information storage techniques. In addition to the contributed papers, there will be invited papers, sessions wherein competing technologies can be assessed, tutorial sessions, and workshops for less formal discussion of timely and/or controversial topics. Special emphasis will be placed on applications oriented topics in the above as well as in the contributed papers. Topics of wide interest in recent years have included all aspects of magnetic recording, various magnetic and other memory technologies, microwave magnetics, electronic transformers, permanent magnetic materials and technologies, control and power conversion and conditioning, magnetometry and transducers, magnetic gradient separation, magnetic levitation and drives, magnet field calculations and magnetic materials - properties and processing.

Individuals who are not on the Conference mailing list may obtain Conference information by contacting either the Conference Chairman, C. D. Graham, Jr., Dept. Materials Science, Univ. of Pennsylvania, 3231 Walnut Street, Philadelphia, PA 19104, or the Publicity Chairman, F. J. Friedlaender, School of Electrical Engineering, Purdue University, W. Lafayette, IN 47907.

An exhibit of equipment, components, materials and technical information is being arranged. Firms wishing to participate are urged to contact the exhibit managers, C&M Associates, P. O. Box 68, Maple Glen, PA 19002.

29th ANNUAL MMM CONF., PITTSBURGH, NOV. 8-11, 1983

The Twenty-Ninth Annual Conference on Magnetism and Magnetic Materials will be held at the Hilton Hotel, Pittsburgh, Pennsylvania, 8-11 November 1983. The Conference annually brings together scientists and engineers interested in recent developments in all branches of fundamental and applied magnetism. Emphasis is traditionally 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 both invited and contributed papers. Selection of contributed papers is based on abstracts whose submission deadline is 5 July 1983. A Program Booklet listing titles and authors of all papers selected for presentation at the Conference will be distributed prior to the Conference. An Abstract Booklet will be available in advance of the Conference for a fee of $5. Registrants will receive this booklet at the Conference. The Conference Proceedings will be published in the Journal of Applied Physics.

Individuals who are not on the Conference mailing list may obtain Conference information and details concerning the preparation of abstracts in the prescribed format by writing Dr. Hugh C. Wolfe, American Institute of Physics, 335 East 45th Street, New York, New York 10017. The deadline for receipt of abstracts by R. W. Patterson, Hewlett Packard Labs, 1651 Page Mill Rd., Bldg. 28C, Palo Alto, CA 94304 is 5 July 1983.

This topical conference is sponsored jointly by the American Institute of Physics and the Magnetics Society of the IEEE in cooperation with the American Physical Society, the Office of Naval Research, the Metallurgical Society of the AIME and the American Society for Testing and Materials. The meeting will be open to all persons subject to a registration fee of approximately $90 (marked reduction for students).

14th ANNUAL IEEE POWER ELECTRONICS SPECIALISTS CONF., ALBUQUERQUE, JUNE 6-9, 1983

The Power Electronics Specialists Conference, held annually since 1970, brings together in a continuing forum specialists in circuits, systems, electron devices, magnetics, control theory, instrumentation and power engineering for inter-specialty discussions of new ideas, research, development, applications and the latest advances in the field of power electronics. Papers which describe original and unpublished work, both experimental and analytical, in this field, are being solicited. Please do not submit papers which have been submitted to any other conference.

Topics of interest include, but are not limited to:

- Power Electronics Applications (industrial, commercial, military, space)
- Power Conversion Techniques (DC-AC, DC-DC, AC-DC, AC-AC)
- Power Semiconductor Devices
- Power Circuit Components (magnetics, capacitors, heat transfer subsystems, etc.)
- Modeling Analysis, Simulation of Power Conditioning Circuits and Systems
- Control of Power Conditioning Systems

Prospective authors should submit five copies each of both an abstract (35 words Maximum) and a three to five page digest of their papers. These should be typed, double-spaced, on standard letter-size paper, headed by title, author(s) and affiliation(s), mailing address and telephone number. The abstract should be on a SEPARATE sheet of paper which includes the full heading. The digest should outline the work to be reported, including a statement of the goal of the work, as many results as possible, and a clear statement of the original contributions of the work to the power electronics field. Inclusion of key equations, figures, tables, and numerical results is encouraged. Papers will be judged strictly on the content of the digest.

The deadline for submission of the digest and abstract to the Program Chairman is November 15, 1982. Authors will be notified of acceptance by January 15, 1983. The final manuscript must be submitted on typed mats which will be mailed February 1, 1983. The deadline for the submission of the complete paper is March 27, 1983.

The Fourth International Pulse Power Conference is being held concurrently with the PESC at the Albuquerque Convention Center. Joint registration has been arranged, allowing attendance at either conference during the week of June 6.

Persons interested in knowing more about the Power Electronics Specialists Conference are encouraged to contact the General Chairman at the address given below.

General Chairman

Dr. William M. Portnoy
Department of Electrical Engineering
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Lubbock, Texas 79409
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Program Chairman

Dr. Richard G. Hoft
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(314) 882-3491

CRYOGENIC ENGINEERING CONF. & INT. CRYOGENIC MATERIALS CONF., COLORADO SPRINGS, AUG. 15-19, 1983

"CRYOGENICS - THE DEVELOPMENT OF A NEW FRONTIER"

August 15-19, 1983
Four Seasons Motor Inn
Colorado Springs, CO 80302 U.S.A.

- Deadline for contributions of papers to CEC and ICMC March 1, 1983.
- Cryo Expo 1983 a technical products exhibit will parallel the Conference August 16-17, 1983.

Information: Linda L. Wise, Centennial Conferences, 1215 Mapleton, Boulder, CO 80302 U.S.A. (303) 449-8320.

NATO ADVANCED STUDY INSTITUTE: MAGNETO-STRUCTURAL CORRELATIONS IN EXCHANGE COUPLED SYSTEMS, CASTIGLIONE DELLA PESCAIA, JUNE 18-30, 1983

Date: June 18-30, 1983

Location: Castiglione della Pescaia, Italy

Organizing Committee:

Roger D. Willett, Washington State University, Pullman, Washington
Dante Gatteschi, University of Florence, Florence, Italy
Olivier Kahn, Universite de Paris, Sud, Orsay, France

Topics to include theoretical foundations, experimental techniques, and application of magneto-structural correlations.

For further information contact:

(North America) Roger D. Willett
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Pullman, WA 99164-4620 USA

(Europe) Dante Gatteschi
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e Inorganiza
Via G Capponi 7
50121 Firenze ITALY

RADAR COURSE, SAN JOSE, APRIL 18, 1983

Date: Monday, April 18, 1983

Topics: Radar fundamentals; phased arrays (Cobra Dane, Pave Paws); signal processing (what is: pulse compression, SAW, CCD, μP, μC, FFT; impact of VHSIC/VL&I; survey of 28 digital signal processors; components (solid state: discrete and monolithic, UHF to X-band; tubes, gyrotron); synthetic aperture radar (strip and spotlight); tracking (mystery taken out of Kalman and g-h filters); detection (simple cookbook procedures).

Sponsor: Boston IEEE/AESS

Lecturer: Dr. Eli Brookner, Raytheon Comp., Wayland, MA 01778; (617) 358-2721, X 2366.

Site: Hyatt San Jose (just off Route 101 and close to San Jose Airport), San Jose, CA.

Fee: $125 (IEEE member), $140 (non-members), add $15 for late registration after April 8. Includes 432-page, 8.5" x 11" hard-cover $45 course book Radar Technology, supplemental notes of over 700 Vugraphs, reprints of 3 papers list priced at $30, lunch, dinner and 3 coffee breaks.

Contact: Dr. Eli Brookner, Raytheon Comp., Wayland, MA 01778; Tel. (617) 358-2721, X 2366.

CONFERENCE CALENDAR

21st INTERMAG Conf., Phila., PA, April 5-8, 1983 (see announcement).

Radar Tech. Course, San Jose, April 18, 1983 (see announcement).

14th Annual IEEE Power Electronics Specialists Conf., Albuquerque, June 6-9, 1983 (see announcement).

NATO Advanced Study Institute: Magneto-Structural Correlations in Exchange Coupled Systems, Castiglione della Pescaia, Italy, June 18-30, 1983 (see announcement).

3rd Int. Conf. On Magnetic Fluids, Univ. College of North Wales, Bangor, June 29-30, 1983 (see announcement).

Cryogenic Engineering Conf. & Int. Cryogenic Materials Conf., Colorado Springs, Aug. 18-19, 1983 (see announcement).

8th Int. Conf. on Magnet Technology, 5-9 Sept., 1983, Grenoble.

INTELEC '83, Tokyo, Oct. 18-21, 1983.

29th Annual MMM Conf., Pittsburgh, Nov. 8-11, 1983 (see announcement).

JOIN THE IEEE MAGNETICS SOCIETY TODAY

Membership in the IEEE Magnetics Society entitles you to receive, for the low Society fee, the IEEE Transactions on Magnetics, and the quarterly Magnetics Society Newsletter. You are kept informed of latest developments, meetings, and conferences in your areas of interest, and are entitled to purchase informative conference records and other helpful educational aids at greatly reduced rates for members.

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Society Fee: $7.00 for IEEE members of all grades except Student.
Student Fee: $3.00. These rates apply to payments received September 1 through February. On payments received March 1 through August 31, remit one-half of the above rates. (Payments received September 1 through December 31 apply through December 31 of the following year.)

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Send to: IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854.

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