



IEEE ULTRASONICS, FERROELECTRICS, AND FREQUENCY CONTROL SOCIETY NEWSLETTER



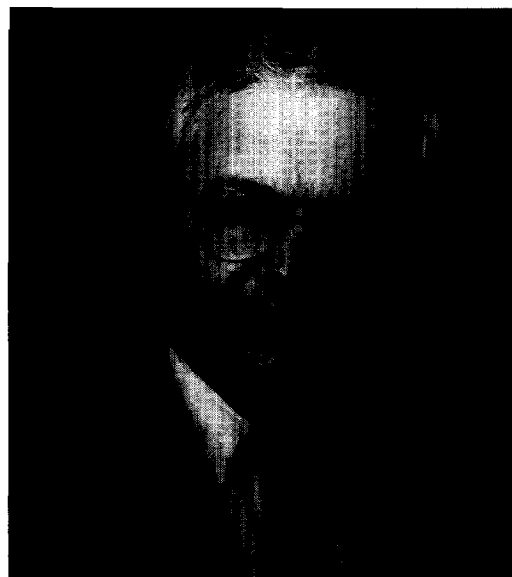
Number 15: April 1993

Editor: Fred S. Hickernell

Awards



Art Ballato – UFFC Society Achievement Award



Wally Smith – Ferroelectrics Recognition Award

47th IEEE International Frequency Control Symposium

June 2-4, 1993

Salt Lake City, Utah

1993 IEEE International Ultrasonics Symposium

October 31-November 3, 1993

Baltimore, Maryland

UFFC-S Distinguished Lecturer Eric L. Adler

Eric L. Adler (M'59-SM'83-F'-89) was born in Alexandria, Egypt, on December 10, 1930. After finishing high-school in Alexandria he went to England and received the B.Sc. (Electrical Engineering) degree in 1955 from the University of London, London, England. He worked for STC (IT&T) in England as a research engineer before moving to Canada where he received the M.A.Sc. degree from the University of Toronto, Toronto, ON, Canada, and the Ph.D. degree from McGill University, Montreal, PQ, Canada, all in electrical engineering, in 1959, and 1966, respectively.

Eric has been with McGill University since 1959 and is currently a Professor of Electrical Engineering. His primary research interests are: SAW and bulk acoustic propagation in anisotropic piezoelectric materials, thin-film transducers, and modeling surface-wave devices. In 1979/1980 his sabbatical leave was spent at the Lincoln Laboratory of MIT and in 1986/1987 a sabbatical was spent at the University of California at San Diego. While in San Diego Eric was a consultant with the Naval Ocean Systems Center.

Eric is a Fellow of the IEEE, has been a member of the Ultrasonics Symposium Technical Program Committee for a number of years and was elected to serve on the UFFC-Society Administrative Committee in 1992. He is a regular reviewer for the UFFC transactions, JASA, and Journal of Applied Physics. He is a member of Sigma Xi and a member of the Order of Engineers of Quebec.



**Eric Adler
Distinguished Lecturer**

Surface Acoustic Wave Devices Fundamentals, Current Status, and Future Trends

**Eric L. Adler
McGill University
Montreal, PQ, Canada H3A 2A7**

Surface-acoustic-wave (SAW) technology has made important advances since the early eighties and the increased use of SAW devices in various signal-processing applications is significant. For example, the common TV receiver contains SAW filters. SAW devices are particularly suited for a variety of analog and digital communications systems applications. They are found in digital communication links of satellites, microwave digital radio, in mobile phones, and in other personal communications systems. Two of the things which make these devices most useful is their miniature size and the fact that most SAW devices do not need any post-fabrication adjustments.

The lecture begins with a review of the fundamentals of surface wave propagation leading to a discussion of the development of accurate models for the analysis and design of SAW devices. The present and future signal-processing capabilities of SAW technology and the recent innovations which have made these devices successful will be summarized.

The many unique advantages offered by SAW devices are illustrated by describing recently documented successful implementations of SAW technology. Examples for discussion will be selected from the following applications: FIR bandpass filters, resonator filters, comb filters, matched-filters for spread-spectrum communications, remote access systems, programmable matched filters, pulse-compression systems, low-loss UHF filters, chirped filters and transform processors, oscillators and frequency synthesizers.

The lecture highlights areas and applications where SAW devices have played an important role. These include television and cablevision filters, digital radio, spread-spectrum and digital communications, and, more recently, in UHF mobile and personal communications.

Schedule the UFFC-S Distinguished Lecturer Now!

The Administrative Committee of the Ultrasonics, Ferroelectrics and Frequency Control Society has announced Professor Eric Adler as the UFFC-S Distinguished Lecturer for 1993-1994. Professor Adler will be available to speak before UFFC-S chapters, graduate and undergraduate student university seminars, IEEE groups, and other appropriate scientific and engineering associations. His topic is:

Surface Acoustic Wave Devices Fundamentals, Current Status, and Future Trends

The establishing of the Distinguished Lecturer program and providing a stipend to cover travel expense by the UFFC-S is indication of the interest of the AdCom in supporting the activities of groups interested in Ultrasonics, Ferroelectrics, and Frequency Control. In addition to present UFFC-S Chapters, groups which are considering chapter formation, university groups, and other IEEE groups which have an interest are encouraged to schedule the distinguished lecturer at as early a date as practical so that he can organize his talks and schedules to best fit the groups' needs. Please feel free to Xerox or extract from the abstract and biographical information given on the opposite page.

Professor Adler may be reached by letter at:

McGill University
3480 University Street
Montreal, PQ H3A 2A7
Canada

or by any of the following means:

Telephone: 514 398 7114
Fax: 514 398 4470
Telex: 05 268 510
E-mail: adler@rssy.lan.mcgill.ca or e.adler@ieee.org

Please make arrangements with Professor Adler early so he will be able to plan his schedule well in advance and conserve on transportation costs and time.

President's Message

The Ultrasonics, Ferroelectrics, and Frequency Control Society continued to thrive. This year we have two meetings scheduled, the Frequency Control Meeting in Salt Lake City in early June and the Ultrasonics Symposium in Baltimore in early November. Last year we had three highly successful meetings: the first meeting was the Frequency Control Meeting in Hershey, PA; the next meeting was the Ferroelectrics Meeting in Greenville, SC; and the Ultrasonics Meeting was in Tucson, AZ. The success of our meetings demonstrate that the Ultrasonics, Ferroelectrics and Frequency Control Society is providing a useful service to its members. In addition, since many of the attendees at these meetings were not members of UFFC or of IEEE, we provide a useful service to scientists and engineers throughout the technical community. The *Ultrasonics, Ferroelectrics, and Frequency Control Transactions*, edited by Bill O'Brien, had a successful year, publishing 790 pages. There is currently no backlog and papers can be published as fast in this journal, perhaps faster, than any other high-quality technical journal available. I strongly encourage all attendees at the meetings sponsored by this Society to submit their papers to the *UFFC Transactions*.

As we look to the future, we see that there may be some new areas of technical interest which may attract new members

to join the UFFC. For instance, we will, in the near future, publish a special issue on applications of ultrasonics in association with the Ultrasonic Industry Association. We are also thinking of sponsoring meetings in the field of smart structures. Perhaps we should think of including a field such as quantitative nondestructive evaluation. I would be very interested in hearing responses from the members as to these or other new areas which might be included in the fields of interests for our Society. Another area of intense interest is in the field of CD-ROM publication. We are looking into the possibilities of publishing the Proceedings of the Ultrasonics Symposium on CD-ROM and would be interested in any comments from the membership.

We are also interested in videotaping tutorials given at the various meetings and providing them for sale to the membership.

As with any Society, we must continue to look for developing technology and respond to such developments by including the associated individuals in our meetings and publications. Please help me do so by contacting me with any ideas you might have concerning these issues.

I look forward to another great year and hope you as members do too.

James F. Greenleaf

Newly Elected Administrative Committee Members



GERALD V. BLESSING

Gerald V. Blessing was born in Cincinnati, Ohio. He received the BS and MS degrees in physics respectively from Xavier University and the College of William and Mary. After spending two years as an Instructor of Physics at Randolph-Macon College in Virginia, he completed his doctoral work at the Catholic University of America in 1973. His thesis topic was on the ultrasonic study of high purity niobium in its normal and superconducting states.

He began his career in ultrasonics with the Naval Surface Warfare Center in Dahlgren, Virginia. Applications work included the development of a nondestructive technique for the inspection of cast explosives, while research work involved ultrasonic measurements of the elastic properties of highly magnetostrictive compounds and metal matrix composites. Since 1980 he has been with the Ultrasonic Standards Group at the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland. At NIST, where he is presently group leader in the Manufacturing Engineering Laboratory, his work has concentrated on improved ultrasonic calibrations, ultrasonic measurements of intrinsic and extrinsic material properties, and sensor developments.

He has been an active member in the IEEE for a number of years, serving as chair of the local Baltimore-Washington-Virginia chapter, on the technical program committees for the annual International Ultrasonic Symposia, and as general chair of the 1995 Symposium planned for Seattle, Washington. He is also active with ASTM, and with the education committee of the NIST chapter of Sigma Xi, the Scientific Research Society.

He met his wife, Mary Lou, at the College of William and Mary. She is now a computer scientist in the Office of the Associate Director for Computing and Applied Mathematics Laboratory at NIST. They have two daughters, one employed in a day care center, and the other completing her BS in chemistry at the University of Richmond.



TADASHI SHIOSAKI

Associate Professor at the EECS of the University of California, Berkeley, from 1978 to 1979.

He has been working on piezoelectric, pyroelectric, ferroelectric and acousto-, electro-, and nonlinear optic materials and their applications. He was one of the invited speakers at the 1978 and 1990 IEEE Ultrasonics Symposium, 1979, 1986, 1988 (ECAPD) and 1990 ISAF (International Symposium on Applications of Ferroelectrics), ISIF 3 (1991), and several other international meetings.

Dr. Shiosaki is a member of nine major academic societies and institutes related to his research activities in Japan and the USA, where he has been a member of the IEEE since 1979.

He is one of the associate editors of the 'Integrated Ferroelectrics' publish-

ed by the Gordon and Breach Science Publishers, the current chairman of the Research Committee on Dielectrics in Japan Technology Transfer Association and the current executive committee chairman of FMA (Japan domestic meeting on Ferroelectric Materials and their Applications).

Tadashi's wife Hiroko works at the office of the Osaka District Court. She receives foreign students warmly by her cooking and conversation in both mixing Japanese and foreign essences. Rieko, one of their two daughter is a student of the Department of Architecture of Kanazawa Institute of Technology, and wants to join a graduate school in the USA. Their younger daughter Miwako is 174cm tall, very tall as a Japanese girl. She attends Heian women's junior college and wants to stay near our home.

Tadashi Shiosaki (M'79) was born in Osaka City, Japan, on March 13, 1944. He received the B., M., and Dr. degrees in Electronics from Kyoto University, Kyoto, Japan, in 1966, 1968, and 1973, respectively. In 1968, he joined the Faculty of Engineering, Kyoto University, where he was a Research Associate from 1968 to 1974. Since 1974 he has been an Associate Professor at the Department of Electronics, Kyoto University. He was a visiting

THOMAS W. GRUDKOWSKI

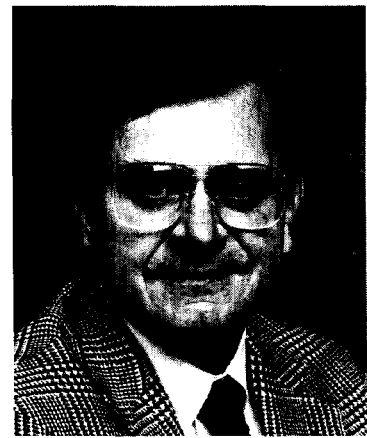
Thomas W. Grudkowski (M'75-SM'91) received his B.S.E.E. from the University of Pennsylvania in 1968 and his M.S. in engineering from UCLA in 1970 while working part time as a Hughes Masters Workstudy Fellow. His Ph.D. thesis, "Surface Acoustic Waves and Electrons in GaAs," was carried out in the Ginzton laboratory, Stanford University where he received his Ph.D. in electrical engineering in 1974.

Dr. Grudkowski has been active in the IEEE Ultrasonics Symposium committee since 1978 as a member of the Technical Program and Symposium Organizing Committees. He has authored or co-authored numerous invited and contributed papers at the IEEE Ultrasonics Symposium in areas of SAW programmable signal processors, monolithic GaAs SAW oscillators and tapped delay lines, piezoelectric thin film development, integrated thin film bulk acoustic wave resonators and filters on silicon, GaAs heterojunction acoustic charge transport devices, GaAs acousto-optic devices and spatial light modulators.

His current research interests include the above areas and also high temperature superconducting materials and applications for optical detectors and frictionless magnetically levitated bearings.

He is currently manager of the semiconductor and superconductor research activities at the United Technologies Research Center in East Hartford, CT and has been with UTRC since 1974 in research and management capacities. His responsibilities include the overall technical and administrative direction of programs involving semiconductor device development, and surface acoustic wave device applications, high temperature superconductivity and GaAs heterostructure device research for microwave and optical signal processing applications.

Dr. Grudkowski has published/presented over 50 invited or contributed papers and has 35 patents granted or pending in areas of microwave acoustics, semiconductor and superconductor technologies. He is an Editorial Consultant for the American Institute of Physics, Encyclopedia of Applied Phys-



ics since 1989 and served on the industrial advisory board for the University of Massachusetts. He is a member of Tau Beta Pi, Eta Kappa Nu, Sigma Xi, the American Institute of Physics, the American Physical Society, the Materials Research Society, Society for Automotive Engineers, SPIE and a senior member of IEEE. He has received UTC awards for his contributions for the advancement of science and technology for GaAs device research and superconductivity research in 1982 and 1987, respectively.

He is a proud father of a sophomore at the University of Pennsylvania and of a blossoming high school musician who is still young enough to go skiing with him. Other interests include travel, music, reading and fishing.

STUART FOSTER

Stuart Foster was born in Montreal, PQ, Canada on July 29, 1951. He received the B.A.Sc. degree in Engineering Physics from the University of British Columbia, Vancouver, BC, Canada, in 1974, and M.Sc. and Ph.D. degrees in Medical Biophysics from the University of Toronto in 1977 and 1980, respectively.

From 1980 to 1991 he was a Senior Scientist with The Ontario Cancer Institute in Toronto, Canada. He is presently a Senior Scientist with the Sunnybrook Health Science Centre, a Senior Research Scholar of the National Cancer Institute of Canada, and professor of Medical Biophysics at the University of Toronto. He has been involved with the

development of conical and annular array transducers, ultrasound biomicroscopy, tissue characterization, and more recently, two-dimensional array technology and intravascular imaging. He has twice won the Ultrasound in Medicine and Biology Prize.

In addition to his recent election to the Administrative Committee of the IEEE Ultrasonics, Ferroelectrics and Frequency Control Society, he is on the editorial boards of *Ultrasonic Imaging* and *Ultrasound in Medicine and Biology*.

Stuart's wife Diane is a Financial mogul at the Royal Bank of Canada, and they have two children. Brett is 8 years old and knows more about computers



than his mother and father combined, while Danusha who is 11 years old, has energy and talent that are apparently unlimited. Stuart and his family enjoy all the s-sports (skating, skiing, swimming, sailing etc.) and can frequently be found in the winter and summer enjoying these pursuits at their cottage on Moore Lake near Minden, Ontario.

47TH ANNUAL IEEE INTERNATIONAL SYMPOSIUM ON FREQUENCY CONTROL

The 47th Annual IEEE International Symposium on Frequency Control is sponsored by the IEEE UFFC Society, with the participation of the personnel of the U. S. Army Electronics Technology & Devices Laboratory, Fort Monmouth, NJ. The symposium will be held on June 2, 3, and 4 at the Marriott Hotel in Salt Lake City, Utah. The symposium committee leadership includes:

General Chairman:	Gary Johnson Sawyer Research Products Inc.
Technical Program Chairman:	Jack Kusters Hewlett-Packard Company
Local Arrangements Chairman:	Errol EerNisse Quartztronics Inc.

The Annual Symposium on Frequency Control has served as the leading technical conference addressing all aspects of frequency control and precision timekeeping. Recent progress in research, development, and applications will be represented by the following topics:

- Fundamental Properties of Piezoelectric Crystals
- Theory and Design of Piezoelectric Resonators
- Resonator Processing Techniques
- Filters
- Surface Acoustic Wave Devices
- Quartz Crystal Oscillators
- Microwave and Millimeter Wave Oscillators
- Synthesizers and Other Frequency Control Circuitry
- Atomic and Molecular Frequency Standards
- Noise Phenomena and Aging
- Frequency and Time Coordination and Distribution
- Sensors and Transducers
- Applications of Frequency Control
- Measurement and Specifications

For any additional information on the 47th Annual IEEE International Symposium on Frequency Control contact Mr. Michael Mirarchi or Ms. Barbara McGivney, Synergistic Management Inc., 3100 Route 138, Wall Township, NJ 07719, (908) 280-2024.

Frequency Control Symposium Committee



Gary Johnson
General Chairman

GARY R. JOHNSON was born in Gary, IN in 1949. He received the BSEE degree from Purdue University in 1971, specializing in materials. He interrupted his professional career in 1974, earning an MS degree in 1975 also from Purdue University.

Mr. Johnson began his career with CTS Corporation in Elkhart, IN, a manufacturer of electronic, including quartz, components. In 1975 he became product manager for crystal filters, leading a team responsible for engineering and manufacturing. In 1979 he joined Cleveland, OH based Sawyer Research Products, Inc., the largest producer of cultured quartz, as Sales Manager. His first efforts were in international marketing. This required more than fifty visits to Asia and twenty to Europe, especially Japan, Korea, Republic of China, People's Republic of China, Germany, France and Russia. This effort was the beginning of a continuing interest in international relations.

He was named Director of Marketing and Technology in 1981 and in 1983 worked to organize the purchase of Sawyer Research from Brush Wellman, Inc. He was elected Vice President in 1983, becoming President and Chief Operating Officer in 1990 and Chief Executive Officer in 1993.

Mr. Johnson's research contributions are in the areas of solid phase inclusions and dislocations in cultured quartz. Current technical research interests to improve the capability of quartz material include the application of statistically designed experiment and advanced computer control techniques to quartz growth.

He and his wife Brenda Ashley live in Cleveland Heights. They enjoy travel, cooking and music. Johnson plays golf and squash as time permits. Though less frequently now, he enjoys mountaineering, having made several winter climbs in Rocky Mountain National Park and warmer weather climbs around the Midwest.

JOHN A. KUSTERS (S'61-M'64-SM'87) was born in Racine, WI in 1937. He received the B.S.E.E. degree from Loyola University, Los Angeles, in 1964. From 1964 to 1968 he attended Stanford University working on microwave acoustic delay lines, receiving the M.S.E.E. degree in 1965. From 1965 to 1986 he was employed



John A. Kusters
Technical Program

by Hewlett-Packard developing cesium frequency standards, acoustooptic devices, and quartz resonators. From 1986 to 1989 he was employed by the Efratom Division of Ball Corporation developing quartz resonators and oscillators. In 1989, he returned to the Santa Clara Division of the Hewlett-Packard Company where he is currently the R&D Manager for Precision Time & Frequency products.

Mr. Kusters is a member of Tau Beta Pi, Sigma Xi, and Alpha Sigma Nu. Mr. Kusters is also the current Chairperson of the Technical Program Committee of the IEEE Frequency Control Symposium and has been active in various IEEE and EIA Standards Committees.

Mr. Kusters is married, has four sons, and spends much of his spare time playing with computers, woodworking, and assisting his wife in the travel agency that they own.

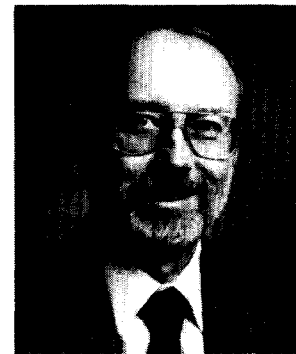
ERROL P. EERNISSE was born in Rapid City, SD, in 1940. He received the B.S.E.E. degree from South Dakota State University in 1962, the M.S.E.E. and Ph.D. degrees from Purdue University in 1963 and 1965, and the M.Ind.Adm. degree from the University of New Mexico in 1974.

He was at Sandia National Laboratories from 1965 to 1979, where he carried out experimental and theoretical research on ferroelectric, diffuse ferroelectric, and piezoelectric devices. From 1968 to 1979 he supervised various research divisions involved in radiation damage effects of semiconductor devices, microwave semiconductor devices, and ion implantation physics of semiconductors, metals, and insulators.

In 1979 he helped found Quartex, Inc. and Quartztronics, Inc., as research and development companies working on quartz resonators as sensors. Quartztronics, Inc. presently sells products utilizing quartz resonators as pressure and temperature sensors. He is president of both companies.

Dr. EerNisse is a Fellow of the IEEE, a Fellow of the American Physical Society, a Senior Member of the Instrument Society of America, and a member of the National Society of Professional Engineers. He received the W.G. Cady Award in 1983 from the 37th Annual Symposium on Frequency Control, a meeting cosponsored by the IEEE-UFFC Society, and the Distinguished Engineer Award from South Dakota State University, 1985.

Errol's wife Claudia is an Assistant Professor at the University of Utah in the Department of Communication Disorders. They enjoy golf, traveling, and skiing together. They have two married daughters and one teenage son.



Errol EerNisse
Local Arrangements

Frequency Control Technical Program Committee Meeting



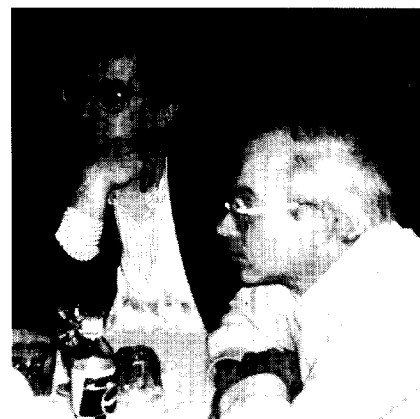
Marvin Frerking (l), Mike Driscoll (r)



Bob Smythe (l), Jack Kusters (r)



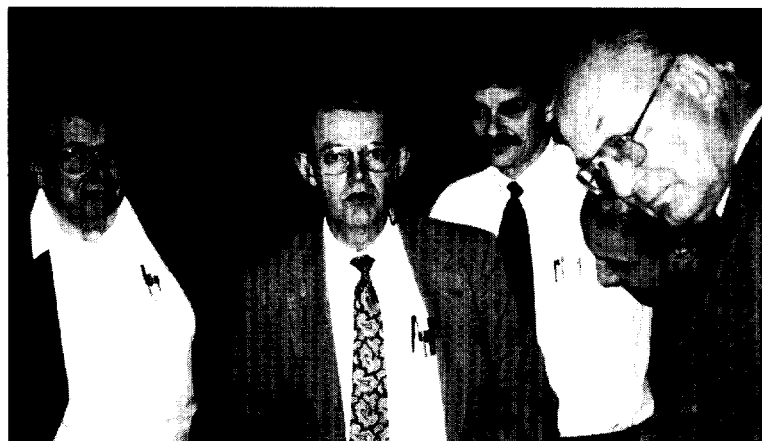
Some of us really work — others pretend.



Gary Johnson (l), General Chair 1993
FCS, Tom Parker (r)



John Vig (l), Tadashi Shiosaki (r)



We're listening . . . Which paper did you say??



IEEE '93

ULTRASONICS SYMPOSIUM

BALTIMORE, MD



October 31 - November 3, 1993

Sponsored by The Ultrasonics, Ferroelectrics, and Frequency Control Society

Call for Papers

Deadline for Abstract Submission: Tuesday, June 1, 1993

Papers are solicited describing original work in the field of Ultrasonics. Authors of Contributed and Invited Papers are required to submit an abstract. The abstract original (unfolded) and two (2) copies should be provided. **The deadline for receipt of abstracts is Tuesday, June 1, 1993.**

Each abstract will receive careful review and evaluation. A good abstract must clearly explain the intent and content of the paper. Evaluation criteria will include, but not necessarily be limited to: **CONTRIBUTION TO THE STATE-OF-THE-ART, ORIGINALITY** of the work, **CLARITY OF THE ABSTRACT** in conveying salient technical detail and purpose/application for the work, and **POTENTIAL OVERALL INTEREST** to the ultrasonics community. Prospective authors should be as specific as possible, and include quantitative information or data whenever possible. **Authors must refrain from presenting vague generalities** in their abstracts.

Papers concerned with a mechanical wave phenomena, including but not limited to the Subject Classifications listed below, will be considered.

ABS Array & Beam Steering	MI Medical Imaging	SMS Smart Materials & Structures
ACE Acousto-Electric Effects & Devices	MPC Medical Probes & Catheters	SMT SAW Manufacturing Technology
ACT Acoustic Charge Transport	MSP Medical Ultrasonics Signal Processing	SP Speckle
AE Acoustic Emission	MSW Magnetostatic Waves & Devices	SPN SAW Propagation
AM Acoustic Microscopy	NDE Nondestructive Evaluation	SRD SAW Resonator & Delay Line Oscillators
AO Acousto-Optic Effects & Devices	NSP NDE Signal Processing	SSP SAW Signal Processing
AOS Acousto-Optic Signal Processing	PA Physical Acoustics	SST SAW Substrates & Thin-Film Materials
BB Bio-Effects & Bio-Physics	PAS Photo-Acoustics	STD SAW Thin Film Devices
BW Bulk Wave Effects & Devices	PF Piezoelectric & Ferroelectric Materials	SWC SAW Wireless Communication
DMC Defect & Material Characterization	QLR Quantitative Laser Ultrasonics	TC Tissue Characterization
ED Exosimetry/Dosimetry	SCA SAW Commercial Applications	TFB Thin Films (Bulk & Optical Devices)
FM Flow Measurement	SCE SAW Consumer Electronics	TH Therapeutics
GA Geophysical Acoustics	SEN Sensors	TM Tomography
HT Hyperthermia	SEP Sonically Enhanced Processing	TMC Tissue Motion & Compliance
HTS High Temperature Superconductors	SFT SAW Filters & Transducers	UA Underwater Acoustics
IPM Intelligent Process Monitoring	SIO SAW Integrated-Optic Effects & Devices	UAM Ultrasonic Actuators & Motors
IS Inverse Scattering	SMA SAW Military & Aerospace Applications	UR Ultrasonic Resonance
IU Industrial Ultrasonics		USG Ultrasonics in Surgery

Carefully follow the ABSTRACT PREPARATION INSTRUCTIONS on the reverse side of this call and send to:
Dr. Susan C. Schneider, c/o LRW Associates, 1218 Balfour Drive, Arnold, MD 21012-2150, U.S.A.

Abstracts will be considered for either poster and/or oral presentation. Poster Sessions provide an alternative format for paper presentation which allows for greater flexibility and expanded audience interaction.

STUDENT TRAVEL SUPPORT - Limited funds are available to support student attendance at the 1993 IEEE Ultrasonics Symposium. Awards will be made on a competitive basis. Further information and application forms can be obtained from Prof. Gerald W. Farnell, Department of Electrical Engineering, McGill University, McConnell Engineering Building, 3480 University Street, Montreal, Quebec H3A 2A7, CANADA (FAX No. (514) 398-4470). **The deadline for applications for student travel support is August 1, 1993.**

GENERAL CHAIR	TECHNICAL CHAIR	FINANCE	PUBLICITY	SHORT COURSES	PROCEEDINGS	CONFERENCE MANAGEMENT
Harry L. Salvo, Jr. Westinghouse Electric Corp. Electronic System Group P. O. Box 1521 - MS 3K13 Baltimore, MD 21203 (410) 765-4290 (Office) (410) 765-7370 (FAX)	Susan C. Schneider Marquette University Department of Electrical & Computer Engineering 1515 West Wisconsin Ave Milwaukee, WI 53233 (414) 288-7178 (Office) (414) 288-7082 (FAX)	Narendra K. Batra Naval Research Laboratory Code 6385 4555 Overlook Avenue, SW Washington, DC 20375 (202) 767-3505 (Office) (202) 404-7176 (FAX)	Keun-Jenn Sun College of William & Mary c/o NASA MS-231 Langley Research Center Hampton, VA 23681 (804) 864-4974 (Office) (804) 864-4971 (FAX)	Janpu Hou Allied Signal, Inc. Electronic Materials & Devices Laboratory Post Office Box 1021R Morristown, NJ 07962 (201) 455-3439 (Office) (201) 455-3008 (FAX)	Bruce R. McAvoy Westinghouse Science & Technology Center 1310 Beulah Road Pittsburgh, PA 15235 (412) 256-1470 (Office) (412) 256-1348 (FAX)	LRW Associates 1218 Balfour Drive Arnold, MD 21012-2150 (410) 647-1591 (Office) (410) 647-5136 (FAX)

ABSTRACT PREPARATION INSTRUCTIONS

Leave this corner area blank
for eventual insertion of an
abstract number

Subject Classification: PA

Insert the one most appropriate
Subject Classification (see reverse side)

SOUND PROPAGATION IN A VACUUM*

J. J. Johnson and S. S. Smith, Super Ultrasonics Research Institute, Sciencetown, Wyoming 99999

This sample abstract shows the appropriate abstract preparation format for the 1993 IEEE Ultrasonics Symposium. Authors of invited and contributed papers must prepare their abstracts for direct reproduction by offset. The material will appear as the author prepares it. Abstracts must be typed on plain bond paper, single spaced with type no smaller than elite. The typewritten material must fit into a 18 cm x 14 cm rectangle. The title must be in all capitals, underlined and centered. Leave one blank line under the title and type the authors' names, all in capital letters but not underlined, starting at the left-hand edge of the rectangle. The affiliation, city, state, and mail (zip) code of the author(s) should be typed in the style shown in this example. For abstracts from outside the United States, include the name of the country. Leave one blank line after the address and begin the body of the abstract. If desired, support acknowledgments may be added at the end of the abstract as shown in this example.

* This work was supported by the Agency for Impossible Research.

14 cm

NOTE: This diagram is not drawn to scale. Please refer to the dimensions given for the actual size of the abstract area

18 cm

On the submitted original and copies, these outlines should appear as light blue or not at all.

J.J. Johnson
Building 111
Super Ultrasonic Research Institute
Sciencetown, WY 99999
tel: (123) 456-7890

3.0 cm

10 cm

This 3.0 cm x 10 cm space should contain the name, complete mailing address, and office/FAX telephone numbers of the author to whom all further correspondence should be sent.

Please help us evaluate your abstract and plan for the symposium by providing this information

I prefer to present my paper in the poster session I prefer to present my paper in an oral session I do not have a preference one way or another I will require a VHS VCR/Monitor I am an IEEE Member # I am an UFFC-S Member I plan to bring my spouse or a guest	} } } } } } }	} } } } } } }	yes yes yes yes yes yes yes	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	no no no no no no no	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
--	---------------------------------	---------------------------------	---	--	--	--

You must type one of these three sentences at the bottom of the abstract sheet to indicate your preference

You must type your answer to each of these four questions at the bottom of the abstract sheet.

Overheard at the First Technical Program Committee Meeting for the 1993 IEEE International Ultrasonics Symposium



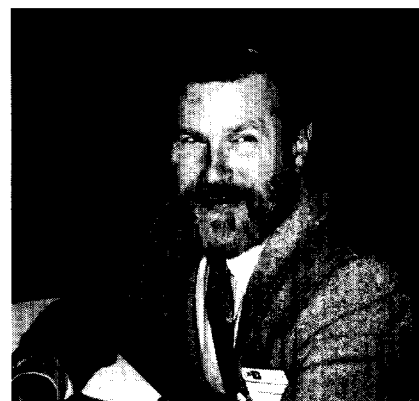
**"Which one of these slides makes
Baltimore look magnificent?" —
Harry Salvo**



**"Harry, we're all ears, convince us to go to Baltimore in
November," — Breazeale and Farnell**



**"Wait a minute, I'm the Technical Chair,
don't I get a vote?" — Susan Schneider**



**"Eric, it looks like you know
something we don't."**



**"Susan, are you sure you have my inputs?" —
Adrian Venema**



"We don't reveal anything to you TI guys." — Bob Potter

IEEE '93 ULTRASONICS SYMPOSIUM BALTIMORE, MD

Baltimore, Maryland will host the 1993 IEEE International Ultrasonics Symposium. Baltimore, birthplace of the Star Spangled Banner, is one of the greatest cities of America. Founded in 1729 it is today our nation's eighth largest city with a population of over two million in the greater metropolitan area. It is a fantastic convention trade show marketplace by virtue of the fact that over 23 million people live within 200 miles. Baltimore is one of the world's most famous seaports and today it thrives with activity.

In the midst of downtown, spectacular rebirth has occurred with new office towers virtually jumping in every direction. The picturesque Inner Harbor has become the focal point of the revitalization. Sailing vessels and other pleasure craft leisurely move about in the shadows of the skyscrapers. The waters of the Chesapeake Bay gently lap against parks and promenades which lead to smart boutiques, outdoor cafes, theaters, and treelined plazas. Fountains spring forth amid steel and glass towers of prize winning new architecture which blends with the masterpieces of an earlier day.

Perhaps Baltimore's most unique characteristic is its community of more than one hundred neighborhoods, each with its own identity, revealing a strong pride in ethnic origins. From the great restaurants of Little Italy to the charming shops and bistros of the Mount Vernon Square area, all visitors will be intrigued with the neighborhoods that once housed the legendary Edgar Allan Poe, H.L. Menken, F. Scott Fitzgerald and Babe Ruth, just to mention a few.

The 1993 IEEE International Ultrasonics Symposium will be held at the Hyatt Regency Baltimore October 31 to November 3, 1993. An integral part of the revitalized Inner Harbor area, the Hyatt Regency Baltimore, with its gleaming contemporary architecture, reflects the vibrancy and excitement of the city's downtown center of business and commerce. Over-the-street walkways connect the hotel to the Baltimore Convention Center and Harborplace, a glass-enclosed European-style marketplace.

For information on the Symposium contact:

Dr. Harry L. Salvo, Jr.
Westinghouse Electric Corp.
Electronic Systems Group
P.O. Box 1521 - MS 3K13
Baltimore, MD 21203
(410) 765-4290

or

Dr. Susan C. Schneider
Marquette University
Department of Electrical & Computer Engineering
1515 West Wisconsin Ave.
Milwaukee, WI 53233
(414) 288-7178



Ferroelectrics Recognition Award

The 1992 Ferroelectrics Recognition Award was presented to:

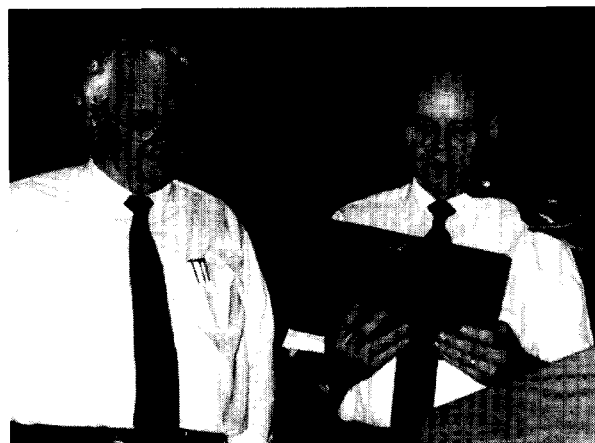
Dr. Wallace A. Smith
Office of Naval Research
Arlington, VA

The plaque was inscribed with the citation:

"For major contributions to the understanding of piezoelectric ceramic/polymer composites and effective continuing advocacy of ferroelectric programs."

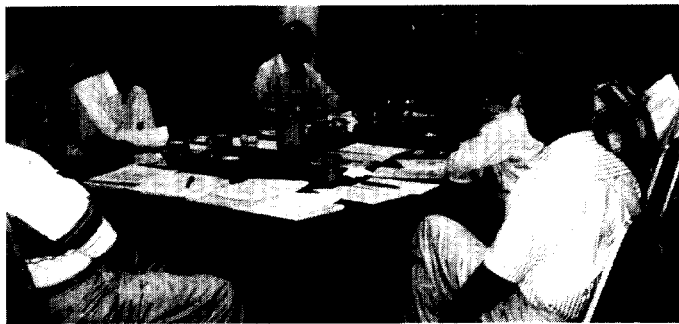
Prof. Eric Cross presented the award at the symposium banquet of the Eighth International Symposium on the Applications of Ferroelectrics (ISAF), on September 1, in Greenville, South Carolina. The purpose of the award is to recognize an individual who has shown meritorious achievement in the field of Ferroelectricity or related sciences.

Eric described Wally's contributions to the field of piezoelectric materials through scientific innovations and support of materials research at numerous laboratories. The best known of Wally's developments is the 1-3 piezoelectric composite which combines piezoelectric ceramic rods in a softer polymer matrix to achieve performance superior to the ceramic by itself. Wally has had wide ranging influence on the field through his interaction with a broad cross-section of researchers in the field and his ability to cross fertilize ideas and techniques. Eric noted Wally's penchant for finding humor in almost every situation and aspect of his work.



Dr. Wallace Smith, Ferroelectrics Recognition Award Winner, with Gene Haertling. "Let's see - it says Wally Smith on here somewhere, I think!"

Scenes from ISAF '92



The Ferroelectrics Committee at work.



Some of the boys.

The fearless leader,
Eric Cross, in one of his
more jovial moods.



Posters galore

Eighth International Symposium on the Applications of Ferroelectrics

August 31 - September 2, 1992 ■ Greenville, South Carolina

The Eighth International Symposium on the Applications of Ferroelectrics was held in Greenville, South Carolina, on August 30th to September 2nd, 1992. It was attended by approximately 260 scientists and engineers who presented nearly 200 oral and poster papers.

On each day, the technical sessions were led by plenary talks. The three plenary presentations covered ferroelectric materials which are currently moving into commercial exploitation, or have strong potential to do so. These were:

- A review of pyroelectric imaging by Bernie Kulwicksi and co-workers at Texas Instruments where arrays of pyroelectric sensors are being successfully produced for infrared imaging,
- A review of ferroelectric materials integrated with silicon for use as micromotors and microsensors, by Dennis Polla of the University of Minnesota,
- a review of research activity in Japan on high permittivity materials for DRAMs, by Yoichi Miyasaka of NEC.

It is believed that future generations of silicon-based microelectronic memories will require high permittivity ferroelectric materials for static capacitors due to the shrinking dimensions of the devices. This will push ferroelectric materials strongly into the thin film microelectronics arena.

Although bulk ferroelectric materials continued to command a significant role at this symposium, their thin film counterparts were clearly the most exciting new area of research. The papers in Greenville continued to reflect the large interest in these

materials which became so evident at the 7th ISAF held at the University of Illinois in 1990. It was encouraging that there have been substantial strides made in both the processing and the understanding of the thin films during the intervening period. It was equally clear, however, that much still remains to be done before viable and reliable thin film devices will be available in quantity in the marketplace. It should also be noted that the growth of activity in ferroelectric thin films has brought researchers with different backgrounds and expertise into the field. This will have a positive impact on the whole ferroelectrics research and development effort in the future.

As the attendees will well remember, this ISAF meeting came complete with unexpected setbacks as the conference hotel suffered power outages on two successive afternoons. Despite this, the program ran on schedule. Eric Cross entertained guests by flickering candlelight at the conference banquet - giving a personal account of some of the people and personalities involved in ferroelectrics over the past 40 years. The Ferroelectrics Recognition Award was presented to Dr. Wallace A. Smith for his contributions in the field of piezoelectric composites. It was also announced at the banquet that the next ISAF will be held at Pennsylvania State University in 1994 with Amar Bhalla as the general chairman.

Angus I. Kington, Program Chairman
North Carolina State University
Gene H. Haertling, General Chairman
Clemson University

1992 IEEE ULTRASONICS SYMPOSIUM REPORT



**Fred Hickernell,
General Chairman**



**Kullervo Hynynen,
Presidential Speaker**



The 1992 IEEE Ultrasonics Symposium was held at the Holiday Inn-Central in historic downtown Tucson, Arizona, October 20th to the 23rd, 1992. The weather was warm, the skies sunny (occasionally dotted with fluffy cumulus), and the atmosphere at the symposium relaxed and informal.

Over 500 were registered for the symposium. Six short course offerings preceded the three days of technical paper presentations with a total attendance of 177. One hundred seventy (170) attendees found their way to Tucson from outside the United States representing 25 countries. Japan led the way with 37, followed by Canada (24) and France (20). Germany, Switzerland, Norway, Italy, United Kingdom, and Austria all had five or more registrants.

Registration ran smoothly under the watchful eyes of Larry and Margaret Wicker and their helpers. It has been good to have their continuity in management of the symposium over the years.

The technical program committee reviewed approximately 356 abstracts of which 290 were selected for presentation (19% rejection) in four parallel sessions and a poster session over the three main conference days. Of the abstracts submitted 156 were from the USA, and 200 were from outside the United States. There were 24 invited presentations and 79 potential poster presentations. Of the 290 papers selected for presentation, 154 (53%) were from outside the United States. Japan led the way with 39 papers, followed by France (23), Germany (20), Canada (14), and the United Kingdom (12). There were several compliments from attendees on the high quality of the technical program. Hats off to the Technical Program Committee and its fearless leader "Grizzly Gary" Montress.

The main symposium program was opened by General Chairman Fred Hickernell and Gary Montress, the Technical Program Chairman. Jim Greenleaf, President of UFFC-S presented awards and expressed his good feelings about our society. He emphasized his main point by some sleight-of-hand magic. Tom Parker introduced the Achievement Award winner, Dr. Arthur Ballato of the U. S. Army Laboratories in Fort Monmouth, New Jersey. Steve Wanuga of General Electric received his Fellow Award. John Vig was recognized as the Distinguished Lecturer of the UFFC Society for 1992-1993. There was no outstanding paper award presented this year. Kullervo Hynynen was the Presidential Speaker.

The guest program was well attended and ran very smoothly through the efforts of Will and Marcy Stanton and Thresa Hickernell. There was good attendance at the buffet breakfasts and for the walking tour of downtown Tucson the first day. Forty-eight braved the border trip to Nogales, Mexico, on Thursday to enjoy



**Art Ballato,
UFFC-S Achievement Award recipient**



**Jim Greenleaf,
Master of the sleight-of-hand**

authentic Mexican cuisine and to barter on the street corners with the local vendors. Forty-four traveled the foothills of the Santa Catalinas by open-air tram and also visited the studio of the world famous artist, Ted DeGrazia, on Friday.

The president's reception was held on Tuesday evening and was a relaxed affair around the pool with a Hawaiian theme. The symposium committee and retiring AdCom/committee members were presented certificates of appreciation by "Jumpy Jim" Greenleaf. The certificates were prepared by the Awards Chairman Roger Tancrell. The Wednesday symposium reception was well attended and enlivened by the presence of a mariachi band.

The banquet at Old Tucson Studios had over 250 attendees who enjoyed a chicken and ribs dinner and the attractions at the park. It was also a time when four desperados from the group, "Swindling Sue," "Grizzly Gary," "Hilarious Harry," and "Jumpy Jim," were thrown in the "hoosegow." Through several attempts at a round rendition of "Row, Row, Row Your Boat" and some bail money (pesos), they managed to obtain an early release.

The Saturday venture to the Desert Sonora Museum and Biosphere II was attended by 80 guests. Even an afternoon shower seemed not to dampen the spirits of the group.

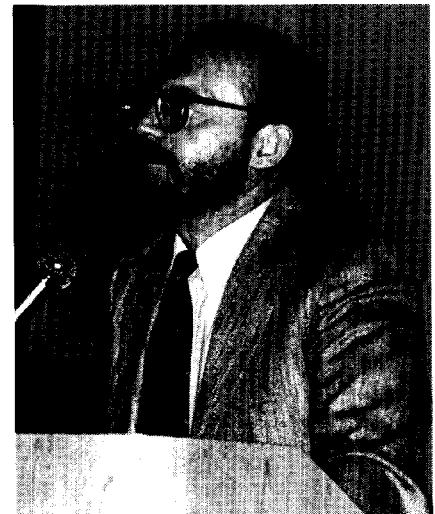
The breaks between sessions continue to be an important place for getting acquainted and exchanging information. The hotel had a couple of surprises including a gorilla passing out bananas.

The symposium sponsored four guests from Russia and one from Bulgaria. Doctors Proklov, Rudenko, Sarvaysan, and Dobershtein were the Russian guests, and Dr. Spassov came from Bulgaria. Dr. Dobershtein came the farthest from Omsk, Siberia, where the climatic change was between a below zero ice sheet to balmy desert temperatures in the seventies.

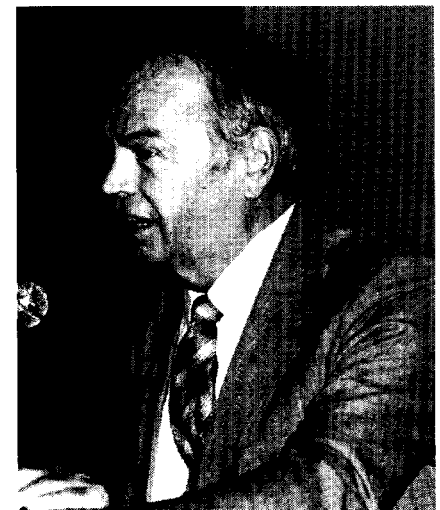
The staff at the Holiday Inn were very cooperative and always helpful. They responded very quickly to requests, and it was a pleasure working with them. Compliments about our group were received from the hotel staff. A most interesting one was from a maid who said our group was one of the cleanest she had ever seen. The week before there was a group at the hotel which she said, "was very messy, but they tipped well."

A very hard working committee made the symposium a huge success. Also appreciated was a lot of incidental help from the membership who pitched in when there was a need and who made some good suggestions during the symposium. It is good to work with a membership who is always willing to help and felt that this was "their" symposium.

Fred Hickernell
General Chairman



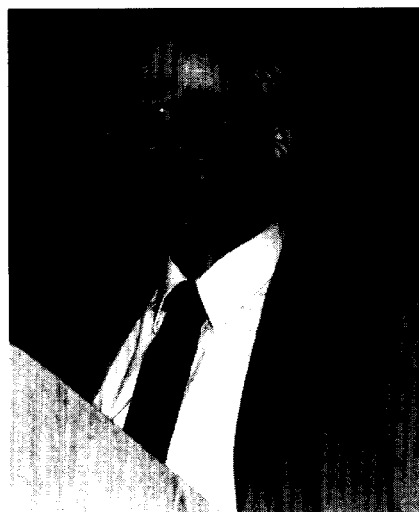
Gary Montress,
Technical Program Chairman



Steve Wanuga,
Fellow Award recipient



Thresa Hickernell,
Guest Program Chair



Tom Parker,
"May the Quartz be with you."



People at the 1992 IEEE Ultrasonics Symposium *From Near*



A Northwestern U.S. contingency.



Hal (local arrangements) and Barbara Tharp of Tucson enjoyed ribs and chicken at Old Tucson Studios.



Two Marylanders, Jerry and Mary Lou Blessing checked out cactus at the Desert Sonora Museum.



What did Grizzly Gary, Swindling Sue, Hilarious Harry and Jimpy Jim do to deserve this?

From Afar



The newlyweds of three months Elena and Andreas Mayer of Regensburg, Germany



Renate and Werner Buff Ilmenan, Germany, enjoying the Arizona sunshine.



The oldyweds celebrating 25 years, Elke and Manfred Weinacht of Dresden, Germany.



An old cowhand from Omsk, Siberia, Sergei Dobershtein.



Will (under hat) and Marcy Stanton (right), hosts for the tours, did some bartering in Mexico.



The western shirts looked great in color.

Two Muscovite desperados, Armen Sarvazyan and Oleg Rudenko.



Irina, Olessia and Basil Plesski of Neuchatel, Switzerland.

Achievement Award

The 1992 Achievement Award was presented to

Dr. Arthur Ballato, Fellow IEEE
U.S. Army Research Laboratory
Ft. Monmouth, NJ

with the citation:

"For his wide-ranging contributions to the fundamental understanding, in both theory and practice, of piezoelectric materials and their application to resonators, filters and frequency control devices, and for his energetic pursuit of IEEE standards."

The award was presented during opening ceremonies at the 1992 Ultrasonics Symposium in Tucson, Arizona on October 21. The award consists of a cash award of \$1000, a plaque and a certificate. The award recognizes an individual for outstanding contributions to, or technical achievements in, the fields of Ultrasonics, Ferroelectrics, or Frequency Control, and for service to the society.

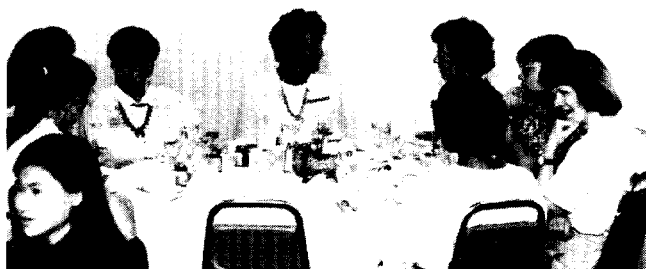
Art was introduced with remarks by Thomas Parker, a colleague in the field of frequency control. Tom acknowledged the contributions Art has made in understanding single crystal quartz and in applying this knowledge to improving high stability oscillators. An example is the SC stress-compensated cut of quartz. Art has had major influence on dielectric resonators, signal processing devices, oscillators, sensors and actuators, to name a few areas of his activities. Tom stressed Art's enthusiasm for all aspects of this work, and his knack for bridging the gap between the theoretical and experimental worlds.



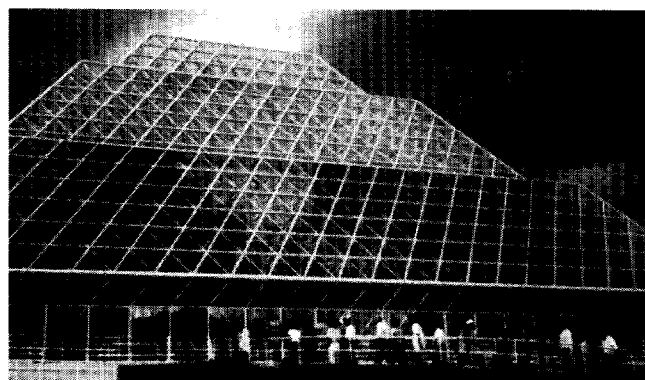
Art Ballato receives UFFC Society Achievement Award from President Greenleaf.

More Scenes from the Symposium

The guest breakfasts were scrumptious, . . .



. . . the Mariachi music lively, . . .



. . . and the Biosphere II was awesome .

Would you let this group, Grizzly Gary, Granny McAvoy, Cuddly Kathy, Tantalizing Tess, Swindling Sue and Phoney Freddy, run an Ultrasonics Symposium again?



Ultrasonics, Ferroelectrics, & Frequency Control Society Administrative Committee

IEEE HEADQUARTERS

Director, Div. IX	J. Brown
Secretary, TAB	I. Engleson

SOCIETY OFFICERS

President	J. F. Greenleaf	<i>Mayo Clinic</i>
Vice-President	H. L. Salvo, Jr.	<i>Westinghouse Electric Corporation, Electronic Systems Group</i>
Secretary/Treasurer	D. C. Malocha	<i>University of Central Florida, Orlando</i>

ELECTED COMMITTEE MEMBERS

1991-1993	E. P. EerNisse	<i>Quartex, Inc. & Quartztronics, Inc.</i>
1991-1993	H. Hellwig	<i>Air Force Office of Scientific Research</i>
1991-1993	G. K. Montress	<i>Raytheon Company, Research Division</i>
1991-1993	H. Takeuchi	<i>Hitachi, Ltd.</i>
1992-1994	E. L. Adler	<i>McGill University, Montreal</i>
1992-1994	J. Brown, <i>Past President</i>	<i>Fisher Controls International, Inc.</i>
1992-1994	H. E. Engan	<i>Norwegian Institute of Technology</i>
1992-1994	J. G. Miller	<i>Washington University, St. Louis</i>
1992-1994	S. C. Schneider	<i>Marquette University, Milwaukee</i>
1993-1995	G.V. Blessing	<i>National Institute of Standards and Technology</i>
1993-1995	F.S. Foster	<i>University of Toronto</i>
1993-1995	T.W. Grudkowski	<i>United Technologies Research Center</i>
1993-1995	T. Shiosaki	<i>Kyoto University</i>

EX-OFFICIO COMMITTEE MEMBERS

Awards	R. H. Tancrell	<i>Raytheon Company, Research Division</i>
Chapters-Membership	K. W. Ferrara	<i>California State University, Sacramento</i>
Fellows	R. M. White	<i>University of California, Berkeley</i>
Ferroelectrics	L. E. Cross	<i>The Pennsylvania State University</i>
Finance	H. van de Vaart	<i>Allied-Signal, Inc.</i>
Frequency Control	T. E. Parker	<i>Raytheon Company, Research Division</i>
Newsletter	F. S. Hickernell	<i>Motorola, GSTG</i>
Nominations	B. R. Tittmann	<i>The Pennsylvania State University</i>
Standards	A. Ballato	<i>U. S. Army Research Laboratory</i>
Transactions	W. D. O'Brien, Jr.	<i>University of Illinois, Urbana</i>
Ultrasonics	G. W. Farnell	<i>McGill University, Montreal</i>

Characteristics of the Attendees at the February AdCom Meeting



Alert — Jim Greenleaf (President)



**On task — Jerry Blessing (1995
Ultrasonics Symposium Chairman)**



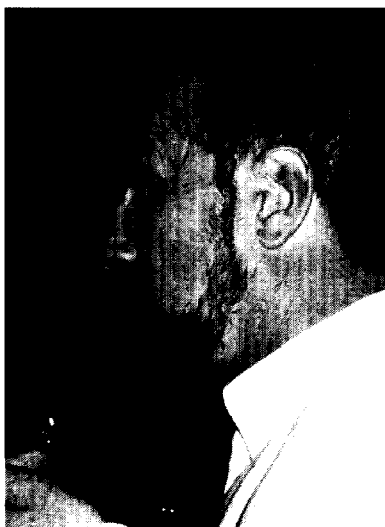
**Listening — Kathy Ferrara
(Chapters/Memberships)**



Happy — Moises Levy and Don Malocha (Secretary)



**Contemplative — Mack Breazeale
(Distinguished Lecturer Coordinator)**



**Focused — Gerard Quentin (1994
Ultrasonics Symposium Co-Chair)**



**Attentive — Bernie Tittman
(1994 Ultrasonics Symposium
Technical Chair)**

UFFC-S ADCOM BRIEFS

The Administrative Committee (ADCOM) of the Ultrasonics, Ferroelectrics, and Frequency Control Society (UFFC-S) was called to order at 8:40 AM, February 12, 1993, by J. Greenleaf at the Harvey Hotel, Dallas, Texas. Introductions of attending members were conducted.

J. Brown moved that the minutes of the August 30, 1992, ADCOM meeting be approved. The motion was seconded by M. Levy. Minutes were approved with minor changes.

J. Greenleaf handed out the TAB brochure on "Value Added" by IEEE Technical Activities to Societies and Technical Councils and gave a short description. The IEEE wishes us to set up a liaison council to work with chapters. Anyone interested in service on the council is encouraged to apply.

The IEEE provides an e-mail service via an alias. J. Vig will set up an UFFC alias service through IEEE whereby all ADCOM members can be contacted at once using the UFFC e-mail address. The secretary will send FAX to those who do not have e-mail.

J. Greenleaf reported that a TAB announcement was made on the First International Symposium on Electronics and the Environment. This was circulated to the attendees.

There was an announcement of a newsletter becoming the *Journal on Robotics and Automation*. The information and proposal was circulated.

J. Greenleaf circulated information concerning the IEEE Metric Policy information.

On February 26, our society will be reviewed by IEEE. J. Greenleaf, H. Salvo, and J. Brown will be attending. This is somewhat of a society self review. They will comment on our society status, make suggestions, and ask questions. These will be some quality management questions related to products and services to our members.

T. Parker reported that the conference manual guide is continuing to be worked on and should be finished in six months to a year. The manual should

help organizers and volunteers of our three sponsored conferences.

W. O'Brien researched the possibility of putting references and bibliographies of the UFFC's interest onto CD ROM. The approximate cost was found to be \$50,000. There was some discussion by the committee regarding cost, duplication with existing data bases, cross references, etc. There was an accepted motion to defer the project at this time.

R. Tancrrell reported that he has studied IEEE field awards on behalf of the society. He will establish a subcommittee under the Awards Committee to pursue these awards on behalf of the society.

J. Brown reported on the Women of the IEEE held at the 1992 Ultrasonics Symposium. Two meetings were held on consecutive nights and were attended by six to eight people per night. There were a number of committee members who spoke in favor of continuing the meetings and extending this to all three of our conferences. A motion by M. Levy was passed to appoint an adhoc committee on Women in the UFFC. S. Schneider volunteered as chairperson. Their charter will be brought to the next ADCOM meeting for approval.

A motion by G. Farnell was passed which was a resolution to be presented to IEEE TAB from the UFFC-S concerning the development of women's roles in engineering, especially in IEEE.

A report was provided by W. O'Brien on the UFFC Transactions. The Transactions are within page budget and financial budget for this year. Approximately \$23,000 will be spent by the editor this year. A motion by M. Levy was approved for \$1,600 for purchase by the editor for a Laser Writer printer.

F. Hickernell reported on the UFFC Newsletter. An advertisement for employment will be in the spring issue. The ADCOM approves and encourages advertisement in the newsletter.

H. van de Vaart reported on the society's finances. He projects a \$107,000 surplus this year with a reserve of ap-

proximately \$500,000. The 1993 projected budget is for a \$12,000 deficit. The society is in a very stable financial position and no longer needs to increase the reserves. A motion by H. van de Vaart was passed which states the UFFC should maintain a nominal reserve of 75% of our average yearly operating expenses. A second motion by H. van de Vaart was passed to put \$200,000 as a long term investment in increments of \$50,000 every 6 months, starting in July 1993.

L.E. Cross reported for the Ferroelectrics Standing Committee. The Ferroelectrics group would continue the ISAF Conferences semi-annually. The question of yearly symposiums was put forth to attendees of the ISAF'92 Conference at the opening of the meeting and was defeated by a show of hands.

A report by G. Heartling on the ISAF'92 was presented. The conference surplus is projected to be only \$1,000 due to the fact that the attendance was down by approximately 100 over that projected.

A.S. Bahalla gave a view graph presentation of the 1994 ISAF to be held at Pennsylvania State University. The anticipated dates are Aug. 7-10 with approximately 320 attendees and 500 papers.

T. Parker reported for the Frequency Control Standing Committee. A motion was passed to change the symposium name to the IEEE International Frequency Control Symposium.

R. Filler reported on the 1992 Frequency Control Symposium (FCS). The 1992 FCS yielded a surplus of approximately \$12,000. It had approximately 311 attendees and had an excellent attendance by foreign travelers. The FCS was able to obtain foreign travel support from companies, government agencies, and the ADCOM. The foreign visitors provided excellent technical and social perspectives.

T. Parker stated that the FCS tutorial chair would now become a member of the FCS Executive Board due to the

scope of the work and the surplus generated through the tutorials.

The ADCOM approved the location of the 1996 IFCS as Hawaii with J. Vig as chairperson.

There was a discussion of the UFFC co-sponsorship and joint meeting with European Time and Frequency Forum (ETFF) held in Europe. A motion by A. Ballato was passed which states: It is premature for ADCOM to give permission for the use of the IEEE name to ETFF. The UFFC encourages and charges the FCS committee to continue to explore avenues of cooperation with the ETFF.

D. Malocha reported that the final budget for the 1991 Ultrasonics Symposium was approved and yielded a surplus \$36,983.62.

F. Hickernell reported the 1992 Ultrasonics Symposium was very successful, with close to 500 attendees. S. Schneider reported a projected surplus of \$41,225.67.

H. Salvo reported that the 1993 Ultrasonics Symposium is progressing well and a complete guest program is also planned.

G. Quentin reported that LRW Associates will be conference manager for the 1994 Ultrasonics Symposium to be held in Cannes, France. Hotel negotiations are complete at the Martenique, and room rates should be under \$100. There is great enthusiasm by everyone to hold an Ultrasonics Symposium in Europe for the first time.

A motion by A. Ballato was passed to change the name of the IEEE Ultrasonics Symposium to the IEEE International Ultrasonics Symposium.

R. Tancrell reported on Awards. The 1992 Achievement Award was presented at the 1992 Ultrasonics Symposium in Tucson, AZ., to Dr. Arthur Ballato "for his wide-ranging contributions to the fundamental understanding, in both theory and practice, of piezoelectric materials and their application to resonators, filters, and frequency control devices, and for his energetic pursuit of IEEE Standards."

The 1992 Ferroelectric Recognition Award was presented at the 1992 ISAF Conference in Greenville, S.C., to Dr. Wallace Smith "for major contributions to the understanding of piezoelectric ceramic/polymer composites and effective continuing advocacy of ferroelectric programs."

J. Vig, the society's 1992-93 UFFC Distinguished Lecturer, was approved to extend his lecture dates through the end of 1993. Dr. Vig's lecture is entitled "High Accuracy Oscillators and Clocks."

ADCOM approved the 1993-94 Distinguished Lecturer as Dr. Eric Adler whose lecture is entitled "Surface Acoustic Wave Devices: Fundamentals, Current Status, and Future Trends."

R. Tancrell stated that a subcommittee will be formed to select applicants for major IEEE awards. He reminded the Committee chairs that Certificates of Appreciation are available for members who are retiring from committees. Request forms are available from R. Tancrell.

K. Ferrara reported that membership appears to be holding steady. A motion by K. Ferrara was passed to strongly promote and advertise in all the UFFC sponsored conference's advanced program books that UFFC membership will be free for one year to those who become an IEEE member.

F. Hickernell reported that there is now a Phoenix UFFC chapter.

A. Ballato reported that the Standards activities are progressing well. Development and acceptance of Standards is a very long process. It goes into print, and then it is sold at very high prices. Therefore, few people have access or use them. A motion by J. Vig was passed that the UFFC endorse the concept that the IEEE make available free on-line distribution of IEEE Standards to the membership. J. Brown and J. Greenleaf will take the motion forward to TAB.

B. Tittman presented a motion to accept the Nominations Committee report for the slate of candidates for ADCOM

members. The motion was approved by ADCOM.

J. Greenleaf requested every conference to keep their manuscript mats for possible future use in CD ROM publication.

J. Greenleaf will start a UFFC Long Range Planning Committee to be chaired by the past president.

J. Greenleaf suggested a reorganization of the ADCOM with more emphasis put on the technical aspects and finance. Four new vice-presidents were suggested, namely, ultrasonics, ferroelectrics, frequency control, and transactions. This would allow all the areas to be similar in form and organized by committees. This would also allow other important technological areas to be able to be integrated easily into the organization. The current vice-president would become, via election, the president-elect. This will require further discussion and a change in by-laws.

A. Ballato and L.E. Cross attended the Smart Materials and Structures Conference. Five hundred people attended the conference. A. Ballato was asked to find out if the UFFC-S was interested in participating in the conference. The conference was sponsored by a large number of groups, including SPIE. C. Tsai suggested that SPIE is a very aggressive society, and they know well how to promote conferences. However, IEEE is much more prestigious. J. Farnell suggested that some of the organizers be invited to our next ADCOM meeting. E. Adler suggested we promote this topical area at the next Ultrasonics Symposium. Tom Grudkowski and Art Ballato will pursue this. A motion was passed to charge T. Grudkowski and A. Ballato as emissaries on behalf of the UFFC in the area of smart materials and structures.

The next ADCOM meeting will be held in Baltimore, Sunday, October 31, 1993.

The UFFCS ADCOM meeting adjourned at 5:25 PM.

Donald Malocha
Secretary

Request For Nominations

UFFCS ACHIEVEMENT AWARD

You are invited to nominate a member of UFFC Society for special recognition through the ACHIEVEMENT AWARD. The award is given in recognition of significant technical publications in Ultrasonics, Ferroelectrics, or Frequency Control, for presentation of lectures, and/or service to the Society. The award covers the entire society and includes all technical specialties. Selection is made by the Officers and Awards Committee.

This list of past winners attests to the quality of this distinction:

1980	John de Klerk
1981	Robert Adler
1982	Herbert J. Shaw
1983	Bertram A. Auld
1984	Gordon S. Kino
1985	Richard C. Williamson
1986	Calvin F. Quate
1987	Thrygve R. Meeker
1988	Richard M. White
1989	Eric A. Ash
1990	Cecil E. Land
1991	Gerald W. Farnell
1992	Arthur Ballato

Photocopy this section and send via FAX or mail:
(You may submit more than one if you wish.)

Here is my nomination for **Achievement Award**:

Nominee's Name: _____

Nominee's main contributions: _____

Your Name/Address: _____

Send by July 1 to: Roger H. Tancrell
Chair, UFFCS Awards Committee
Raytheon Research Division
131 Spring Street
Lexington, MA 02173
Tel: (617) 860-3072
FAX: (617) 860-3195

Call For Nominations

FOR THE NEXT DISTINGUISHED LECTURER AND/OR TOPIC

Every year UFFCS selects a Distinguished Lecturer to represent the Society at Colloquia around the world. Recent lecturers have spoken to local IEEE chapters, universities and companies throughout North America, Japan, Europe, China and South America. The Distinguished Lecturer represents our Society to the larger technical community, and stimulates interest in the Society's professional areas.

What topics would you like to hear, and who are speakers whom you think can represent our Society? Here's your chance to influence the next lecturer! Past lecturers are:

- | | |
|---|---|
| <p>1980 Richard C. Williamson
"Surface Acoustic Wave Signal Processing in a Digital Age"</p> <p>1981 Lawrence W. Kessler
"Acoustic Microscopy: Methods, Applications, Outlook"</p> <p>1982 Frank E. Barber
"Ultrasonics in Medical Diagnosis and Biomedical Research"</p> <p>1983 George A. Alers
"Quantitative Nondestructive Evaluation — A Timely Confluence of Science, Engineering, and Economics"</p> <p>1984 Arthur Ballato
"Frequency and Time Sources — Past, Present, and Future"</p> | <p>1985 Robert E. Newnham
"Transducers, Sensors, and Actuators"</p> <p>1986 Chen S. Tsai
"Acoustooptic Interactions, Devices, and Applications"</p> <p>1987 Mack A. Breazeale
"Physics and Engineering Principles of Nonlinear Acoustics"</p> <p>1988 Joseph S. Heyman
"NDE in Aerospace — Requirements for Science, Sensors and Sense"</p> <p>1989 Richard M. White
"Micro-scale Mechanics for Sensors and Actuators"</p> <p>1990 James F. Greenleaf
"Multidimensional Ultrasonic Imaging and Tissue Characterization"</p> <p>1991 Moises Levy
"Ultrasonics of High TC and Other Unconventional Superconductors"</p> <p>1992 John R. Vig
"High-Accuracy Oscillators and Clocks"</p> <p>1993 Eric L. Adler
"Surface Acoustic Wave Devices: Fundamentals, Current Status, and Future Trends"</p> |
|---|---|

Photocopy this section and send via FAX or mail:
(You may submit more than one if you wish.)

Suggestions for the next **Distinguished Lecturer and/or Topic:** _____

Your Name/Address: _____

Send by July 1 to:

Prof. Mack A. Breazeale
Chair, UFFCS Distinguished Lecturer Subcommittee
The National Center for Physical Acoustics
University of Mississippi
University, MS 38677
Tel: (601) 232-7490
FAX: (601) 232-7494

IEEE UFFC-S Members Elected To Fellow Grade

Congratulations to the following members of the Ultrasonics Ferroelectrics, and Frequency Control Society who were recently elected to the grade of IEEE Fellow.

Dr. Kenneth L. Davis
1938 E. El Freda
Tempe, AZ 85284

For technical leadership in the initiation and development of basic electronics research programs and for contributions to the development of surface acoustic wave devices.

Dr. Reimund Gerhard-Multhaupt
Bundesallee 114
D-1000 Berlin 41, Germany

For contributions to the study of dielectric materials and their application in communications devices.

Prof. Peter A. Lewin
Dept. of Elec. & Computer Engrg.
Drexel University
Philadelphia, PA 19104

For contributions to the fields of electroacoustics and medical ultrasonics and for the development of new transducers and measurement methods.

Mr. Lawrence C. Lynnworth
Panametrics
221 Crescent Street
Waltham, MA 02254

For contributions to ultrasonic measurements of flow, temperature, and liquid level for process control.

Dr. Charles Maerfeld
Thomson Sintra Dias
Route des Cretes-BP38
Parc D'Activities
De Valbonne 06561
Valbonne Cedex France

For contributions to surface acoustic wave devices and their applications.

Prof. Donald C. Malocha
409 Bay Tree Lane
Longwood, FL 32779

For contributions to the development of computer-aided design for surface acoustic wave (SAW) transducers and filters.

Prof. Matthew O'Donnell
Dept. of EECS
University of Michigan
Ann Arbor, MI 48109

For contributions to biomedical ultrasonics, medical imaging, and the application of VLSI devices to medical imaging systems.

Prof. K. Kirk Shung
The Pennsylvania State University
Bioengineering Program
231 Hallowell Bldg.
University Park, PA 16802

For contributions to research in ultrasonic imaging and tissue characterization and to biomedical engineering education.

Dr. Bikash K. Sinha
Schlumberger-Doll Research
Old Quarry Road
Ridgefield, CT 06877

For contributions to the development of surface acoustic wave pressure and temperature sensors.

Dr. Donald O. Thompson
1605 Amherst
Ames, IA 50010

For technical leadership in developing the concept of quantitative nondestructive evaluation.

Prof. Celia E. Yeack-Scranton
IBM Almaden Research Center
650 Harry Road
San Jose, CA 95120

For the development and application of transducers that characterize the head-medium interface in magnetic recording.

Do You Have A Minute?

The IEEE keeps a file of society minutes. Could you please check in your files for the following missing minutes? If you should locate any of the missing administrative committee minutes listed below, please forward a copy to Don Malocha, ECE Dept., University of Central Florida, Orlando Florida 32816-2450.

October 15, 1985	November 10, 1974	April 6, 1973
March 25, 1970	December 10, 1970	October 16, 1964

Thanks for your help.

Standards Activities Report

Our society is currently responsible for eleven items, six standards and five projects.

Piezoelectric Crystals	T. R. Meeker	(176-1987) (177-1978)
-------------------------------	--------------	--------------------------

Standard 177-1966, "Standard Definitions and Methods of Measurement for Piezoelectric Vibrators," was published in the January 1993 issue of Trans. UFFC. After publication, comments received will be used in its revision, which is presently scheduled for June 1994. Standard 176 will then be revised.

Ultrasonics in Medicine	P. D. Edmonds	(790-1989)
--------------------------------	---------------	------------

Two possible new topics are currently being considered for IEEE standards: ultrasonic lithotripsy equipment and ultrasound for hyperthermia, with the latter more probable. No progress since last report.

Time and Frequency	J. R. Vig	(1139-1988 and P1193)
---------------------------	-----------	-----------------------

"Guidelines for Measurements of Environmental Sensitivities of Precision Oscillators." A final draft of P-1193 is being readied for submission to the IEEE Standards Committee.

Sensors	J. Schoenwald	(P1182)
----------------	---------------	---------

The draft version of "Guide to terms and definitions of ferroelectric, frequency control and ultrasonic sensors" is being submitted to Trans. UFFC for reader comments.

Ferroelectrics	A. H. Meitzler	(180-1986)
	G. H. Haertling	(P1211)

Work on P1211 - "Standard Definitions, Symbols and Characterization of Ferroelectric Thin Films, Memory Cells and Device Structures," continued at ISAF 92, Greenville, SC in September 1992.

Regarding Standard 180-1986, the Ferroelectrics Committee meeting at ISAF is being asked to reaffirm the standard for another five years.

Surface Acoustic Wave Devices	E. A. Mariani	(P1037)
--------------------------------------	---------------	---------

The draft standard has been given final approval for publication by the IEEE Standards Board.

Piezomagnetic Technology	S. L. Ehrlich	(319-1971)
---------------------------------	---------------	------------

A measurement standard committee is being assembled; it is hoped that work will begin later this year.

Acoustic-Optics	D. L. Hecht	(P1022)
------------------------	-------------	---------

Presently inactive.

Industrial Ultrasonics	E. P. Papadakis	
-------------------------------	-----------------	--

Continued liaison with ASTM committee E-07 for NDT ultrasonics standards.

Delay Lines	A. A. Comparini	
--------------------	-----------------	--

Presently inactive.

Art Ballato
Standards Committee Chair

UFFC Financial Report

As shown on the the UFFC Operating Statement Summary 12/31/91 (which is preliminary), our operating surplus for 1992 was \$107K, \$20K below budget. Due to falling interest rates, the interest received on our reserves was substantially down from budget. The Transactions net was also down, due to reduced income from the Non-Member and All-Transactions subscriptions and the voluntary and overlength page charges. These were offset to some degree by the reduced cost of printing and distribution. AdCom expenses increased substantially as a result of our "Ambassador" program, which pays for IEEE and UFFC membership and travel expenses to our Symposia for selected East-European colleagues, and partial reimbursement of travel expenses for some members to AdCom meetings. On the positive side, our Symposia continue to show a healthy surplus. The surplus from the 1990 International Symposium on Applications of Ferroelectrics and the 1991 Frequency Control Symposium, which were not budgeted for 1992, were received in 1992, thereby boosting the net income. The bottom line is that UFFC reserves grew from \$398.1K to \$505.1K in 1992, or about 66% of actual 1992 expenses. Because our reserves are now considered adequate to meet any emergency, AdCom passed a motion at its last meeting to limit the reserves to 75% of expenses. This will be achieved by either increasing our services to members, or reducing the cost of services that UFFC provides to its members. In addition, part of our reserves will be shifted from a short term T-bill fund to an IEEE long term investment fund to boost the return on investment. Apart from these measures, it is not expected that our reserves will increase in 1993 since the budget for 1993 shows a \$12.3K deficit. In summary, even though UFFC is the smallest Society in the IEEE, our three Symposia are very successful and we are in excellent financial shape.

H. van de Vaart – Chair Finance
and Operations Committee.
February 22, 1993.

UFFC OPERATING FINANCIAL STATEMENT 12/31/92

UFFC	INCOME		EXPENSE		NET	
	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
MEMBERSHIP FEES	27.1	24.3	0.0	0.0	27.1	24.3
INTEREST	30.6	11.1	0.0	0.0	30.6	11.1
UFFC TRANSACTIONS	290.1	235.8	204.6	173.9	85.5	61.9
NEWSLETTER	0.0	0.0	6.5	10.4	-6.5	-10.4
NON-PERIODICALS	1.3	1.7	1.0	1.3	0.3	0.4
SYMPOSIA	295.9	597.2	257.9	511.8	38.0	85.4
HQ ADMINISTRATION	0.0	0.0	11.4	14.0	-11.4	-14.0
OTHER	0.0	2.5	0.0	0.0	0.0	2.5
ADCOM	2.8	0.0	39.4	54.2	-36.6	-54.2
TOTAL	647.8	872.6	520.8	765.6	127.0	107.0

TRANSACTIONS	INCOME		EXPENSE		NET	
	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
INDIVIDUAL NM SUBS.	91.7	81.0	0.0	0.0	91.7	81.0
ALL TRANS. PACKAGE	94.3	72.9	0.0	0.0	94.3	72.9
VOLUNTARY PAGE CHARGES	40.4	29.3	8.1	6.3	32.3	23.0
OVERLENGTH PAGE CHARGES	62.7	50.1	1.0	2.7	61.7	47.4
AIRFREIGHT	1.0	2.5	0.0	0.0	1.0	2.5
PRINTING/DISTRIBUTION	0.0	0.0	133.1	100.0	-133.1	-100.0
EDITING	0.0	0.0	37.6	32.5	-37.6	-32.5
PUB. ADMINISTRATION	0.0	0.0	4.4	4.4	-4.4	-4.4
UFFC EDITOR	0.0	0.0	9.2	16.9	-9.2	-16.9
SUBSCRIBER HANDLING	0.0	0.0	11.2	11.1	-11.2	-11.1
TOTAL	290.1	235.8	204.6	173.9	85.5	61.9

SYMPOSIA	INCOME		EXPENSE		NET	
	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
1991 ULTRASONICS	200.9	272.3	171.4	235.3	29.5	37.0
1991 FREQ. CONTROL	0.0	101.4	0.0	79.6	0.0	21.8
1992 FREQ. CONTROL	95.0	113.8	85.0	102.0	10.0	11.8
1990 ISAF	0.0	109.7	0.0	94.2	0.0	15.5
CONF. ADMINISTRATION	0.0	0.0	1.5	0.7	-1.5	-0.7
TOTAL	295.9	597.2	257.9	511.8	38.0	85.4

ADCOM	BUDGET		ACTUAL	OUTSTANDING LOANS	
PRESIDENT'S OFFICE	5.0		4.7	1992 ULTRASONICS	35.0
ADCOM EXPENSES	3.3		32.0	1992 ISAF	8.0
CHAPTERS/DIST. LECTURER	8.0		10.6	1993 ULTRASONICS	5.0
TECHNICAL	1.6		2.7	1993 FREQ. CONTROL	8.0
MEMBERSHIP	15.9		3.4	TOTAL	56.0
AWARDS	2.0		0.8		
OTHER	3.6		0.0	RESERVES 12/31/91	398.1
TOTAL	39.4		54.2	SURPLUS TO DATE	107.0
				RESERVES 12/31/92	505.1

The 14th International Congress in Acoustics

Beijing, China, 3–10 September, 1992

Many UFFC-society members attended the 14th International Congress in Acoustics (ICA92) held in Beijing, China in September, 1992. The Proceedings of ICA92 consists of four volumes containing the text of 836 papers presented at the Congress. Gerard Quentin gave an admirable plenary lecture on "Direct and Inverse Problems in Resonant Scattering." Mack Breazeale organized a structured session on nonlinear



UFFC-Society members Eric Adler, Tom Parker, John Vig, and Mac Breazeale, and Erica and Peter D. Edmonds, SRI Int'l, visiting the Ming Tombs in China during the 14th Int'l Congress on Acoustics. (photographer Lou Breazeale)

acoustics and material characterization with speakers Y. Shui, B. P. Bonner, A. Alippi, W. Jiang, O. Buck, L. Adler, J. Cantrell, W. Yost, Z. W. Qian, J. Wu, K. Wu, and D. Gerlich. Eric Adler organized a structured session on SAW with speakers C. F. Ying, J. Kushibiki, G. Socino, D. Malocha (who, unfortunately, was unable to attend), T. Parker (who, fortunately, read D. M's paper), and J. Vig our 1992/1993 distinguished lecturer. The Congress was organized by the

Acoustical Society of China and the Institute of Acoustics, Academia Sinica and was sponsored by IUPAP, the International Union of Pure and Applied Physics. A warm welcome was given to all the participants at a reception on September 3rd, and a banquet was held on September 9th. Many of the participants were able to visit various institutes and research centers either before or after the Congress. Sightseeing tours organized as part of the Congress activities included the Great Wall, Ming Tombs, Summer Palace, and Sleeping Buddha Temple. Participants found it a stimulating meeting in a special part of the world. Our thanks to the Chinese hosts for a wonderful visit and an opportunity to make new friends.



Adler, Parker, Vig and Breazeale at Emperor's Palace.



Things go better with . . .

IEEE Symposium on Electronics and Environment

The IEEE Technical Activities Board (TAB) is sponsoring the first International Symposium on Electronics and the Environment, May 10-12, 1993. The conference will include a half-day tutorial on fundamentals of Design for the Environment. Plenary sessions will address international environmental regulations, legislation, public opinion trends and environmental marketing. The General Chair is Diana Bendz, Director of Integrated Safety Technology for IBM corporate worldwide manufacturing and development organization.

Conference specifics:

IEEE International Symposium
on Electronics
and the Environment.

May 10-12, 1993

Hyatt Regency Crystal City
Arlington, VA 22202

For information contact:

IEEE Conference Registrar
IEEE Technical Activities
445 Hoes Lane
Box 1331
Piscataway, NJ 08555-1331
Phone: (908) 562-3878
FAX: (908) 562-1571
e-mail g.sacchi@ieee.org

Boston Chapter

The Boston Chapter of the UFFCS has arranged for a number of interesting speakers covering a wide range of topics during the 1992-1993 meeting year. The attendance varied from about 20 to 35 people depending on the topic. The meeting dates, topics and speakers for this year are as follows:

September 23, 1992

"Ferroelectric Thin Films for Microelectronic Applications," S. R. Collins and S. D. Bernstein, Raytheon Company, Research Division.

December 3, 1992

"Microwave and RF Superconducting Circuit Development," J. Martens, Conductus Inc.

January 20, 1993

"Exploring the Ocean with Sonar," M. Klein, Klein Associates.

March 24, 1993

"State-of-the-Art SAW Oscillators: Design and Performance," G. Montress, Raytheon Company, Research Division.

April 21, 1993

"Temperature Derivative of Stress Coefficients of SAW Resonator Frequency from Pressure Sensor Measurements," B. K. Sinha, Schlumberger Doll Research.

May 19, 1993

"High Accuracy Oscillators and Clocks," J. R. Vig, Army Research Laboratory, Ft. Monmouth, 1992-1993 UFFC Society Distinguished Lecturer.

June 16, 1993

"Piezo-electric Transducers for Medical Ultrasonic Imaging," R. Gururaja, Hewlett-Packard.

Chapter officers for the 1992-1993 year were:

Chairman: James A. Greer
Raytheon Research Div.
Lexington, MA

Vice-Chairman: Iwen Yao
MICRILOR
Wakefield, MA

Sec./Treas.: Gary K. Montress
Raytheon Research Div.
Lexington, MA

Elections for 1993-1994 officers will be held at the May meeting. Presently, G. Montress and J. Smits are the nominations for Chairman and Vice-chairman positions, respectively, for the upcoming session.

Details of next year's speakers and topics are incomplete at this time, but the first meeting is tentatively planned September or October.

James A. Greer
Chapter Chairman,
1992-1993

Tokyo Chapter

Technical Meeting

The Tokyo Chapter held the following 6 technical meetings during the second half of 1992, in conjunction with the Technical Group on Ultrasonics of the Institute of Electronics, Information and Communications Engineers of Japan.

Date	Papers	Place
1) July 24, 1992	9	Tokyo
2) August 20	6	Tokyo
3) September 21-22	19	Sendai
4) October 16	6	Tokyo
5) November 27	6	Tokyo
6) December 15	8	Yokohama

The 13th Symposium on Ultrasonic Electronics

The Tokyo Chapter sponsored the 13th Symposium on Ultrasonic Electronics (USE92) held on November 30-December 2, 1992, at the Sensai-Fukko Kaikan in Sendai with more than 320 participants. Four invited talks and 128 contributed papers were Presented. The papers will soon be published in the special issue of Jpn. J Appl. Phys.

UFFC-S 1992-1993 Distinguished Lecturer Program

Dr. John R. Vig, the UFFC-S 1992-1993 Distinguished Lecturer, was invited to Japan. He gave impressive and informative talks on the topic "High-Accuracy Oscillators and Clocks," at the USE92 in Sendai and at technical meetings in Toyohashj, Fukushima, and Oyama.



Dr. John R. Vig
delivered an invited talk
at the USE'92.



Dr. Vig enjoyed "ShabuShabu" dinner with
several members of Tokyo Chapter

(Continued on next page)



"Kagamibiraki" at the banquet of the International Symposium on SAW Devices for Mobile Communication Technology

International Symposium on SAW Devices for Mobile Communication Technology

The International Symposium on SAW Devices for Mobile Communication Technology, organized by the 150th committee of Japan Society for Promotion of Science, was held on December 3-5, 1992 at the Sendai International Center in Sendai. Total number of Participants in this Symposium was more than 120 including 35 persons from outside Japan and 26 invited papers were presented. The second evening of the Symposium was highlighted by a banquet held at the Sendai Washington Hotel with a congenial atmosphere. It was started with Kagamibiraki which means breaking the cover of a new

rice wine barrel with a wooden hammer (see photograph) and is one of traditional opening ceremonies on happy occasions in Japan. The Participants were able to strengthen friendships with each other and have an enjoyable time. As a post-symposium program, a technical tour visit to Tohoku University and several companies in the Tokyo and Kyoto areas was arranged. Those who wish to have the Proceedings of the Symposium, please directly contact Prof. Kazuhiko Yamanouchi, Research Institute of Electrical Communication, Tohoku University, Katahira 2-1-1, Aoba-Ku, Sendai, Japan 980.

1993 Officers

The new officers of the Tokyo Chapter for 1993 are:

Chairman: Professor Yasutaka Shimizu, CRADLE, Tokyo Institute of Technology, Ohokayama, Meguro-Ku, Tokyo 152.

Vice Chairman: Professor Kiyoshi Nakamura, Faculty of Engineering, Tohoku University, Aoba, Aramaki, Aoba-Ku, Sendai 980,

Secretary: Professor Hiroaki Sato, Faculty of Engineering, Tamagawa University, Tamagawagakuen 6-1-1, Machida, Tokyo 194.

Treasurer: Professor Yasuhiko Nakagawa, Faculty of Engineering, Yamanashi University, Takeda 4-3-11, Kofu 400.

Kiyoshi Nakamura
Vice Chairman,
Tokyo Chapter-UFFC



Attendees at the International Symposium on SAW Devices for Mobile Communication

NEW TECHNOLOGY DIRECTIONS COMMITTEE of the IEEE TECHNICAL ACTIVITIES BOARD

The NEW TECHNOLOGY DIRECTIONS COMMITTEE (NTDC) is a standing committee of the IEEE Technical Activities Board (TAB). Its charter is to identify emerging technology areas not currently addressed by IEEE entities and to encourage and facilitate the formation of appropriate ad-hoc intersociety committees in such areas.

The Committee currently consists of a maximum of seventeen members. They are the Chair, the immediate Past Chair, a representative of each of the ten IEEE Divisions, and five Members-at-Large which are to broaden the representation by including other professional societies, government, etc. Recently, at the suggestion of the TAB Structure Review Ad-Hoc Committee, each of the IEEE Societies and Technical Councils was invited to appoint a corresponding member to the NTDC. These corresponding members provide a key technical link between the NTDC and the Societies. Because of this new linkage, the 1993 committee will consist of five standing members and the 37 corresponding members.

The current activities of the NTDC include the development of a set of "Grand Challenges" in electrotechnology. They are:

1. To be or not to be reachable anytime, anywhere (wire-free and fiberless communication)
2. To have instant access to all information (databases, highspeed links, flat panel displays and interfaces)
3. To be present or absent anytime, anywhere (virtual presence and reality).
4. Abundant, clean, safe and affordable energy.
5. Intelligent highways and transportation systems (personal global navigation)
6. The paperless office (flat panel displays, pen and tablet)
7. The cashless society (electronic purse and wallet)

In addition to these lofty goals, the committee is considering a number of near-term activities in support of new technologies. For example, an Ad-Hoc Committee of NTDC is exploring the possibility of co-sponsoring, with the IEEE Atlanta Section, an interdisciplinary New Technologies Conference

with possible emphasis on environment, health, and safety issues.

NTDC is also compiling a list of video tapes on emerging technologies currently in production. Several of the Societies have indicated interest in expanding production of such tapes.

In the interest of preparing a "portfolio" of emerging technologies, NTDC has solicited from each Society a summary of emerging technologies related to its technical purview. Several fascinating summaries have been received and will form the basis of the portfolio.

NTDC recognizes that as Engineers we must emphasize that the new technologies which we promote must be incorporated into new products which fulfill the needs of humanity. Thus, we must not merely study new phenomena but must study their application for the good of mankind. Interestingly, the fastest growing IEEE Society is currently the Vehicular Technology Society. This rapidly growing area is certainly among those having a positive impact on Society. This growth has spread to the related areas of signal processing, information theory, and communications all of which are areas of interest to specific IEEE Societies.

As mandated by its charter, the NTDC has formed an Ad Hoc Committee on "Energy" chaired by Thomas Pinkham, our Division VII Representative. This Committee is to include representation from a number of Societies. This relates to the fourth "Grand Challenge" listed above.

NTDC also recognizes its relationship to lifelong learning in the practicing engineers must be encouraged to become proficient in the emerging technologies identified by the committee. Educational materials must be made available by the IEEE through its cognizant Societies and through IEEE Press. Communication is paramount both intersociety and with the lay public which must be made aware of the engineers' contribution to the quality of life.

NTDC continues to meet and plan promotion of new technologies within IEEE and welcomes your suggestions in this regard.

Ronald J. Pogorzelski
Division IV Representative, NTDC

Call for Papers

Special Issue on Correlation Techniques and Applications in Ultrasonics

(Submission Deadline:
July 1, 1993)

The *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* invites the submission of **Correlation Techniques and Applications in Ultrasonics Papers** on any of the following topics:

- Medical Techniques and Applications
- NDE Techniques and Applications
- SONAR Techniques and Applications
- Characterization and Calibration Techniques and Applications
- Imaging Techniques and Applications
- Measurement Techniques and Applications

The contributed papers must have a significant correlation technique and/or application component in order to fall within the scope of this Special Issue.

Contributed papers should be sent to the Editor-in-Chief

William D. O'Brien, Jr.
Department of Electrical and Computer Engineering
University of Illinois
1406 West Green Street
Urbana, IL 61801

In the transmittal letter, identify that the contribution is being submitted for publication consideration for the **Correlation Techniques and Applications in Ultrasonics Special Issue**. Consult the "Information for Contributors" for manuscript preparation requirements. All papers will be subjected to the normal peer-review process. Submission deadline is July 1, 1993 and the expected publication date is early 1994. The Guest Editor of the Special Issue is Gordon Hayward of Strathclyde University, Glasgow, Scotland.



A JOINT IEEE/OSA PUBLICATION



Journal of LIGHTWAVE TECHNOLOGY

THE JOURNAL OF LIGHTWAVE TECHNOLOGY is published by the Optical Society of America and the following seven societies of the IEEE:

Aerospace & Electronic Systems Society
Instrumentation & Measurement Society
Microwave Theory & Techniques Society
Ultrasonics, Ferroelectrics, and Frequency Control Society
Communications Society
Electron Devices Society
Lasers & Electrooptics Society

THE JOURNAL is published monthly, as a single source for engineers and scientists making use of new contributions to the general field of fiber and integrated optics. Some topics included are:

Optical Fibers & Fiber Components
Active & Passive Guided-Wave Components
Integrated Optics and Optoelectronics
Optical Systems & Subsystems
Networks & Switching
New Applications & Unique Field Trials
Optical Sensors

Journal of Lightwave Technology 1993 SUBSCRIPTION ORDER FORM

This JOURNAL is published monthly.

1993 Subscription Prices (Surface Delivery)	†Optional (additional) Air Freight Charge	
	*Area 1	**Area 2
OSA Member \$43.00	\$52.00	\$89.00
IEEE Member \$32.00	\$52.00	\$89.00
Nonmember \$386.00	\$52.00	\$89.00

Member rates are restricted to members of OSA and/or members of one or more of 8 IEEE Societies.

† Available to all countries outside the U.S.A., Canada, and Mexico.

* Area 1 includes the U.K. and Western and Eastern Europe.

** Area 2 includes the Mideast, Africa, Asia, Oceania, Australia, and Central and South America.

Contact the IEEE Service Center for the special rates for microfilm and microfiche editions, and other information.

Please enter my 1993 subscription. I hold the following Society membership(s):

☐ OSA, ☐ Aerospace and Electronic Systems, ☐ Communications, ☐ Electron Devices,
☐ Instrumentation and Measurement, ☐ Microwave Theory and Techniques, ☐ Lasers and Electrooptics,
☐ Ultrasonics, Ferroelectrics, and Frequency Control.

To claim member rate, enter member number below:

OSA Member No. _____ IEEE Member No. _____

Subscription Price \$ _____ Air Freight Charge \$ _____

Total Amount Enclosed \$ _____

Depending on your membership, make check payable to either OSA or IEEE in U.S. dollars drawn on a U.S. bank.

Name: _____

Street Address: _____

City: _____

State/Postal Code/Country: _____

Photocopy this form and return with payment to either:

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

or
OSA
2010 Massachusetts Ave., NW
Washington, DC 20036, U.S.A.

Tracking Code													
Event Code					Brochure Code								
P	J	L	T	2	9	1	B	9	9	9			

A Professional Edge in a Globally Competitive Economy.



Is your Management aware of the value of your IEEE membership?

IEEE is the world's largest technical professional organization in electrical and electronics related fields. Our membership includes leading practitioners in theory, research and development, systems and equipment design, testing, application, project and technical management.

SENIOR MANAGEMENT'S EVALUATION OF IEEE

• "ENGINEERS AT ASEA BROWN BOVERI MUST STAY TECHNOLOGICALLY CURRENT IF WE ARE TO REMAIN COMPETITIVE IN THE GLOBAL MARKETPLACE. IEEE MEMBERSHIP, THROUGH ITS CONFERENCES, PUBLICATIONS AND OTHER ACTIVITIES INVOLVING LEADING EXPERTS FROM AROUND THE WORLD, CONTRIBUTES TO PROFESSIONAL GROWTH AND, THEREBY, TO THE COMPANY'S ABILITY TO COMPETE."

PERCY BARNEVIK, PRESIDENT AND CEO
ASEA BROWN BOVERI LTD.

• "AT&T PEOPLE ARE VERY ACTIVE IN IEEE. LEARNING ABOUT THE SUCCESSES AND FAILURES OF OTHER ENGINEERS WHILE ATTENDING IEEE CONFERENCES OR BY READING IEEE PUBLICATIONS SPEEDS UP OUR PROGRESS AND AVOIDS FALSE STARTS."

JOHN MAYO, PRESIDENT
AT&T BELL LABORATORIES

• "THE IEEE AFFORDS A VARIETY OF OPPORTUNITIES TO ENHANCE THE TECHNICAL VITALITY OF THOUSANDS OF IBM ENGINEERS WORLDWIDE WHO ARE MEMBERS OF THE IEEE. OUR EMPLOYEES CAN READ ABOUT THE LEADING-EDGE DEVELOPMENTS THAT ARE REPORTED IN THE EXTENSIVE PUBLICATIONS OF THE IEEE AND PARTICIPATE IN THE MANY CONFERENCES SPONSORED BY IEEE ORGANIZATIONS WHICH PROVIDE A VENUE FOR THE TIMELY INTERCHANGE OF TECHNICAL IDEAS."

JACK D. KUEHLER, PRESIDENT
IBM CORPORATION

• "SUN'S SUCCESS DEPENDS ON BEING AT THE VERY FOREFRONT OF TECHNOLOGY. ACTIVE, TWO-WAY DISCUSSIONS BETWEEN SUN ENGINEERS AND THE BEST WORLDWIDE EXPERTS AT IEEE CONFERENCES IS ONE WAY WE ACHIEVE THIS GOAL."

SCOTT MCNEALY, CHAIR AND PRESIDENT
SUN MICROSYSTEMS, INC.

• "THE IEEE SUBSTANTIALLY INCREASES THE VALUE OF OUR ENGINEERS TO US. THE INSTITUTE'S CONFERENCES, PUBLICATIONS, AND MANY OTHER PROGRAMS AND ACTIVITIES PROVIDE THEM WITH AN OUTSTANDING INFORMATION RESOURCE THAT, IN TURN, HELPS MAKE THEM MORE EFFECTIVE AND PRODUCTIVE."

J.D. TIMMER, PRESIDENT
PHILIPS ELECTRONICS N.V.

• "AT SONY, WE CONSIDER IT AN EXCELLENT INVESTMENT WHEN ONE OF OUR ENGINEERS ATTENDS AN IEEE MEETING, GETS INVOLVED WITH INSTITUTE STANDARDS PROGRAMS, OR SIMILAR IEEE ACTIVITY. BY CONTINUING TO HONE HIS, OR HER, TECHNICAL KNOWLEDGE, THAT EMPLOYEE IS ALSO HELPING TO KEEP US SHARP AND COMPETITIVE."

AKIO MORITA, CHAIRMAN AND CEO
SONY CORPORATION

• THE IEEE PROVIDES NEC WITH AN INTERNATIONAL DIALOGUE THAT IS ESPECIALLY IMPORTANT TO US IN OUR TASK OF MAKING THE INTEGRATION OF COMPUTER AND COMMUNICATIONS TECHNOLOGY A REALITY. THE INSTITUTE KEEPS OUR ENGINEERS IN TOUCH WITH THE LATEST IN LEADING-EDGE TECHNOLOGY, HELPING US TO COMPETE IN THE WORLDWIDE MARKETPLACE.

KOJI KOBAYASHI, CHAIRMAN EMERITUS
NEC CORPORATION

YOUR IEEE MEMBERSHIP IS A PASSPORT TO:

— GLOBAL NETWORKING WITH:

- Members of the world's largest technical organization in the electrical and electronics fields.
- 370,000 society memberships in 145 countries
- 37 specialized technical societies

— GLOBAL INFORMATION ACCESS:

- 22% world's electro technical literature- 200,000 pages annually published by IEEE
- 77 specialized journals • 300 annual conferences
- 650 published standards • 170 conference records

— CONTINUING EDUCATION PROGRAMS

— ACHIEVEMENT AWARD PROGRAMS



TA-93

YOUR IEEE MEMBERSHIP - THE PROFESSIONAL AND TECHNICAL EDGE

Newsletter Editor Notes

A big thank you to all the contributors who supplied articles, disk, and photographs. I was again overwhelmed with photographs and had to be selective. I do thank all our roving photographers for their candid camera shots. My secretary, Kathy Nolan, was promoted and I had to struggle with some of the typing. My wife Thresa, whose fingers fly on the keyboard, came to my rescue. Ann Scrupski and her associates at IEEE Publishing Services also came to the rescue with their editorial and artistic magic to produce what you now hold in your hand.

Eric Adler is our new distinguished lecturer. Be sure and have your section schedule him for a timely talk. Two good symposiums are coming up this year (Frequency Control and Ultrasonics). Plan on attending both. Our society symposia are noted for their high technical quality and we also have fun (in case you hadn't noticed). Be sure and read the minutes of the administrative committee meeting to know what the society is up to. Let the committee know of ways we can improve services to the membership. Take Roger and Mack up on their request for nominations for the Achievement Award and Distinguished Lecturer. Herman shows that the society is financially sound. Let's find ways to use our surplus for the benefit of the membership and continue to reach out for new members.

I will need your next newsletter inputs by July 15th. Have a good summer.

Fred S. Hickernell
Newsletter Editor

RFM

RF Monolithics, Inc.

RF Monolithics is North America's largest manufacturer of SAW devices. We are now seeking the following professional to join our SAW Design Team:

SAW Design Engineer

As a member of this team, you will be responsible for the design of SAW resonators, coupled resonator filters, SPUDT filters, delay lines, high-loss filters and new SAW devices in development. In addition to designing the product, with the use of computers, the engineer will also design RF tuning networks, write test procedures and prepare documentation for the manufacturing of the SAW device.

This position requires a minimum of 2 years SAW design experience and a minimum of a BSEE degree. A MSEE or MS in physics will be considered in lieu of the 2 years SAW design experience.

Please send resume and salary requirements to:

Human Resources Department SDE
RF Monolithics, Inc.
4441 Sigma Road
Dallas, Texas 75244

Equal Opportunity Employer



The INSTITUTE OF ELECTRICAL & ELECTRONICS ENGINEERS, Inc.
445 Hoes Lane, P.O. Box 1331 • Piscataway, NJ 08855-1331, USA

Non Profit Org.
U.S. Postage
PAID
IEEE
Permit #52