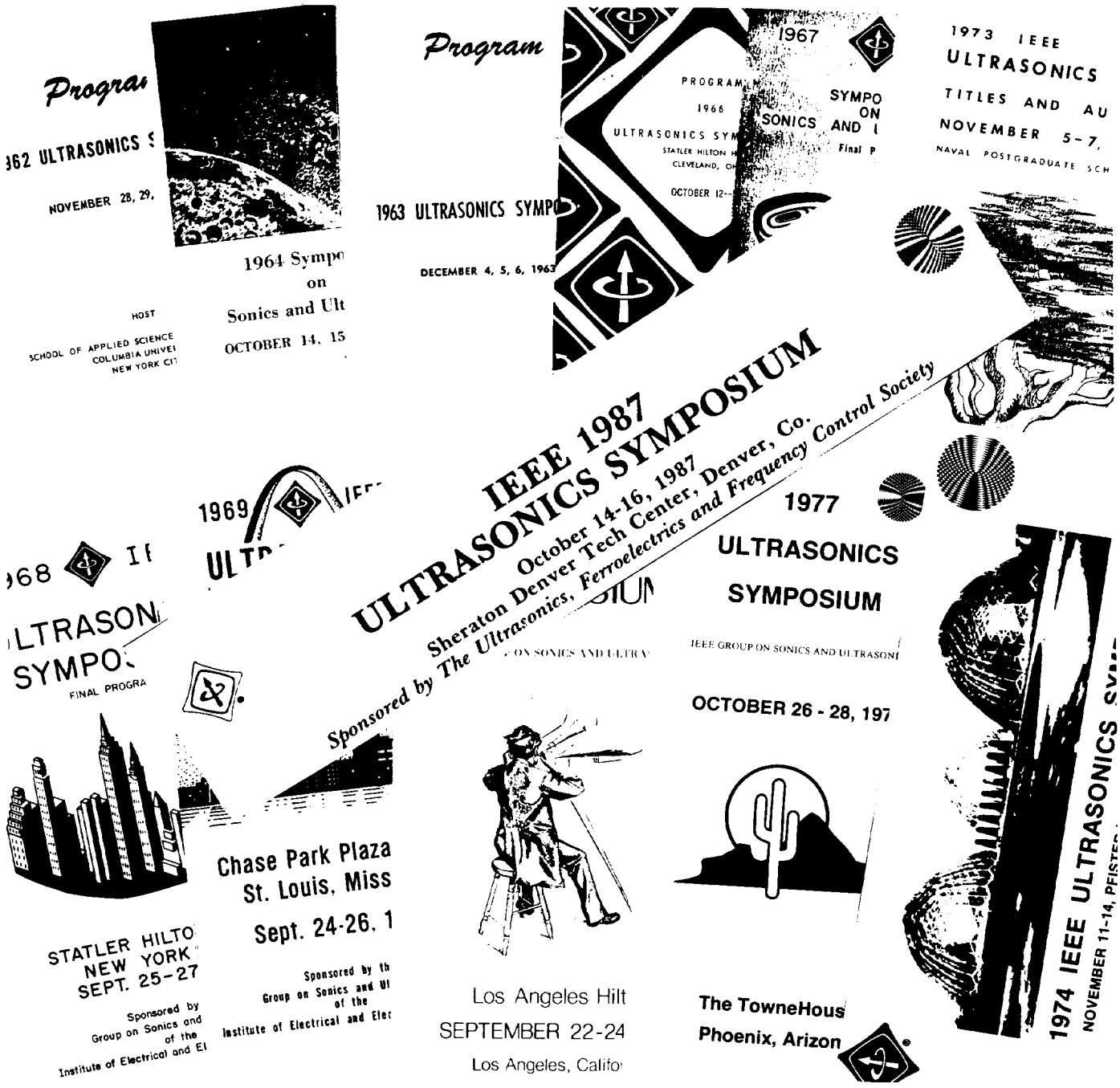
IEEE
ULTRASONICS, FERROELECTRICS AND FREQUENCY CONTROL SOCIETY NEWSLETTER

NUMBER 4 SEPTEMBER 1987 EDITOR: FRED S. HICKERNELL



Note From The Technical Program Chair

The IEEE 1987 Ultrasonics Symposium scheduled for October 14-16 at the Sheraton Denver Tech Center in Denver, CO, promises to be an exciting time. We have an invited poster presentation and demonstration on Ultrasonic Motors. This will be complimented by several oral session papers on the same topic. The symposium this year will feature an invited talk on Ultrasonic Measurements in a high temperature superconductor,

The Technical Program Committee's work this year was difficult as the quality of papers appeared to be at an all time high. You are all to be congratulated. The committee worked very smoothly and efficiently putting together this year's symposium. I'm sure you have all received the Advance Program by now. The Vice-Chairs of our working groups have prepared summaries of the Symposium Highlights for you. We are looking forward to seeing you in Denver.

Group I

Roger Tancrell

Featured in piezoelectric transducers is a new type of motor driven with ultrasonic waves. A live demonstration of several types of motors, which have the advantage of light weight and high torque at low speed, are presented. In other types of transduction, an integrated sensor fabricated by depositing (and poling) a piezoelectric polymer directly on a silicon chip is described. The session includes comparisons between medical transducers made from different types of polymers and ceramic/polymer composites. Finite element analysis is applied to the composite structures, as well as to array element to give a more complete description than with a simple analytic model. The effort of anistrophy of the ceramic in the composite (eg, lead titanate vs PST) is discussed, as is the influence of domains in some materials. Measured properties of composites and polymers are shown over broad temperatures and frequency ranges, by new methods developed for low Q materials. Procedures to reduce multiple reflections at a transducer's interface are described.

Design and performance of transducer arrays are discussed for a variety of applications. A ring array is shown, capable of being steered in 3-dimensions to improve performance over that of a linear array. For hyperthermia applications, a sector vortex array is discussed, and a 2-dimensional array is developed to attain versatility (eg, heating the back and front of a tumor by changing focus), and an array designed for intracavity insertion is developed to bring the acoustic source close to a tumor. For imaging, sidelobe level is examined in a multi-scattering medium (eg, tissues).

High powered ultrasound in medical systems is examined in detail. At one extreme, the objective is to avoid the creation of cavitation and yet optimize image quality; the conditions for the onset of cavitation are discussed. At the other extreme, the objective is to disintegrate kidney stones ultrasonically. Instruments are described which utilize thin probes to guide sound energy to the stone in-view, or alternatively to use external focused sources. Discussion is given on how an incipient shock wave is distorted by the tissues attenuation. Non-linear properties (B/A) of human fat are reported and modeled.

Commercial development of doppler imaging equipment (with color display) is now accepted clinically. The key performance features and technical trade-offs in the design of these instruments are discussed. Improvements being explored are: use of real-time pattern recognition to automatically determine volume flow in an aorta; use of speckle pattern to improve velocity resolution; and use of an esophogeal probe with variable (mechanical focus to improve accuracy of received waveforms.

An approach to improve resolution in a static ultrasonic image is reported with a 5X improvement over conventional method. A system which records echoes from multiple angles permits characterization of scatterers as small as one wavelength via diffraction analysis. A system designed to examine skin disorders with resolution almost 0.1 mm is discussed; the high frequency components are described. A technique to overcome the inherent sensitivity limits of PUDF by exploiting its large bandwidth capabilities is presented. Novel approaches (eg, based on bubble resonances) are proposed as a means to extend the utility of doppler systems.

An in-vivo method of measuring sound speed in reflection using a commercial scanner is described. By using a large synthetic aperature, accurate results are reported on normal and abnormal liver using signal processing and pattern recognition is discussed, based on attenuation coefficient and patterns in the image. Techniques to correct for diffraction in attenuation measurments via a universal curve are discussed. Results from a breast tomography system show correlation with sound speed but not with attenuation by itself when compared to biopsied specimens. The relation between tissue composition and the non-linear parameter B/A is discussed.

Variation in sound speed from tissue inhomogenities give rise to a number of effects which compromise image quality and tissue parameter measurements. Quantitative values of variations, via time-of-flight measurements, are reported for human abdominal wall (eg, in front of liver). A method to predict the effect of inhomogeneities on a wideband (pulsed) signal is developed using angular spectrum method. An instrument to reduce speckle by introducing phase incoherence via a rotating rough screen is discussed. Change in the pitch spread function is another approach to quantify inhomogeneities. This effect is shown for subcutaneous fat as a function of apertuse size.

In tissue characterization, the molecular origin of absorption is discussed where the dominant mechanism is via protein. Dependence of absorption on molecular size, protein concentration, buffer ions, etc are presented. The significance of recent observations of a relaxation peak in the enzyme alpha-amylase is discussed. The influence of glycogen on attenuation in liver in controlled animal studies are compared to other sources of attenuation. In bioeffects, recent absorption studies in rat embryos suggest four classifications of absorption.

In tomographic imaging, a pulsed-doppler computer tomography system combines flow imaging from different directions (using 2 crossed linear arrays) to obtain improved flow mapping. In static imaging, improvements are achieved by introducing known (or bounded limits) on the reconstruction algorithm. Methods to improve that rats of convergence and stability of the solution during reconstruction are presented, along with a comparison of the relative importance of various properties (eg, absorption and speed).

Group II

Bernie Tittmann

The main emphasis of the group II presentations are on Sensors with two sessions for oral presentation and one posted session. The sessions on Sensors, include novel approaches to monitor chemistry, flow of liquids, flow of gases to sense solid objects and features for robotics, vibrations and to monitor material processing. Other sessions deal with techniques of generating and detecting sound waves ranging from transducer devices to non-contact methods with the aid of lasers. Interpretation of ultrasonic signals received are explored in sessions in Signal Processing, Ultrasonic Imaging and Defect/Material Characterization. Another highlight is two sessions on novel techniques and a range of applications in Acoustic Microscopes.

Four invited papers are featured: these are "Laser-induced Underwater Sound" by Bruce S. Maccabee of the Naval Surface Weapons Center, "Controlling a RObot with Sonic and Ultrasonic Means" by M.K. Brown of AT&T Bell Laboratories, the "Role of A Priori Information in Ultrasonic Imaging" by J.M. Richardson of Rockwell International Science Center, and "Ultrasonic Evaluation of Green-State Powder Density Compaction" by Martin P. Jones of the Alcoa Technical Center and Gerald V. Blessing of the National Bureau of Standards. These papers represent the state-of-the-art in applications of great current interest.

Group III

Art Ballato

The papers selected in Group 3 contain an exciting assortment of new results and techniques. A session on superconductivity and layered propagation deals with attenuation and acoustic velocity measurements obtained on new ceramic systems having critical temperatures above liquid nitrogen. Thin films and superlattice investigations are also described. A session on transducer design and applications and another on thin film resonators complement these papers with additional talks covering transducers consisting of layered piezoelectrics operating up to 90 GHz and development of low-loss air gap structures and miniature single-chip oscillators. Magnetostatic wave techniques and channelizers are considered in a session that deals with signal sorting and processing; focussed bulk acoustic waves are discussed as an alternative to MSW as well. Lithium tautalate and quartz are discussed for use in lower frequency conventional resonators with extremely accurate modeling of their frequency spectra in a session that also deals with microwave frequency sources. A session on elastic properties considered the dynamic control of the elastic properties of acoustic materials used in both SAW and BAW applications. The ceramic PZT can have its properties changed dramatically by the application of electric fields. Newly developed growth methods have led to greatly improved Q in aluminum phosphate (berlinite), providing how a material that stands between quartz and lithium tantalate in piezocoupling. Photothermal radiation and imaging are the subjects of a session dealing with use of these techniques in microscopy and surface absorption studies. Acousto-optics continues its strong representation in papers covering four sessions. Novel A-O techniques combined with fiber optics is dealt with in one session. The others deal with other coupled A-O and acousto-electric interactions and A-O thin films. Another session covers acoustics in fibers and the analog with fiber optics, including use of fiber acoustics for diagnostics. Additional sessions cover photoelastic imaging and visualization.

Group IV

Gary Montress

In a focused session on Programmable SAW Devices, John Cafarella (MICRILOR) will present an invited paper describing programmable SAW filters for a wide variety of system applications. Four papers describing GaAs based acousto-electric SAW signal processing devices and their performance round out this session. A second invited paper highlights a SAW Signal Processing session. Scott Monroe (MIT Lincoln Lab) will compare the performance of SAW and CCD (both silicon and GaAs) devices for correlation, demodulation, and matched filtering as well as other applications. Four papers describing high performance RAC dispersive delay line design, fabrication and performance conclude this applications oriented session.

In a session featuring Surface Transverse Waves, Prof. B.A. Auld (Stanford University) will present an invited paper describing temperature compensation for these waves. Additional papers in the session analyze surface transverse wave (STW) propagation and coupling, as well as presenting experimental results on STW resonators and oscillators. A strong SAW oscillator session is planned which emphasizes low noise VHF/UHF SAW oscillator applications and characterization techniques.

Sessions describing SAW Propagation, SAW Materials, SAW Device Design, Unidirectional SAW Transducer Design and SAW Filters are also included on the program. A fourth invited talk by Clint Hartmann (Hartmann Associates) will describe a novel SAW notch filter design and its performance during the SAW Filter Session.

Symposium Committee

General Chairman

Joseph S. Heyman

Joe Heyman received an M.A. and Ph.D. in Physics from Washington University in 1971 and 1975, respectively. In 1971, he started the Laboratory for Ultrasonics at NASA Langley Research Center which has grown to one of the major NDE research efforts in the U.S. He has over 15 patents, primarily in the field of ultrasonics NDE and over 120 papers and presentations covering a broad area of measurement science such as particle detection in flowing fluids, acoustic spectroscopy and its calibration, transducers, high resolution acoustic phase monitors, NDE in composites, residual and applied stress measurement, and thermal NDE. In 1979, he was made an Adjunct Professor of Physics with The College of William and Mary and in 1985 was appointed by Governor Robb to the Hampton Roads Sanitation District Commission.

Dr. Heyman is the only person to receive four IR-100 awards for his technology developments in 1974, 1976, 1978 and 1981. He received the NASA Exceptional Service Award in 1979, the Arthur S. Fleming Award for Outstanding Federal Employee in Science in 1981, NASA Inventor of the Year Award in 1982, and the NASA Technology Utilization Annual Award in 1979 and 1982.

He is currently Head of the Materials Characterization Instrumentation Section at NASA and is Program Manager of the Agency's Research in Advanced NDE. He lives in Williamsburg, Virginia with his wife, Berna, and daughter, Laura, and enjoys stimulating interest in measurement science with students and faculty.

Technical Chairman

Jan Brown

Jan Brown was born in Wyoming and grew up in the Rocky Mountains of Utah, Montana, and Washington. She was educated in St. Louis, MO, at Washington University where she earned her A.B., A.M. and Ph.D. degrees in Physics in 1972, 1974, and 1978, respectively.

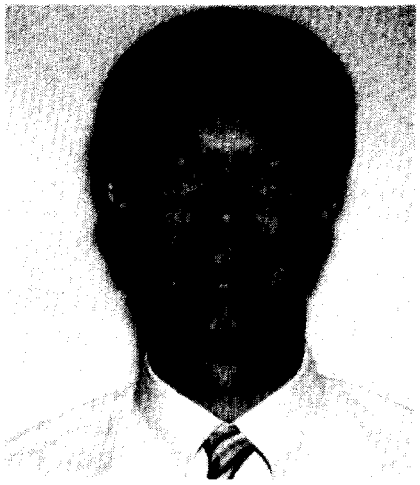
From 1978-1984 she was a member of the professional staff at Schlumberger-Doll Research in Ridgefield, CT, where she was primarily involved in investigations of materials, devices, and techniques for pressure and temperature measurements in extreme conditions. Since joining Fisher Controls in Austin, TX, in 1984, she has continued materials and sensor research and applications including development of thin films for arduous applications, and sensor materials research for pressure, temperature, flow and liquid level measurements.

Jan has been an elected member of the GSU Administrative Committee (1984-1986), a member of the Ultrasonics Symposium Technical Program Committee (1980-Present), a member of the Frequency Control Symposium Technical Program Committee (1984-Present), and is Technical Chair of the 1987 and 1988 IEEE Ultrasonics Symposium. Currently, she is Associate Editor for Materials for the IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control. She is a member of the American Physical Society and of Sigma XI.

Jan enjoys the Hill Country of Central Texas, outdoor recreation, woodworking, reading and UT Women's Volleyball and Basketball.

Symposium Committee

Local Arrangements



Dennis Dietz

Dennis R. Dietz (M'79) received the B.S., M.S., and Ph.D. degrees in Physics from Washington University, St. Louis, in 1970, 1973, and 1976 respectively. From 1976-1978 he was a Postdoctoral Fellow at the National Bureau of Standards, where his research was in ultrasound imaging. He was with McDonnell-Douglas Astronautics Company from 1978-1980, working in electromagnetic wave propagation and scattering. From 1980-1985 he was with Johnson & Johnson Ultrasound where he was Director of Research. There he developed annular array and duplex Doppler products. Since 1985 he has been President of Tetrad Corp., a research and development company specializing in ultrasound imaging and Doppler subsystems and in laboratory instrumentation. The company has recently introduced a high speed data acquisition system for imaging research. Publications include work in ultrasound imaging and a recent paper on acoustoelectric ultrasound power detection. He has been inventor or coinventor on four patents.

Dennis, his wife and two children live in the suburbs of Denver. He is active in outdoor sports and plays some tournament handball.

Transportation

Narendra K. Batra

Dr. Batra received his Masters Degree (1967) in Physics from Columbia University, New York City, and Ph.D. Degree (1972) in Solid State Physics from Wayne State University. He was Research Associate at Wayne State University until 1974. Following this, he was on the faculty at Lake Forest College, Ill. In 1977, he joined Systems Research Lab, Dayton, and worked as a contractor for Wright Patterson Air Force Base until 1982. He has been with Naval Research Laboratory since 1982.

His present research interests include NDE characterization of cracks, microstructural variations, thick composites and NMR. He has numerous publications in the area of Solid State Physics, NMR, NDE and Instrumentation.

He is a member of American Society for Nondestructive Testing (ASNT) and has been certified by ASNT as NDT Level III in Ultrasonics, Radiography, and Eddy Current. He is also a member of American Physical Society and Institute of Electrical and Electronics Engineers. He is past chairman of IEEE Sonics and Ultrasonics, Baltimore - Washington, and Northern Virginia Chapter.

Symposium Committee

Finance

Ted J. Lukaszek

Ted Lukaszek received the B.S. degree in Physics from Monmouth College, West Long Beach, NJ, in 1960, the M.S. degree in Solid-State Physics from Fairleigh Dickinson University, Rutherford, NJ, in 1966, and did post graduate work at the Polytechnic Institute of Brooklyn, NY, from 1967 to 1970.

Currently he is leader of UHF/Microwave Frequency Sources Team in the U.S. Army Electronic Technology and Devices Laboratory at Ft. Monmouth, NJ. He has done extensive work with bulk acoutic wave (SBAW) devices and has authored/co-authored a number of papers in these areas. More recently, he has investigated the properties of dielectric resonator oscillators (DRO). He is presently applying the results of those investigations to the development of components/subsystems that serve as frequency selective and stable frequency sources in communications, radar, and electronic warfare systems.

His work in these areas have been acknowledged with the receipt of the U.S. Army Research and Development Achievement Award in 1980 and again in 1986, the Electronic Technology and Devices Laboratory Harold Jacobs - Certificate of R&D Excellence Award in 1984 and the Secretary of Defense DOD Productivity Excellence Award in 1987.

Ted is a senior member of the Institute of Electrical and Electronic Engineers (IEEE), and serves on numerous committees in the Microwave Theory and Techniques (MTT) and the Ultrasonics, Ferroelectric and Frequency Control (UFFC) Societies.

Publicity

Arlene P. Maclin

Arlene P. Maclin received her B.S. degree in engineering physics from North Carolina A&T State University in 1967. She continued her graduate work in nuclear physics at the University of Virginia where she completed her M.S. degree in 1971. She received her Ph.D. in Solid-State Physics in 1974 from Howard University. She was a staff scientist at MIT Lincoln Laboratory from 1975-1976. She has held various assignments in universities and in the Federal Government.

In 1983, she went to Oak Ridge National Laboratory as a visiting scientist in the metals and ceramics division. She performed theoretical calculations on the nickel and iron aluminides. In 1985, she founded her own company called NOVALINK, INC., for the purpose of performing materials research designed to improve defense systems. She has a number of publications in the field of Solid-State Physics.

DENVER

Symposium Committee

Publications

Gerald V. Blessing

Dr. Gerald V. Blessing is a physicist in the Ultrasonic Standards Group of the Center for Manufacturing Engineering at the National Bureau of Standards (NBS) in Gaithersburg, Maryland. He earned his doctorate in solid-state physics from the Catholic University of America studying electron-phonon interactions in metals at low temperatures using ultrasonic techniques. Upon completion of the thesis, he spent seven years at the Naval Surface Weapons Center (Maryland) in ultrasonics research and nondestructive testing. These areas included magnetoelasticity measurements in highly magnetostrictive metal alloys, elasticity measurements of metal matrix composites, and void detection in cast explosives. Since coming to NBS in 1980, his research has been in ultrasonic measurements of material properties, defect artifact and velocity calibrations, and sensor developments. Specific areas of concentration have been in residual stress and texture measurements in metals, in-process monitoring of ceramic elasticity, and evaluating material surface roughness by ultrasonic scattering.

His relaxation periods take him jogging, landscape gardening, and watching his daughter perform on the soccer field. Extracurricular involvement with professional, civic, and church groups consume the remainder of time's short hands.

Proceedings Editor

Bruce McAvoy

Bruce McAvoy has been the Editor and formerly the Co-editor with John de Klerk of the Ultrasonics Symposium Proceedings since 1976. He is currently an Advisory Scientist in Microwave Acoustics at the Westinghouse R&D Center in Pittsburgh, PA, having been active in the area of SAW and bulk mode devices since 1972. He has published over 50 papers in the microwave field concerning effects in bulk and junction semiconductors in addition to microwave acoustics. Currently, his work includes new designs and processing techniques for microwave bulk mode delay lines, high overtone bulk mode resonators and a study of the effects of magnetostrictive films on SAW propagation for device applications. He holds 9 patents in these areas with several pending.

Bruce has served as the Meetings Chairman of the Group from 1975 to 1981 and was General Chairman of the 1982 Ultrasonics Symposium in San Diego. In 1981 he joined the Meetings Committee of the Technical Activities Board of the IEEE as Division IV representative. He has served two terms as Vice President of the Group on Sonics and Ultrasonics. Bruce currently serves as President of the Ultrasonics, Ferroelectrics and Frequency Control Society.

Spouse's Program

In addition to the usual state-of-the-art papers we expect at the IEEE Ultrasonics Symposium, this year we will have an excellent spouse's program to sample the National treasures which are within a several hour radius of the Denver, Colorado conference site. The number of 14,000+ foot high mountains and their beauty is hard to describe in words. The National Parks are outstanding!

For the conference, we will have a unique opportunity to gather for an evening of great food, music and art at the Denver Art Museum, our planned evening outing for the Symposium. In addition to having some of the galleries open for our pleasure, we will see a special exhibit on the long history of film making in the United States including actual hardware items that are part of immortality such as the ruby slippers in the movie "The Wizard of OZ" and Marilyn Monroe's dress in one of her famous movies.

The evening outing will be a chance to socialize, catch up on the latest research news in an informal atmosphere, have a delightful dinner with friends, and see great art with appropriate live music in the background. As we must schedule the food and transportation, it is requested that everyone pre-registers for the conference and checks the block for the special evening activities.

See you in the mile high city!

Joseph S. Heyman
General Chairman

Frequency Control Symposium

The 41st Annual Frequency Control Symposium was held 27-29 May 1987, at the Dunfey City Line Hotel, Philadelphia, PA. There were 86 technical papers presented at 20 sessions. The titles of the sessions included: Resonator Theory, Atomic Standards, Electrodiffusion and Point Defects, Etch Channels and Dislocations, Hydrogen Masers, Microwave and Millimeter Oscillators, Instrumentation and Time Transfer, SAW Devices, Sensors and Transducers, Frequency Synthesis and Quartz Oscillators.

Three awards for outstanding achievement were presented. The Cady Award was presented to Virgil E. Bottom, the Rabi Award to Louis Essen, and the Sawyer Award to John A. Kusters.

The 42nd Annual Frequency Control Symposium has been tentatively scheduled for 1-3 June 1988, in Baltimore, MD. Actual dates, location and details of the program will be announced in late 1987. For information concerning the 42nd Symposium please contact:

Synergistic Management Inc.
P.O. Box 826
Belmar, NJ 07719 USA
(201) 280-0410

Proceeding of the 41st Symposium can be ordered from the:

IEEE
445 Hoes Lane
Piscataway, NJ 08854

Raymond L. Filler
Publicity Chairman

Standards Committee

When more than one IEEE Society has an interest in participating in the writing of an IEEE Standard, the IEEE Standards Board (New York) sets up a Standards Coordinating Committee (SCC) composed of members of the interested societies.

We are currently involved with the establishment of an SCC jointly with Instrumentation and Measurement (IM) and Microwave Theory and Techniques (MTT) Societies to handle Time and Frequency Metrology Terminology.

The IEEE Standards Board requires approval by the participating societies' ADCOMs. Both IM and MTT have given approval, and the following motion was approved by ADCOM:

The UFFC-S ADCOM approved the formation of, and participation in, a Standards Coordinating Committee, jointly with IM-S and MTT-S, to deal with standardization of time and Frequency Metrology Terminology.

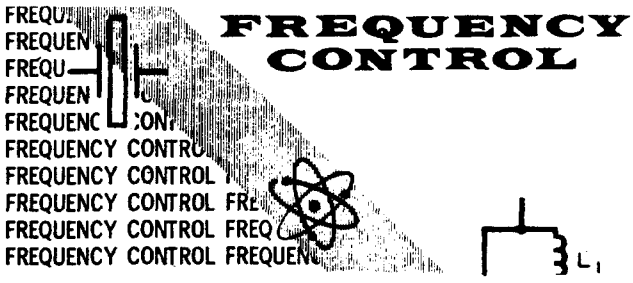
Arthur Ballato
Chairman, Standards Activities

Call for Papers

42nd Annual Frequency Control Symposium, Stouffer Harborplace Hotel, Baltimore, MD, June 1-3, 1988. Topics include: crystal resonators, oscillators and filters; SAW devices; atomic frequency standards; and time coordination and distribution. Send a 500 word summary to:

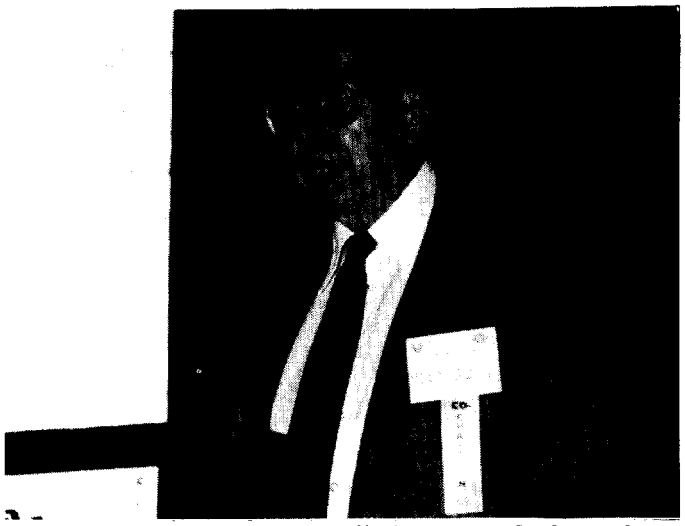
T. R. Meeker
2956 Lindberg Ave.
Allentown, PA 18103

Deadline for summaries: January 18, 1988.



Frequency Control Symposium

General Chairman John Vig making opening remarks.

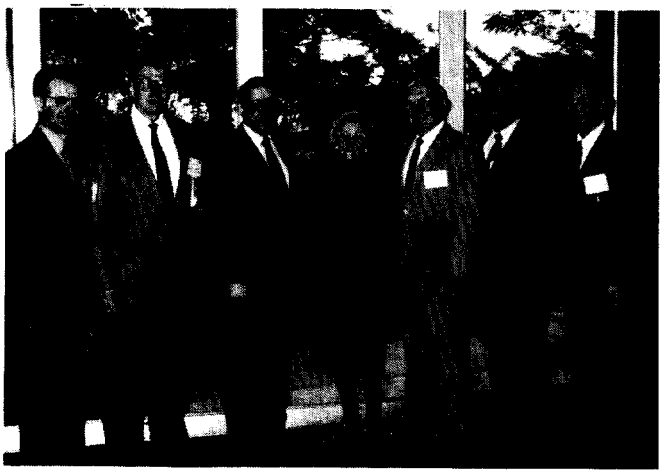


Technical Program Committee Chairman Len Cutler welcoming the attendees.

Charles Adams presenting the Cady Award to Virgil Bottom.

Charles Adams presenting the Sawyer Award to Jack Kusters.

John Vig accepting the Rabi Award for Louis Essen who was, unfortunately, unable to travel to the Symposium to accept the award.



Award ceramony participants John Vig, Len Cutler, Jack Kusters, Dr. and Mrs. Virgil Bottom, Charles Adams and David Allan.

Frequency Control Symposium

Bruce McAvoy and Harry Salvo helping attendees to IEEE literature at the IEEE-UFFC Society booth.

Dave Allan and Jim Barnes discussing the statistics of frequency standard stabilities.

Alton Armington, Earle Simpson and Joe Balascio discussing how not to grow quartz.

Don Malocha, Tom Parker and Gary Montress discussing SAW devices during intermission.

Robert F.C. Vessot, Derek Morris and Lauren Rueger discussing atomic frequency standards during intermission.

Ferdinand Euler, Jack Kusters, Al Kahan, and Joel Martin discussing quartz defects.

President's Message

"I think you ought to do as you like but above all like what you do." Such Winston Churchill's admonition to his offspring. I join with those who believe that the most fulfilling experience is to have fun and accomplish something at the same time. Over the past two years your AdCom has had some tough problems most of which had to do with money. During our meetings there was little if any rancor, no raised voices and no hard feelings. I think that is noteworthy. As I leave as your president, at year's end, I know that I will regret no longer working with such a remarkable group.

This past year Bob Adler, Awards Chairman, asked to step down. He has been an important contributor to many aspects of our Society and not a few of us have benefited from knowing him. Our new Awards Chairman is Roger Tancrell who joins AdCom as an Ex Officio member having served previously as an elected member. Roger's appointment is evidence of the importance we attach to our awards program.

Usually AdCom meets two times a year, early spring and in the fall. This year however events were such that an extra meeting was required. This took place on July 8, 1987, at the Sheraton Denver Tech Center which is the site of this year's Ultrasoncis Sysmposium (October 14-16). Prior to this meeting a task force headed by Bob Moore had been established. Its functions have been running from fact finding to drafting recommendations for formal AdCom approval. An extensive report on these activities was provided to AdCom by Bob Moore. He will, I believe, report to you in these pages in the futrue at the conclusion of the task force. As an example, we have had in the past less than 20% response to voluntary page charges from authors in the Transactions. Actions have been taken by Bill O'Brien, Jr., Transactions Editor to bring the level to near 50%. Further imporvements are expected through his and the Associate Editor's efforts. The result will be more pages available to the Transactions and a stronger, more useful journal.

Of our long range problems/opportunities I believe the identity of our Society like that of the IEEE often suffers. Let me use an analogy: What state do you live in? The state of (you fill in) and other than taxes and speed laws so what? The community you live in however is much more important, more immediate, your turf. We have to work to be more of a community to serve our members best. Are we having fun yet? I think so and I believe it will continue.

Bruce McAvoy
President UFFC-S

AdCom Briefs

Breaking with tradition, the first AdCom meeting of 1987 was held on February 11, 1987 at the Holiday Inn North, Newark, New Jersey. This was done so that the Annual Frequency Control Symposium Technical Committee, UFFC-S AdCom, and Ultrasonics Symposium Technical Committee could be held at the Holiday Inn North on consecutive days. Bruce McAvoy presided over the meeting that was attended by 22 people.

Like the previous meeting, the focus quickly turned to the financial status of the Society. H. Van de Vaart presented a very comprehensive financial report showing that UFFC-S expenses, like the last few years, greatly exceeded the income. In order to recover from this decline several resolutions were adopted.

The first motion to pass was: "It is the intent of AdCom that in the long run, the number of pages in the Transactions be governed by the editor's ability to generate papers and the ability of UFFC-S to pay for it." The second motion passed stated that "the Transactions should be approximately selfsupporting." In order to raise more revenue, short courses were approved as part of the symposium and the continuation of exhibits. As a cost savings, it was unanimously passed that the monetary award for the "Best Paper" award be removed and a plaque used instead.

B. R. McAvoy reported that Henry Bertoni was elevated to Fellow and will receive his certificate at the Ultrasonic Symposium. After several outstanding years of service, R. Ader requested to step down as Award Chairman. R. H. Tancrell agreed to replace him.

In Technical Activities, Art Ballato stated Meitzler's revision of 176-1978 for piezo-electric crystals was sent to IEEE Headquarters and "Terms and Definition for SAW Devices was sent to sub-committee members.

The Transaction editor, W. D. O'Brien, Jr., pointed out that for 1987 all issues are completed and that more authors are honoring the voluntary page charges. They are now paying at a rate of 39.5% compared to the 15% compliance rate for the three previous years. However, according to the IEEE controller, the normal rate is about 70%.

R. A. Moore reported on the Chapters/Membership. A "Speaker Listing" has been mailed to all chapter Chairmen. As of December 31, 1886, the UFFC-S has 2,333 members. J. D. Larson's 1988 slate of nominees was unanimously approved.

G. W. Farnell presented his list of upcoming Ultrasonic Symposiums. J. S. Heyman, 1987 Denver Chairman, is actively trying to expand the number of exhibits. R. Kagiwada, 1990 Hawaii, is negotiating with hotels on Oahu. D. C. Malocha, 1991 Orlando, is looking at various hotels. R. Colvin has both general review and special topics types of short courses for the 1988 Ultrasonic Symposium.

T. E. Parker stated that the Frequency Control Symposium registration has increased to $150. Also, thirty minute invited papers are part of the symposium.

W. A. Smith stated the ISAF 1986 showed a surplus. A resolution was passed UFFC-S to cooperate with the organizer of the First European Conference on Applications of Polar Dielectrics/IEEE 1988 International Symposium on Applications of Ferroelectrics to be held August 29 - September 2, 1988 in Zurich, Switzerland.

B. McAvoy appointed M. Levy as UFFC-S representative for Educational Activities. AdCom adjourned at 4:00 P.M; the next meeting is scheduled for July 8, 1987, at Sheraton Denver Tech Center, Denver, Colorado.

Reynold Kagiwada
Secretary/Treasurer

New AdCom Members

Nobuo Mikoshiba

Nobuo Mikoshiba was born in Japan in 1930. He received the B.S. and Ph.D. degrees in Solid State Physics from Nagoya University in 1953 and 1960, respectively.

He joined Electrotechnical Laboratory, Tokyo, in 1957 and was engaged in researched on physical acoustics and acoustoelectronic devices. He is a Professor in the Section of Acoustoelectronics, the Research Institute of Electrical Communication, Tohoku University, Sendai, since 1974. He is Director of the Laboratory for Microelectronics of the Institute founded in 1984. He has been engaged in researches on various kinds of SAW-Semiconductor devices and Photoacoustic Spectroscopy in semiconductors.

Nobuo served as Chairman of the Steering Committee for the 5th (1984) Symposium on Ultrasonic Electronics in Tokyo. He is Vice-Chairman of the Organizing Committee on the 19th (1987) and 20th (1988) Conference on Solid State Devices and Materials in Japan, and will serve as Chairman for the 21st and 22nd Conference. He was the first Chairman of Tokyo Chapter of IEEE UFFC Society, which was established on August 5, 1983.

He is married to Ryoko and they have a daughter, Yuri, who was born in Chicago in 1963. Every morning he relaxes in his small backyard, where he enjoys to see many kinds of trees and flowers.

Eric Cross

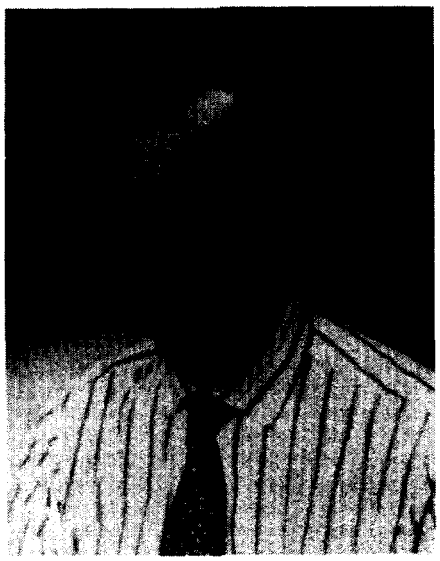
L. Eric Cross was born in Leeds, England in 1923. He earned B.S. and Ph.D. degrees in Physics at Leeds University where he was a University Scholar. From 1952 to 1955 he was an Imperial Chemical Industries (ICI) fellow researching ferroelectric and antiferroelectric behavior.

In 1956 Dr. Cross joined the Electrical Research Associates in Leatherhead, England where he worked on dielectric and ferroelectric crystals until coming to the USA in August 1961. He joined Penn State University initially in the Department of Ceramics, but was also associated with the Materials Research Laboratory since its inception in 1964.

Eric is now an Evan Pugh Professor of Electrical Engineering and the Director of the Materials Research Laboratory at Penn State. He is a member of the National Academy of Engineers and a fellow of the I.E.E.E., the American Institute of Physics, the American Ceramic Society, and the American Optical Society. He is a recipient of the John Jeppson medal and award, the Ross Coffin Purdy award of the American Ceramic Society, best paper awards from the Electronics Division of the Ceramic Society in 1968 and from IEEE Ultrasonics Ferroelectrics and Frequency Control Society in 1985. He was also a recipient of the Penn State University Scholars Medal in Physical Sciences and Engineering in 1982. Professor Cross is a member of the National Materials Advisory Board (NMAB) and of the Materials Research Council of the Defence Advanced Research Projects Agency (DARPA). He is on the editorial board of Ferroelectrics and of the Journal of Materials Science and Materials Science Letters.

Eric's wife Lucilla is a homemaker and they have six grown children Peter Charles, Matthew John, Daniel Eric, Rebecca Lorna, Rachel Jean, and Elizabeth Mary. Four male grandchildren have now ensured the complete transfer of the "Cross clan" from England to the USA.

New AdCom Members



Rolf D. Weglein

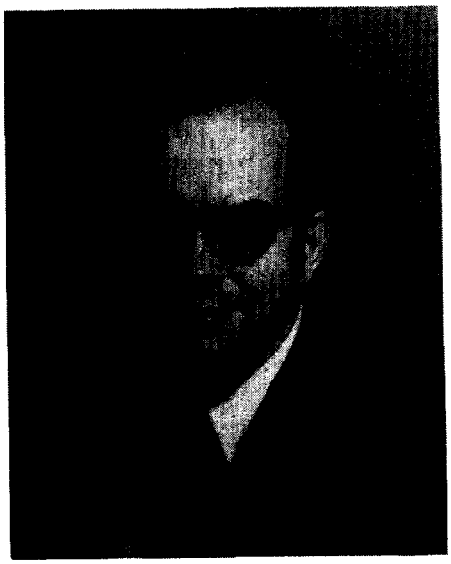
Rolf Weglein, born in 1920, is a native of West Germany. In California since 1937, he was formally educated at the California Institute of Technology, Pasadena, CA leading to B.S.E.E. and M.S.E.E. degrees in 1953 and 1954, respectively. Since then, he has been with the Hughes Aircraft Company. He has 12 issued patents to his credit as well as 78 published papers and invited talks. His current position is Senior Staff Engineer at the Company's Missile Systems Group.

Rolf's career spans 33 years of microwave electron beam, solid state and acoustic device research as well as the exploratory development of these devices and their impact on radar systems. He has taught a graduate extension class in microwave electronics at the University of Sourthern California.

During the past 10 years, Rolf has also taken an active interest in acoustic microscopy. He developed reflection acoustic microscopy, particularly as a metrology tool for nondestructive evaluation of microelectronics, materials and modified surface characterization. In this field, he was Senior Visiting Fellow at the University of Oxford, England in 1981, and at the Centre Nationale de la Recherche Scientifique, Besancon, France, 1984.

Long affiliated with the IEEE UFFC and MTT-S Societies, Rolf currently serves on the Technical Program Committee of the SUFFC's Annual Frequency Control Symposium. He also hold membership in APS, ASNT, Tau Beta Pi, and the Research Society of America.

Rolf likes literature, tennis, hiking, animals - especially Gus, the family dog - nature photography and travel, not always in that order. Ruth, his long time mate in matrimony is a pianist, some-time teacher and independent travel agent in her spare time. Her green thumb keeps the family home in bloom.



Tom Parker

Thomas E. Parker (M'79-SM'86) was born in Natrona Heights, PA, on September 17, 1945. He received his B.S. in physics from Allegheny College in 1967. He received his M.S. in 1969 and his Ph.D. in 1973, both in physics, from Purdue University. His doctoral thesis was a Brillouin scattering study of acoustoelectric domains in GaAs.

In August, 1973, Dr. Parker joined the staff of the Raytheon Research Division working with the Generalized Filters and Microwave Acoustics (now Stable Sources) Group. Initially, his work was mainly related to development of improved temperature stable surface wave materials. He was responsible for the development of the fused silica-lithium tantalate structure, which not only has higher piezoelectric coupling, but also has only one-tenth the temperature sensitivity of ST-cut quartz. More recently, Dr. Parker has been responsible for the surface wave controlled oscillator program at the Research Division. His primary interest has been frequency stability, with emphasis on 1/f noise, temperature stability, and aging.

Dr. Parker is a member of IEEE, Sigma Pi Sigma, and Sigma Xi. He has served on the Technical Program Committees for both the Ultrasonics Symposium and the Frequency Control Symposium. He was Finance Chairman for the 1980 Ultrasonics Symposium and is the current Finance Chairman for the Frequency Control Symposium.

Chapters – Membership

What has the UFFC-S done lately for its membership? One of the most impressive is the increase in the size of the Transactions! For several years, the Transactions was running at about 450 - 500 pages annually. Starting in 1984 the page count has increased rapidly so that in 1988 we will publish 800 pages. We are projecting an increase of 100 pages annually, i.e., 900 pages in 1989 and to 1200 pages in 1992. If the quantity of quality papers calls for increases in 1993 and beyond, you can be sure we will find a way to continue increasing the page count after the present plan works out.

As you are aware of, the UFFC-S manages the Ultrasonics, the Frequency Control and the Ferroelectric Symposia. We hope you come to these symposia which are certainly the industry standards for each of their fields. Even if you cannot, at least you can order a copy of the Proceedings at an attendee rate for the Ultrasonics Symposium at the time of the symposium. We are working on having a memberhsip discount for the other two.

Other membership services include the distinguished lecturer and a speakers' pool for UFFC-S chapters. Do you make use of our chapters? They are in the major cities where we have membership concentrations, i.e., Boston, Long Island, Baltimore/Washington/Northern Virginia, Pittsburgh, Orlando, Santa Clara Valley/San Francisco, Irvine (CA), Portland, and Tokyo. Both the distinguished lecturer, selected annually, and the speakers' pool, constantly being updated, provide quality speakers for all our chapters and student groups oriented toward UFFC-S related technologies. If you are near a chapter, why not take advantage of their programs? You are probably on their mailing list. If you are in a membership concentration that doesn't have a chapter, why not organize one? Our new chapter's correspondent, Narendra Batra, is anxious to talk to you. Call him at (202) 767-3505 or write him at NRL, Code 5834, 4555 Overlook Avenue, Washington D.C. 20375.

Since our original reason for being was to publish a transactions, certainly we should put a high priority to quick publication of quality submitted papers. If it weren't for the extremely high cost and rapid increase in numbers of quality papers, we certainly would. Because of the very high cost, we have to work toward increasing the annual page count until we are publishing all quality papers on a quick turn-around basis. It is necessary to increase the page count gradually rather than as rapidly as we would like. We are concentrating on all means of income including voluntary page charges, conference surplus (including exhibitions) and dues. Though none of these main sources of income can individually provide the increase needed to keep up with the number of quality papers being received, each must do its share. This is the kind of problem we like to have - so many quality papers we require extra effort to provide the means to publish them. As noted above, we are now projecting a 100 page count increase per year which should begin to catch us up. This is considered a business like way to increase - an approach through which we can expect to just about meet costs as we go.

To meet this scheudled increase, all major sources of income mentioned above must advance, Voluntary page charge compliance for UFFC-S is up from 15% to about 40%. Some societies are at the 80% to 95% area for voluntary page charge compliance. This is the level which UFFC-S needs to meet to finance publication of all quality papers received on a timely basis. The Transactions editor is increasing significantly the attention given to the need for voluntary page charge compliance with each paper received.

A very hopeful way of increasing revenue toward supporting the Transactions is through increasing and/or initiating exhibits at our symposia. The Ultrasonics Symposium has currently a small exhibition which provides a small funding surplus. This exhibition needs to be increased. The Frequency Control and Ferroelectric Symposia are considering the possibility of having exhibitions. The UFFC-S Administrative Committee has agreed in principle that a continuing committee (rather than each year's symposium starting new on the exhibition) is needed to provide a sounder basis for more repeat exhibitions and strategies for develpoing more new exhibitions. Also, such a committee could look into the possibility for exhibits for our other symposia.

The cost of bringing you the Transactions is approximately $87.00 per member. The cost of increasing the page count is approximately $200.00 per page. The fact that we have non-member individual and group subscribers who pay over ten times the current member dues of $10.00 along with the other sources of income we have been discussing is what brings the Transactions to you at such a low member cost. Now both to help finance the increased size of the Transactions and comply with both IRS and postal guidelines that the member rate must be at least 10% of the nonmember rates, the Administrative Committee has voted to increase the member rate to $15.00 annually. This new rate will be effective in 1988. Now none of us likes to experience a cost increase. We certainly hope, however, that with the increasing sized transactions and the many other values available to the membership, you and all our present membership will want to renew our memberships when they come due this year. In fact why not each member bring in another member. That would make a real dent in our financial need and permit more rapid publication of our papers backlog.

R.A. Moore
Committee Chairman

CHAPTER CORRESPONDENCE

We are happy to announce the appointment of Dr. Narendra K. Batra as Chapters Correspondent. In this job it will be his function to collect and transmit to the chapters information which will be helpful in carrying out their functions. This could include information on speakers, possible sources of support, such as the annual stipend provided by the society, and other timely information.

As Chapter Correspondent he will be calling Chapters periodically to learn of their success and any problems which may develop. When problems are identified it will be Narendra's function to serve as an interface witht he society and assist in developing sources for solving these problems. UFFC Chapter officers and members are encouraged to contact him at:

Dr. N. K. Batra
P.O. Box 323
Springfield, VA 22150-0323

by writing or (202) 767-3505 (office) or (703) 690-6677 (home). He will welcome input from all the UFFC members regarding how to improve chapter activities for its members.

Membership Report

Harry L. Salvo, Jr.

As of June 20, 1987, the Ultrasonics, Ferroelectrics, and Frequency Control Society consisted of 1,984 members. This membership is broken down as follows:

84	Fellows
249	Senior Members
1,372	Members
116	Associates
257	Students
6	Affiliates

Members who are involved in conferences which would be of interest to persons in the ultrasonics, ferroelectrics and frequency control community are urged to have UFFC membership materials on display at their conference. These materials can be obtained from:

Dr. Harry L. Salvo, Jr.
333 Gordon Avenue
Severna Park, MD 21146

In addition to conferences, this material is available to local chapters and any society members who need them.

We wish to welcome the following new members who joined the society during the first half of 1987.

Ackeret, Roger P.
Ahmadi, Hossein M.
Ahn, Jae Y.
Al-Wasmi, Khaled A.
Austen, Mark A.
Austin, J. E.
Avalos, Juan Z.
Baker, Steven R.
Bashyam, Manohar
Baumbach, Peter
Benito, Juan J.
Bernard, Marc
Besnard, Michel L.
Brown, Lewis F.
Budai, Jerry M.
Cha, Soon Chil
Cheeke, David
Chellappan, Ramasamy
Chowdhury, Reza
Cross, Leslie E.
Dange, Sanjeev M.
Daukas, John S.
Davis, Robert R.
Douthat, Howard B.
Ebbini, Emad S.
Echenrode, Robert M.
El-Kareh, Edwin V.
Eldefrawy, Mostafa H.
Ellis, John E.
Ermete, Piana
Errabolu, Ravimeher L
Evans, Bruce B.
Fiene, Dale G.
Frazier, A. B.
Gardner, William M.
Gessert, James M.
Gilbert, Barry E.
Godil, Asif A.
Goncalves-S-Isep, Manuel
Grandia, Willem A.
Greenhalgh, Philip A.
Groenendyk, Jan C.
Gruber, Carl L.
Grundy, Reed H.
Gutierrez, Manuel
Hakalahti, Hannu A.
Hallett, Robert L.
Han, James C.
Hanaoka, Kazuhisa
Harris, Jerry M.
Hergatt, N. Keith
Irion, Klaus M.
Isley, Jan L.
Iuclea, Harry I.
Johnson, W. A.
Juhola, David B.
Kato, Kokichi
Kenney, Jerry L.
Kershaw, Charles H.
Kheong, Wong Chee
Killian, James G.
Kimmell, Andrew D.
Klug, Kevin L.
Korhonen, Jukka T.
Kurtz, Kevin D.
Lau, Keifung
Leaker, Michael G.
Lee, Ho Young
Lee, John N.
Lee, Sang In D.
Leopold, Hans A.
Levinson, Judith
Lim, Jun S.
Loboda, Mark J.
Lobodzinski, Slawomir M
Long, Bruce R.
Lorkowski, Thomas P.
Maclennan, Stephan A.
Macleod, Norman C.
Macon, Richard C.
Marchywka, Mike
Marlow, Joseph M.
Massimo, Comparini
McCray, Allan G.
McGregor, James A.
McIntyre, Thomas J.
Mcnitt-Gray, Micheal F.
Miller, David G.
Miller, James K.
Mo, Jianhua
Morris, Robert C.
Mugdan, C. J. M.
Munoz, Daniel
Nelson, Thomas R.
Niizaki, Nobuya
Nussle, Werner F.
Pagancarlo, Luis A.
Palmstrom, Robert E.
Park, Seong-Su
Parks. Chris E.
Payne, John P.
Perera, Asanga
Peterson, Faye V.
Phillips, George R. (Jr.)
Pilla, Arthur A.
Purewal, Tarsem S.
Rago, Lon D.
Reimund, James A.
Rodgers, Micheal J.
Rofheart, Martin S.
Ross, Larry
Sandland, Paul
Sandra J. Moe
Sanford, Jerald R.
Savre, Steven L.
Schelbert, Peter
Sidlowski, Robert
Sikora, Robert M.
Silva, Richardo H.
Silver, J. F.
Song, Minkyu
Stanley, D. O.
Suzuki, Shigeru
Takeuchi, Yasuhito
Tanaka, Kunimichi
Taylor, Lawrence S.
Tesei, Alberto T.
Tupper, Bradley J.
Uemura, Hirozumi
Uetakaya, Koichi
Vaccaro, John R.
Vaddiparty, Y. P.
Vickers, David S.
Watson, Lawrence E.
Watters, Bill G.
Whitlock, Jonathan
Wilbur, Joellen
Yamen, Victor
Yao, Xi
Yeung, King-Wah W.
Yuen, Suet F.
Yung, Shing M.

Chapter Activities

BOSTON CHAPTER

The Boston Chapter of the UFFCS had an interesting varied collection of speakers covering a wide range of topics during the 1986-1987 meeting year. Several meetings were held jointly with other Boston area chapters, thus adding to the diversity of subjects presented as well as increasing attendance. The meeting dates and the topics/speaker for the 1986-1987 year were:

DATES	TOPIC/SPEAKER
October 15, 1986	"History of a SAW Retiming Filter for a Trans-Atlantic Fiber Telephone Cable," Dr. R. L. Rosenberg, AT&T Bell Labs
December 10, 1986	"High Performance Transducer Microprocessor Modules for Ultrasonic Air Applications," D. P Massa and F. Massa, Massa Products, Inc.
January 14, 1987	"The Rubidium-Crystal Oscillator (RbXO)," W. J. Riley, EG&G, Inc.
February 4, 1987	"Heating: An Emerging Technology for Cancer Therapy," Dr. P. P. Lele, MIT.
March 18, 1987	"Finite Element Modeling for Ultrasonic NDT, "Prof. R. Ludwig, Worcester Polytechnic Institute.
April 1, 1987	"Acousto-Optic Interactions, Devices and Applications," Prof. C. Tsai, U. of C. Irvine UFFCS 1986 Distinguished Lecturer
May 20, 1987	"Underwater Acoustic Imaging: Current Status and Future Frontiers," Dr. J. S. Jaffe, Woods Hole Ocenaographic Institute

Chapter officers for the 1986-1987 year were:

Chairman:	Tom Szabo Hewlett-Packard Andover, MA
Vice-Chairman:	Gary Montress Raytheon Research Div. Lexington, MA
Sec./Treas.:	Alan Budreau Sanders Associates Nashua, NH

Elections for 1987-1988 officers were held at the May 20, 1987 meeting. Officers for the upcoming year are:

Chairman:	Gary Montress
Vice-Chairman:	Alan Budreau
Sec./Treas.:	Tom Shoup Hewlett-Packard Andover, MA

While details of next year's speakers and their topics are incomplete at this time, the first meeting is planned for November 1987. There will be no October 1987 meeting as this conflicts with the 1987 IEEE Ultrasonics Symposium scheduled for October 14-16, 1987 in Denver.

Gary Montress
Chapter Chairman

TOKYO CHAPTER

1. Technical Meetings

The Tokyo Chapter has held 5 technical meetings during the first half of the year in conjunction with the Technical Group on Ultrasonics of the Institute of Electronics, Information and Communications Engineers in Japan as follows:

Date	Papers	Place
January	11	Tokyo
February	7	Yokohama
March	5	Tokyo
May	6	Tokyo
June	8	Tokyo

2. A China-Japan Joint Conference on Ultrasonics was held in Nanjing 11-14 May 1987 which was partially supported by UFFC-Tokyo Chapter. A total of 155 individuals took part, 52 of them Japanese, and 118 papers were given of which 44 were presented by Japanese researchers.

3. The 8th Symposium on Ultrasonics is scheduled for 8-10 December in Tokyo and Dr. Mach Breazeale, UFFC-S National Lecturer for 1987-1988 has accepted an invitation to be guest speaker.

Yasutaka Shimizu
Vice-Chairman
Tokyo Chapter - UFFC

PITTSBURGH CHAPTER

The Pittsburgh UFFC/Electron Devices joint chapter held two meetings in 1986/87. Chen Tsai (UFFC Distinguished Lecturer) presented "Acousto-Optic Interactions, Devices and Application" at the fall meeting which was held in conjunction with the Optical Society of America. The spring meeting was held in cooperation with the Westinghouse R&D Center Physics Colloquium Series. The speaker was Ed Niehenke (MTT Distinguished Lecturer) who discussed "Gallium Arsenide -- Key to Modern Micorwave Technology." Both speakers gave excellent presentations which generated significant interest from the audiences.

Program planning 1987/88 is underway. The first speaker of the new season will be Dave Allan of NBS, Boulder who will talk about "Millisecond Quasar Stability" on October 8 at 2:30 pm in the Westinghouse R&D Center Auditorium. At least two more meetings will be held in 1987/88.

J. D. Adam
Pittsburgh Chapter

ORLANDO CHAPTER

The 1986-87 year's activities ended in June for the Orlando Section and it was a very active year. The UFFC-S held 5 meetings which were well attended; typically having more attendees than there are members in the local chapter. Sundar Gopani, this years's chapter chairman, received the Orlando Section Outstanding Chapter Award for the chapter having the most activity and providing service to the local members.

The meetings held for this past year were:

Sep. 15, 1986	"SAW Filter Modelling and Design", D.C. Malocha, University of Central Florida, Orlando.
Dec. 11, 1986	"SAW Devices in Communications Systems", M.A. Belkerdid, University of Central Florida, Orlando.
Feb 18, 1987	"Acousto-Optic Interactions, Devices and Applications, Dr. Chen Tsai, UFFC-S National Lecturer, dinner meeting.
Mar. 9, 1987	"Tactical Miniature Crystal Oscillators" T. Payne, Piezo Technology, Inc., Orlando.
Apr. 9, 1987	"SAW Real Time Fourier Analysis", T. Martin, Phonon, Bloomfield, Conn.

All the lecturers gave excellent presentations and there was a very diverse range of technologies covered in this year's meetings. Dr. Chen Tsai's lecture was given at a dinner meeting in which 50 people from areas throughout central Florida attended.

The new officers for the 1987-88 year will be D.C. Malocha, Chairman, and S. Gopani, Vice-Chairman.

D. C. Malocha
Chairman

BALTIMORE, WASHINGTON AND NORTHERN VIRGINIA CHAPTER

The officers of the Baltimore, Washington, and Virginia Chapter of the UFFC for 1987-88 are:

Chairman: Dr. Harry Salvo
Westinghouse Defense and Electronics Center
P.O. Box 1521
Baltimore, MD 21203

Vice Chairman: Dr. Paul Gammel
Naval Surface Weapons Center
White Oak
Silver Spring, MD 20910

Secretary/Treasurer: Mr. Michael M. Driscoll
Westinghouse Defense and Electronics Center
P.O. Box 1521
Baltimore, MD 21203

We had a very interesting planning meeting in May in which Dr. R. C. Moore, the past four chairmen, and the present officers took part, and gave constructive suggestions for the future growth of the chapter. The topics for the meetings for the 1987-88 are:

October:	Non-destructive testing
December:	Medical Ultrasonics
January:	To be decided
March:	Nonlinear Acoustics
May:	Acoustic Charge Transfer Devices

The schedule is still tentative. After the tremendous success of last year's one-day course on Bulk Acoustic Wave Devices, we are planning another one-day course on a topic to be determined later.

Manas Roy
(Past Chairman)

UFFC-S Award Winners

Achievement Award:

Thrygve R. Meeker
Consultant
Allentown, PA
Retired, AT&T Bell Laboratories

1986 Best Paper Award:

"Optical Detection of Ultrasound"

Jean-Pierre Monchalin
Industrial Materials Research Institute
National Research Council of Canada
Boucherville, Quebec, Canada

UFFC-S Distinguished Lecturer Schedule

"Physics and Engineering Principles of Nonlinear Acoustics" lectures are scheduled as follows:

1. December 8-10, 1987, Tokyo - Kyoto, Japan
2. December, Beijing - Nanjing, China
3. January 1988, Baltimore-Washington - Northern Virginia Chapter, UFFC.

Other lectures are pending.

Acknowledgments

The editor wishes to thank all those who submitted articles and photographs for this issue of the UFFC-S Newsletter. Also a special thank you to Liz Rau and Suzy Reichard for typing the manuscript. Articles of interest to UFFC-S members are welcomed. For inclusion in the spring issue, please send by March 1, 1988, to Fred Hickernell, Motorola Inc., Government Electronics Group, 8201 E. McDowell Road, Scottsdale, Arizona 85252.

Call For Speakers Pool Directory

The UFFC Society has established a speakers directory which serves as an aid to local chapters in contacting people who are capable and willing to address chapter meetings. The first request for speakers was made last Fall and we are pleased with the response. The list is just now being used by the chapter officers in planning next year's programs. We do need to expand the list, however, and urge anyone in the UFFC Society who has a topic on whick to speak and would like to share this with others to fill out the form for the speakers pool directory and send it to me. This list will also be made available to academic institutions which regularly invites the National Lecturer because of the interest which they have expressed UFFCs field. The completed form may be sent to Dr. Leland Solie, Electronic Decisions Inc, 1776 E. Washington ST, Urbana, IL 61801.

CALL FOR SPEAKERS POOL DIRECTORY

for the Ultrasonic, Ferroelectrics, and Frequency Control Society

If you would be willing to have your name included on a list of available speakers for UFFC chapter meetings, please provide us with the following information and return this form to Dr. Leland Solie, EDI, 1776 E Washington St, Urbana, IL 61801.

NAME: _____
(print or type)

ADDRESS: _____

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BUS. PHONE: _____

HOME PHONE: _____

VISUAL AIDS REQUIRED: _____

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TRAVEL LIMITATIONS: _____

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TOPICS: _____

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CONDENSED RESUME: _____

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SUBJECT CLASSIFICATION (check one)

( ) Medical Ultrasonics

( ) SAW Devices or Applications

( ) Nondestructive Evaluation

( ) Acousto-Optic

( ) Magnetostatic

( ) Bulk Wave Devices

( ) Ferroelectrics

( ) Frequency Control

( ) Other _____

_____

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☐ *Journal of Solid-State Circuits*

IEEE entrance fee (if IEEE member, see month application. CANCELLED -0- ☐ $_____

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☐ IEEE membership plus Society membership.

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Full signature _____ Date _____

First name (print) _____ Middle initial(s) _____ Last name _____

Street address _____

City _____ State/Country _____ Postal Code _____

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PLEASE COMPLETE THE FOLLOWING INFORMATION:

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Were you ever a member of IEEE? ☐ Yes ☐ No If Yes, please furnish (if known): _____ Grade _____ Membership No.

EDUCATION (Highest level completed):

Name of educational institution _____

Course _____ Degree received _____ Date _____

ENDORSEMENT (Signature of one IEEE member, who knows you professionally.) _____

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Meetings Sponsored by the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society

42nd Annual Frequency Control Symposium

May or June, 1988
Venue: To be announced

J. R. Vig, *General Program Chair*
US Army LABCOM
SLCET-EQ
Fort Monmouth, NJ 07703
201/544-4275, 4805

1988 IEEE International Symposium on Applications of Ferroelectrics and First European Conference on Applications of Polar Dielectrics

August 29–September 2, 1988
Zurich, Switzerland

P. Gunter, *General Program Chair*
Swiss Federal Institute of Technology
Honggerberg
CH-8093 Zurich
Switzerland

1988 IEEE Ultrasonics Symposium

October 3–5, 1988
Chicago, IL

W. D. O'Brien, Jr., *General Program Chair*
Department of Electrical
and Computer Engineering

University of Illinois
1406 W. Green St.
Urbana, IL 61801
217/333-2407

J. Brown, *Technical Program chair*
Fisher Controls
1712 Centre Creek Drive
Austin, TX 78754

43rd Annual Frequency Control Symposium

May or June, 1989
Venue: To be announced

1989 IEEE Ultrasonics Symposium

October 4–6, 1989
Montreal, PQ Canada

H. van de Vaart, *General Program Chair*
Allied Signal Incorporated
P. O. Box 1021 R
Morristown, NJ 07960
201/455-2482

K. V. Montress, *Technical Program Chair*
Raytheon Research Division
131 Spring St.
Lexington, MA 02173

44th Annual Frequency Control Symposium

May or June, 1990
Venue: To be announced

1990 International Symposium on Applications of Ferroelectrics

June, 1990
Urbana, IL

D. A. Payne, General Program Chair
Department of Ceramic Engineering
University of Illinois
105 S. Goodwin Ave.
Urbana, IL 61801
217/333-1770

1990 IEEE Ultrasonics Symposium

Date: To be announced
Honolulu, Hawaii

R. S. Kagiwada, *General Program Co-Chair*
TRW-ESG, MS M5/1007
One Space Park
Redondo Beach, CA 90278
213/535-5515

N. Mikoshiba, *General Program Co-Chair*
Research Institute Electrical Communications
Tohoku University Katahira
Sendai 980, Japan
(0222) 27-6200

K. H. Yen, *Technical Program Chair*
TRW-ESG, MS R6/1164
One Space Park
Redondo Beach, CA 90278
213/535-0637

45th Annual Frequency Control Symposium

May or June, 1991
Venue: To be announced

1991 IEEE Ultrasonics Symposium

December, 1991
Orlando, FL

D. C. Malocha
Department of Electrical Engineering
University of Central Florida
Orlando, FL 32816

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