


IEEE ULTRASONICS, FERROELECTRICS AND FREQUENCY CONTROL SOCIETY NEWSLETTER

NUMBER 2 OCTOBER 1986

EDITOR: FRED S. HICKERNELL

Program

1962 ULTRASONICS SYMPOSIUM
NOVEMBER 28, 29



1961 Symposium on Sonics and Ultrasonics
OCTOBER 14, 15

HOST
SCHOOL OF APPLIED SCIENCE
COLUMBIA UNIVERSITY
NEW YORK CITY

Program

1963 ULTRASONICS SYMPOSIUM
DECEMBER 4, 5, 6, 1963

1967 SYMPOSIUM ON ULTRASONICS AND ELECTROACOUSTICS
OCTOBER 12-14

1966 ULTRASONICS SYMPOSIUM
STATLER HILTON
CLEVELAND, OH

1973 IEEE ULTRASONICS SYMPOSIUM
TITLES AND AUTHORS
NUMBER 5-7, 1973
GRADUATE SCHOOL MONTEREY

968 IEEE ULTRASONICS SYMPOSIUM
FINAL PROGRAM

1969 IEEE ULTRASONICS SYMPOSIUM
1977 ULTRASONICS SYMPOSIUM
OCTOBER 26 - 28, 1977

IEEE 1986
NOVEMBER 17-19, 1986
COLONIAL WILLIAMSBURG, WILLIAMSBURG, VA
Sponsored by The Ultrasonics, Ferroelectrics and Frequency Control Society



STATLER HILTON
NEW YORK
SEPT. 25-27

Sponsored by Group on Sonics and Ultrasound of the Institute of Electrical and Electronics Engineers

St. Louis, Miss
Sept. 24-26, 1986

Sponsored by the Group on Sonics and Ultrasound of the Institute of Electrical and Electronics Engineers



Los Angeles Hilt
SEPTEMBER 22-24
Los Angeles, Calif



The TowneHouse
Phoenix, Arizona

1974 IEEE ULTRASONICS SYMPOSIUM
NOVEMBER 11-14, PFISTER HOTEL, MILWAUKEE, WISCONSIN



Symposium

The closing session, "Resonator Theory - Linear," will contain the paper on "AT Strip Resonators," which will present a review of the history and current technology of AT strip resonators in a manner accessible to those unfamiliar with the subject.

Thursday evening, May 28, will be highlighted by a cocktail party featuring a smorgasbord. This will be a unique opportunity to interact with experts in the field in an informal, relaxed atmosphere. The sessions are scheduled as follows:

Wednesday, May 27

- | | |
|-----------------------------------------|-----------------------------|
| 0 Plenary Session - Award Presentations | 0 Cesium Standards |
| 0 Resonator Theory - Nonlinear | 0 Atomic Standards |
| 0 Electrodiffusion and Point Defects | 0 H Masers and Distribution |
| 0 Etch Channels and Dislocations | |
| 0 Resonator Processing - I | |

Thursday, May 28

- | | |
|---------------------------------------------|-------------------------------------|
| 0 Digital Techniques | 0 Theory and Specification |
| 0 Microwave and Millimeter-Wave Oscillators | 0 Instrumentation and Time Transfer |
| 0 SAW Devices | 0 Frequency Synthesis |
| 0 Sensors and Transducers | 0 Resonator Processing - II |

Friday, May 29

- | | |
|----------------------------------|------------------------------|
| 0 UHF Resonators and Oscillators | 0 Quartz Crystal Oscillators |
| 0 Resonator Theory - Linear | |

R.H. Filler
Publicity Chairman



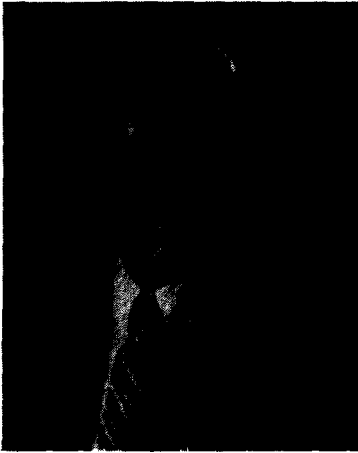
***Although you may be
involved in something really
fantastic at the moment . . .***

don't forget

**Come to the 41st Annual
Symposium on Frequency Control**

Symposium Committee

Local Arrangements



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.



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. His thesis topic was "Electromagnetic Generation and Attenuation of Ultrasonic Waves in Gallium".

He was a Research Associate at Wayne State University until 1974. Following this, he was on the faculty of the Physics Department, Virginia Tech, for two years and a year on the faculty at Lake Forest College, Illinois. 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.

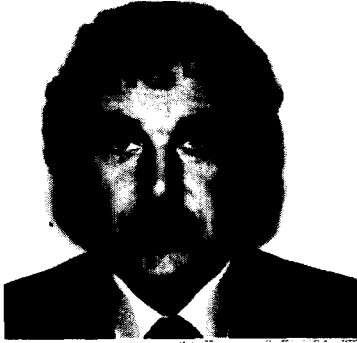
His present research interests include NDE characterization of cracks, microstructural variations, thick composites and NMR. He has numerous publications in the area of Solid-State Physics, NMR, NDE and Instrumentation.

He is a member of American Society for Non-destructive Testing (ASNT) and has been certified by ASNT as NDT Level III in Ultrasonics, Radiography, Eddy Current, Magnetic Particles and Penetrants. 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 Branch, 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 both bulk acoustic wave (BAW) and surface acoustic wave (SAW) devices and has authored/co-authored a number of papers in this area. More recently, he has investigated the properties of shallow bulk acoustic waves (SBAW). He is presently applying the results of these investigations to the development of components/subsystems that serve as frequency selective and stable frequency sources as needed in communications, radar, and electronic warfare systems. He was awarded the U.S. Army Research & Development Achievement Award in 1980 and again this year, 1986, for his accomplishments in these areas.

Ted's weekday hobbies include looking for investment opportunities in the stock market and with tax shelters, while weekends will find him jogging, working around the house or boating along the Jersey Shore after, of course his duties as the financial chairman for UFFC-S are completed.

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.



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 the areas of 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 his 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 40 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 7 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 is currently on the TAB Finance Committee and 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.



Williamsburg



Williamsburg

1986 IEEE Ultrasonics Symposium

WILLIAMSBURG IS FOR EVERYONE

THE SYMPOSIUM

Make your reservations early for the 1986 Ultrasonics Symposium in Colonial Williamsburg. The Technical Program Committee (TPC) headed by Jim Miller has put together an outstanding array of over 40 technical and open forum sessions. From the over 300 papers submitted, a program has been crafted which is truly a must for keeping abreast of happenings in your field.

The present symposium has grown from its beginning at Stanford University in 1959 where it was attended by 15 people. The next symposium was in 1962 at Columbia University in New York where 17 invited and 21 contributed papers were given in six sessions over three days. In some recent years, attendance has topped 600. The early papers were dominantly physical acoustics with a scattering of what now might be classed as industrial and medical ultrasound and microwave acoustics. The first SAW paper came in 1965.

With the vast increase in papers and the necessity of parallel sessions, the Technical Program Committee (TPC) has had to develop approaches to best arrange papers for each interest community and minimize subject conflicts. The evolving approach of the TPC has been to organize according to the four technology groupings for papers. This has facilitated efforts as the program is laid out to minimize conflicts between papers on closely related topics or of strong interest to a broader community. Though it is realized conflicts cannot totally be avoided, and the committee would appreciate your comments to pass on to next year's TPC, the process provided for several reviews with an objective of minimizing this conflict. First, no invited papers are scheduled opposite each other. Since there must be invited talks in parallel sessions, they are scheduled within the sessions so any conferee can hear all invited talks. Then, after all sessions have been organized, the assistant TPC chairmen for each of the four groups together reviewed all sessions. Where there was any feeling there might be interest conflict between parallel possible scheduling, changes were discussed. Those scheduling changes were actually made where it was felt the net conflict could be reduced by so doing. It must be recognized that because of both our multiple interests and broad technical impacts of many papers, it would be impossible to totally remove all conflicts from parallel sessions. It can only be minimized. The committee is to be congratulated.

A special feature of this year's symposium this year is the paper "Acoustic Radiation Momentum Transfer Measurement Utilizing Acoustic Phase System Techniques in a Microgravity Environment," by students of the Norfolk Virginia Public Schools. The NORSTAR (Norfolk Virginia Public School Student Team for Acoustical Research) program experiment will measure the acoustical radiation transfer of momentum from a propagating sound field to spheres in a liquid medium. Possible sources of error include surface tension of the suspension wire passing from air to the liquid medium, and attachment of the suspension to the sphere. The NORSTAR experiment will eliminate these errors by performing this experiment in a microgravity environment provided by a Get Away Special canister mounted in the cargo bay of a space shuttle.

Because it was felt the paper best could be presented by demonstration on the actual equipment, the paper will be featured as a special session in the exhibition area. Though listed as an open forum

(poster) paper so the title and abstract will appear in the advance program, program and proceedings, the paper will be set up and available for interaction with the students by conference during all exhibition hours.

Central Place Proceedings Plays in Ultrasonic Technology

Another feature of the Ultrasonics Symposium is the central place the proceedings play in the technology. There were no proceedings until 1970 where the initial volume covered just invited papers. There were no proceedings in 1971. The first coverage of all papers in 1972 was just under 500 pages. The 1985 proceedings is over 1200 pages and requires two volumes. As opposed to many conferences where, at most, digests are published, the Ultrasonics Symposium provides essentially complete papers. The typical work is extremely current. Though, in some cases, perhaps not as well documented as work in the transactions, the currency and coverage of the proceedings makes it an ideal way of following the latest in the state-of-the-art.

The value of the proceedings is further emphasized by the fact that in 1977 three compendia were published covering the subjects of SAW, Medical Ultrasound and NDE. After the first printing was sold out a second printing is virtually sold out.

A special effort is made to facilitate publication of late breaking work. The abstract deadline is just four months prior to the conference and paper selection just a little over three. Since manuscripts for the proceedings are provided at the symposium itself, work included can be only days old when presented and no more than three months old when the proceedings are mailed.

EXHIBITION

A recent addition to the symposium has been the exhibition where products relate to interests of people working in ultrasonic technology and related fields. The exhibition area is open each day from the beginning of the first coffee break through the close of the technical sessions. We hope you will find time to talk to our exhibitors and discuss your product need with them. Besides the availability of product information, we appreciate the support our exhibitors provide toward financial success of the symposium. At press time companies with space reserved include:

Anderson Labs	SAWTEK, Inc.
Crystal Technology Inc.	Sonoscan, Inc.
Hewlett Packard Co.	Ultrasonics Soc.
P. R. Hoffman, Inc.	Walpey Fisher
MATEC Inc.	Westinghouse (DESC)
Phonon Corp.	

Refreshments for the breaks will be served in the exhibition area.

Colonial Williamsburg

How often when we attend symposia do we lock ourselves in our hotels and hardly know where we are, much less take in the broader offerings of our host area? Colonial Williamsburg is so unique in the way it brings our historic heritage to life, it will be tragic if any conferee fails to wander through the town, go through the craft shops, visit the Governor's Palace and the capital. Nearby, there are Carter's Grove, a restored early plantation on the James River, Jamestown, site of the first permanent English settlement in the New World; the Yorktown where Lord Cornwallis surrendered to General Washington ending

the American Revolution.

Williamsburg is truly a location for a family visit. Children and young people who can get away to attend with their families will participate in a truly educational experience. There is no better way to learn the history of this vital link in our American heritage than stroll the streets, walk through the buildings, try the crafts while we visualize ourselves with our patriot ancestors of the American revolution at Williamsburg.

As the capitol of Colonial Virginia, Great Britain's most popular colony, Colonial Williamsburg, brings the American Revolution to life. Based on extensive and continuing research, the buildings have been restored or reconstructed on original foundations. In some cases, documentation containing original bills of materials has been available. In other cases, such information from closely related structures has been used. All buildings are restored at the exact location of the original.

At the symposium you will be enveloped by the colonial atmosphere of Williamsburg practically from the moment you arrive. The program is designed to provide as much involvement as is possible in a few short days. Orientation for all, guests and conferees alike, will begin at the Opening Plenary Session promptly at 8:00 AM Monday with the film, "The Story of a Patriot", which sets the historic significance of Williamsburg and provides suggestions for your visit. This leads directly to the "Colonial Science Lecture" with a demonstration of a colonial physics laboratory. Williamsburg is for the complete family. Because your time will be so short, you will want to plan early and use the advance registration to reserve your place for the Groaning Board Dinner and as many other activities as your plans allow or you may be left out!

Activities Advisor

An activities advisor will be available in the registration area for all scheduled registration times. The activities advisor will answer questions and assist conferees and guests arrange individual and organized excursions and tours in the colonial town and to nearby areas. Since it will help us establish the activities most desired by conferees and guests, you are urged to sign up on the advance registration form for your preferences.

When You Arrive

Your activities can begin as soon as you arrive. If you arrive Sunday afternoon (November 16), you will want to stop by and talk with the activities advisor about the possibility of dinner at one of the taverns or other attractions available at that time. If you arrive too late for Sunday evening activities, the activities advisor will be available with the opening of registration Monday at 7:00 AM. You will want to see the "Patriot" and the Colonial Science Lecture at the opening session (8:00 AM). At 10:30 after the mid-morning coffee breaks (parallel with the start of the first technical sessions) there will be a Williamsburg Orientation Program in the Garden Lounge for guests. This will provide a broad picture of the colonial resource so you can better plan your own program or work with the activities advisor. Following the orientation will be a group (Dutch) lunch and free guided tour of Williamsburg.

"A Colonial Science Lecture of the 18th Century"

Both conferees and guests are urged to attend the Opening Plenary session in the auditorium, 8:00 AM, Monday, November 17. Professors John McKnight and

Hans von Baeyer, Physics Department, College of William and Mary will provide a demonstration of colonial physics laboratory. The professors demonstrate experiments using equipment, language, procedures, style and costume of the colonial period.

Guests Continental Breakfasts

A spouses get-together will be held in the Garden Lounge at 10:00 to 11:30 AM Monday, November 17, immediately following the Plenary Session and at 8:30 to 9:30 AM Tuesday and Wednesday, November 18 and 19. This will be an informal get-together each morning for guests. At 10:30 AM on Monday, parallel with the first technical session, Colonial Williamsburg will provide an hour long orientation on background, available services and typical ways of seeing the colonial area. This will be followed by a group luncheon (Dutch) and a free guided tour of Williamsburg,

Special Evening Events

Groaning Board Reception Dinner - Monday, November 17, Reception 6:30, North Gallery, Dinner 7:30, Virginia Room, of the Conference Center. The social climax of the symposium, the "Groaning Board," is named from the fact that you eat so much that you groan. It is a true colonial dinner with colonial entertainment including the Fife and Drum Core, colonial music and madrigal singers from CW. Because attendance is limited, you should sign up with your advance registration. Tickets will be available at registration until sold out. Reception, free. The dinner and entertainment, at \$15 per person, is a bargain you can't resist.

Lantern and Candlelight Tour - Tuesday evening 8:00-10:30 PM, November 18. There are two evening events planned - a guided lantern tour of the colonial village - and a candle "engagement" tour through the Governor's Palace. Each will be a grand illumination of colonial life and will help develop a lasting impression of Williamsburg. Cost of each tour is \$4.50. These tours are available only if sufficient people sign up with advance registration.

Additional Activities and Tours

A Special Colonial Williamsburg Pass is available for conferees and their registered guests which makes available all Colonial Williamsburg facilities open for viewing including the Governor's Palace, the House of Burgesses and Carter's Grove Plantation. The pass is good for the conference period plus any extended period while you are lodging in CW facilities at special conference rates. The special conference pass is \$13.00 and may be ordered on your advanced registration form or picked up at registration when you arrive.

Lunch or Dinner at a Colonial Tavern - In colonial times, taverns provided both lodging and food for travelers. Within Colonial Williamsburg are three taverns, King's Arms, Christiana Campbell's and Chowning's which serve colonial style meals. Advance reservations are recommended for these popular eating places. Phone (804) 229-1000 and ask for the tavern of your choice. At least one and more if possible meals at one of these taverns during your stay is a must. For dinner, come early enough Sunday, Tuesday before the Lantern Tour at 8:00 (remember to reserve Monday for the Groaning Board Dinner), any lunch or during your extended stay. Remember to call ahead for reservations of your choices.

Bus Tours - Tuesday

Bus tours have been arranged for several nearby

attractions contingent on sufficient sign-up for Tuesday afternoon and Wednesday morning. Cost of transportation for each will be \$7.50. Sign up on the advance registration form, or with the activities advisor immediately on arrival both to help us plan (once facilities are full, that's it).

Carter's Grove Plantation - Early travel was by water. Carter's Grove is a typical early Virginia plantation on its original site on the James River a few miles from Williamsburg. Also, on the grounds is Martin's Hundred described in National Geographic June 1979, an excavated early settlement probably wiped out by an Indian raid. No cost with special conference pass described earlier.

Jamestown - Site of the first permanent English settlement in the New World is located on the James River about a twenty-minute ride down the Colonial Parkway from Colonial Williamsburg. At Jamestown, you will first see the Festival Park which features a reconstruction of what is felt to be the first settlement. A little further on is the excavated town of Jamestown showing location and foundation of many of the buildings and the only surviving building, the chapel. There is also an operating glass works within walking distance of Jamestown. Entrance at the Festival Park is \$5.00 and at the actual town is \$0.50.

The Pottery - One of the world's largest factory outlet stores. Beginning in a small shed in 1938, the pottery now covers 200 acres with one building as large as eight football fields. The pottery includes almost anything that can be purchased for your home.

Tour of NASA - NASA's Langley Research Center is located 30 miles southeast of Williamsburg and is the oldest of NASA's laboratories. It has some of this country's most unique labs as well as a visitors' museum open from 9:00 - 4:00 every day (Sunday - in afternoon only). In addition, special tours of the NDE lab and a wind tunnel will be arranged for Thursday, November 20th for those who write Joseph Heyman, MS-231, NASA Langley Research Center, Hampton, VA 23665 before November 4th (U.S. citizens only) - non U.S. citizens must request this tour through their embassy to NASA Headquarters in Washington.

R. A. Moore
General Chairman

Opening Session - 1986 President's Speaker

If you are making plans to come to Williamsburg please do not forget the Opening Session - Monday, November 17, 1986 starting at 8:00 AM. This year's program will be memorable, bring your family, spouses and teens are welcome to hear about Williamsburg and about science in the 18th Century. Professors John McKnight and Hans von Baeyer have prepared a lecture as it would have been presented over two centuries ago. Some background about their work is given in what follows. I look forward to seeing you there.

B. R. McAvoy
President, UFFC-S

SCIENTIFIC LECTURES

Throughout Europe and America the 18th century was a time of widespread interest and faith in science.¹ Formal scientific societies and their journals flourished, and the public was involved in science to a much greater extent than it is today. Newspaper accounts, books, pamphlets and popular lectures attest to this general interest. While medicine and natural philosophy were more widely discussed, the physical sciences, comprising physics, astronomy, geology, meteorology and chemistry were not far behind. Public lectures ranged from learned discourses by leading scientists to entertainments performed for profit by travelling actors. The most popular topic for lectures during the second half of the 18th century was electricity, and a most qualified and justly famous lecturer, Benjamin Franklin's friend and collaborator Ebenezer Kinnersley², provided an example of such in an advertisement which appeared in the Maryland Gazette on 10, 17 and 24 May 1749:

Notice is hereby given to the Curious that at the House where Mr. Walter Dulany lately lived in Annapolis, will be exhibited from day to day (the Weather being fair) for the space of a Fortnight, a Course of Experiments on the newly discovered ELECTRICAL FIRE: containing not only those that have been made and published in Europe, but a Number of new ones lately made in Philadelphia; by which several of the principal properties of this wonderful Fire are demonstrated.

Similar lectures by Kinnersley and others continued for over a quarter of a century.

Colleges in America gathered collections of scientific equipment, referred to as philosophical cabinets, for the purpose of instruction. Much of Harvard's collection is extant,³ but the superb cabinet of the College of William and Mary in Virginia was destroyed by fire. It had been chosen and purchased in London by Jefferson's teacher William Small, professor of mathematics and philosophy from 1758 to 1764, after his return to England. A four page fragment of a list of this equipment, in Small's own hand, survives.

THE ELECTRICAL MACHINE

The history of frictional electrostatic generators, or electrical machines, stretches from the 17th century into the 19th when the frictional machines were supplanted by those which utilize induction. Small models were common in the drawing rooms of gentlemen and in physicians' offices, where they were used for therapeutic purposes. The machine pictured on the cover is a research model, reconstructed from the description contained in a scientific article published by the London instrument maker Edward Nairne,⁴ whose name appears in Small's list. The published perspective engravings were converted, using the dimensions given in the article for the glass cylinder as a scale, into modern scale drawings, which were reviewed for authenticity by a leading expert on the subject.⁵ Brass and mahogany parts were fashioned by hand while glass pieces were custom manufactured. The reconstructed machine works better than many modern electrostatic generators used for classroom demonstrations.

THE AIR PUMP

The air pump shares with the electrical machine a history ranging from the 17th to the 19th century as well as a great popularity with amateurs. It had been extensively used by the great chemist Robert Boyle (1627-1691) whose estate funded the Brafferton, a building of the College of William and Mary. By the 1760's a standard model, the common air pump, had evolved, which did not change significantly in design until the middle of the 19th century. The pictured instrument is an antique bearing the name "Griffin/London". It is tentatively dated ca. 1825 and has been restored to its original operating condition.

THE MECHANICAL PLANETARIUM

The mechanical planetarium derives its more popular name of Orrery from the man responsible for one of the first ones. Early in the 18th century the Early of Orrery, grand-nephew of Robert Boyle, ordered the construction of a large clockwork model of the solar system. Such devices, driven by springs or weights or cranked by hand, became extremely popular throughout the world. By the beginning of the 19th century a major encyclopedia devoted over 65 printed pages to them.⁶ In America the most famous orreries were two built by David Rittenhouse of Philadelphia, who received an honorary degree from the College of William and Mary in 1784. One of these large and complicated devices has been restored at Princeton University.⁷

The instrument pictured here is a copy of one owned by Colonial Williamsburg and inscribed "W. and S. Jones/Holborn". It was built by the craftsman A. O. Perry in 1792 and remodeled by Cuthbert in 1828. This original had been modified to include the planet Uranus, discovered in 1781. The copy has its planets arranged following a 1760's description of a planetarium by Benjamin Martin⁸ under whom the elder W. Jones had been an apprentice.

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ACKNOWLEDGEMENTS

John McKnight (Ph.D., Yale) and Hans C. von Baeyer (Ph.D., Vanderbilt U.) are professors of physics at the College of William and Mary. They are supported in this work by a grant from the National Science Foundation. Generous assistance from the Colonial Williamsburg Foundation and the Society of the Alumni of the College of William and Mary is gratefully acknowledged.

Technical Program Committee Report

The Technical Program Committee held the second of its two meetings on August 1st in Chicago to determine the final program for the Symposium. Several modifications in the operation of the Committee were introduced to streamline the functions of reviewing abstracts and organizing sessions. As Technical Chairman, I want to express my gratitude to Larry Whicker of LRW Associates and to the four Vice Chairmen, Roger Tancrell, Bernie Tittmann, Art Ballato, and Gary Montress. Through their efforts and those of the other members of the Technical Committee, we have attempted to put together a highly stimulating symposium. Each of the Vice Chairmen has been good enough to provide a synopsis of his Group's contributions to the program.

Group I, Vice Chairman: R. Tancrell

Progress is reported from several laboratories on new piezoelectric materials made by combining piezoelectric particles in a passive polymer. New methods of calibrating the effectiveness of these and other materials are presented especially regarding accurate methods to determine patient dose in medical ultrasonics. Non-linearities in tissue at high power levels are being explored as a new property for imaging. Changes induced in tissue by different intensities of ultrasound are examined by a variety of techniques, e.g., tissue growth and morphology. Utilizing tissue changes for therapy via hyperthermia is examined for uniform heating of tumors -- augmented by new arrays and new temperature monitoring methods. Characterizing tissue is a major emphasis exploring, for example, protein transfer, the ratio of absorption-to-attenuation, and advanced spectrum analysis. Toward that end, image reconstruction in the presence of noise or incomplete data sets is developed. For Doppler, advancements are reported on understanding velocity gradients and fluctuation rates. Deriving information from speckle of backscatter and the tradeoffs with spatial resolution are examined, including approaches based on the use of contrast agents. Special instrumentation is shown for fracturing bladder stones and imaging the damage to burned skin.

Group II, Vice Chairman: B. Tittmann

These sessions focus on novel techniques and concepts for ultrasonic sensing and imaging. Applications range from robotics, to material characterization, to process monitoring and control. One session is devoted to "composites", an emerging class of important materials for industrial and aerospace applications. Two sessions are devoted to advances in acoustic microscopy, a powerful technique for the high resolution characterization of microstructure. An exciting session deals with non-contact sensing of ultrasonic waves with optical (laser) techniques to provide ultra-high sensitivity for real-time materials characterization and process monitoring in hostile environments.

Group III, Vice Chairman: A. Ballato

Bulk waves have a conventional ring, but the latest devices and applications are certainly not. Precision resonators operate up to 2 GHz, and new materials such as lithium tetraborate are being exploited for sensors and signal processors. Ultra-thin composite resonators and transducers are investigated for optical fiber modulation and wide bandwidth delay lines. Acousto-optic and magnetostatic devices and technology address studies of intermodulation in Bragg cells, acoustic phase modulators, scattering of

MS waves, and Ka band delay lines, as well as new materials such as Hg₂Cl₂. Nonlinear effects in crystals are treated in some detail. An overview is followed by discussions of non-linear constants of lithium niobate and aluminum, stochastic lattice anelasticity, and non-linear Stoneley waves.

Group IV, Vice Chairman: G. Montress

Two sessions describing advanced SAW filter design techniques include approaches which incorporate compensation for second order effects such as diffraction and spurious reflections. Two SAW Signal Processing sessions describe a wide variety of signal processing hardware including FFT, chirp transform, convolver, correlator, and adaptive transversal filtering com-

ponents. A focal point of the Signal Processing sessions is an Invited Talk by D. C. Webb, NRL, which compares A-O, SAW, BAW and MSW technologies for spectrum analysis. Finally, the remaining sessions are devoted to new SAW materials, modes of propagation, novel SAW device designs and applications, and high performance SAW resonators and oscillators. An invited paper by R. B. Bray, Hewlett-Packard, describes the application of high performance SAW devices in advanced instrumentation, while an invited paper by B.A. Auld, Stanford University, presents novel SAW devices on electrostrictive substrates.

Jim Miller
Technical Chairman

Invited Speakers – 1986 IEEE Ultrasonics Symposium

Group I

Gerald R. Harris (Center for Devices and Radiological Health, FDA), "Hydrophone Measurements of Medical Ultrasound Devices"

Barry Koepke (Honeywell), "Mechanical Integrity (Crack Propagation) in Thin Piezoelectric Ceramics"

William D. O'Brien, Jr. (University of Illinois), "Ultrasonic Risk Assessment Via Dose-Dependent Birthweight"

Takuso Sato (Tokyo Institute of Technology), "Non-Linear Tissue Imaging"

J. M. Thijssen (University of Nijmegen), "Speckle and Texture in Echography--Artifact or Clinical Information?"

Group II

Robert C. Addison, Jr. (Rockwell), "Techniques in the Characterization of Film Adhesion"

P. Cielo (Industrial Materials Research Institute - Canada), "Laser Generation of Convergent Acoustic Waves and Applications to Materials Evaluation"

R. Mark Havira (Schlumberger-Doll), "Ultrasonic Techniques in Oil Well Logging"

Gordon S. Kino (Stanford University), "Laser Probes in Photo-Acoustics"

Eric I. Madaras (NASA-Langley), "Combining Fracture Mechanics and Ultrasonic NDE to Predict Strength Remaining in Thick Composites That Were Subjected to Low-Level Impact"

Group III

Robert Green (Johns Hopkins University), "Nonlinear Waves in Crystals"

Adrianus Korpel (University of Iowa), "Acousto-optics Tutorial"

Daniel E. Oates (Lincoln Lab.-MIT), "BAW Reflection-Grating Devices"

John R. Vig (U.S. Army ET&D Lab.), "BAW Resonators-Problems and Advances"

Clayton Williams (T.J. Watson Res. Center-IBM), "High Resolution Thermal Microscopy"

Group IV

B. A. Auld (Stanford University), "SAW Devices on Electrostrictive Substrates"

R. C. Bray (Hewlett-Packard, Santa Rosa, CA), "Applications of SAW Devices in High Performance Instrumentation"

Michael Hoskins (Electronic Decisions, Inc.), "Recent Developments in Acoustic Charge Transport Devices: Performance and Applications"

Dennis Webb (Naval Research Lab.), "SAW, MSW and A-O Technology for Frequency Sorting"

Call for Speakers Pool Directory

The UFFC Society is establishing a speakers directory which will serve as an aid to the local chapters in finding people who are capable and willing to address chapter meetings. This directory will be updated on a regular basis to keep current with the topics and the major contributors within the technical scope of UFFC-S.

We have begun the list by asking each author who submitted an abstract for the Ultrasonics Symposium to be a part of this directory. We would like to expand the directory by inviting other members of UFFC-S to consider this forum for presenting the results of their work. If you would be willing to be included in this directory, we ask you to fill out the form and return it to Dr. Leland Solie, Sperry CSD, MS U1M14, P.O. Box 64525, St. Paul, MN 55164-0525.

Leland Solie
Chapters Chairman, UFFC-S

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, Sperry Computer Systems, MS U1M14, PO Box 64525, St. Paul, MN 55164-0525.

NAME: _____ (print or type)	CONDENSED RESUME: _____
ADDRESS: _____ _____ _____	_____ _____ _____
BUS. PHONE: _____	_____
HOME PHONE: _____	_____
VISUAL AIDS REQUIRED: _____ _____	_____ _____
TRAVEL LIMITATIONS: _____ _____	SUBJECT CLASSIFICATION (check one)
TOPICS: _____ _____ _____ _____ _____ _____ _____ _____	<input type="checkbox"/> Medical Ultrasonics <input type="checkbox"/> SAW Devices or Applications <input type="checkbox"/> Nondestructive Evaluation <input type="checkbox"/> Acousto-Optic <input type="checkbox"/> Magnetostatic <input type="checkbox"/> Bulk Wave Devices <input type="checkbox"/> Ferroelectrics <input type="checkbox"/> Frequency Control <input type="checkbox"/> Other _____

ISAF Symposium Overview

The 1986 IEEE International Symposium on the Applications of Ferroelectrics was held at Lehigh University from June 8 to 10, 1986. More than three hundred seventy scientists and engineers participated in the 28 oral and poster sessions. It is heartening to note that the participants included over 80 students as these young workers constitute the future of our profession. Researchers from industrial, university and government laboratories provided a good balance of perspectives. The 82 participants from 18 countries outside the U.S. verify the truly international character of this meeting. The many spirited technical discussions - both in the meeting rooms and corridors - testify to the value of this Symposium for the interchange of technical information on ferroelectric materials and their applications.

This Symposium was the sixth in a series begun in 1968 organized by the IEEE Committee on Ferroelectrics. Each symposium has been larger and more vigorous than the preceding, thereby recording the growth and dynamism in ferroelectrics research. 1986 marked a particularly significant milestone in the maturation process: the emergence of the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society from its predecessor, the IEEE Group on Sonics and Ultrasonics. In a brief ceremonial session at this meeting the Certificate of Recognition of the IEEE Committee on Ferroelectrics was presented to Cecil E. Land in recognition of both his scientific contributions in ferroelectrics research and of the key role he played in bringing the ferroelectrics community to full partnership in the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society.

The Symposium began on Sunday afternoon with an educational session comprising introductory lectures by R. E. Newnham, R. C. Pohanka and A. M. Glass. This was the first time for such tutorial overviews to start our meeting. The response was enthusiastic -- nearly 150 persons attended. Monday through Wednesday, the technical sessions, both poster and oral, proceeded in two parallel streams in adjacent buildings. The grassy mall between the auditoriums provided a beautiful site for coffee breaks and informal technical discussions. The lunches, a reception, a picnic and a banquet provided further opportunities for the informal dialogue that accomplishes the main purpose of scientific meetings: information interchange. All participants are indebted to Lehigh's Local Arrangements Committee, headed by Martin Harmer, for smoothly orchestrating these events; they added much to the productivity and enjoyment of the Symposium.

The Call for Papers elicited over 200 abstracts from every domain of ferroelectric material and device research. The submissions were coherently organized into oral and poster sessions by the Program Committee under Robert Newnham's leadership. Each of the oral sessions began with an invited talk that provided a unifying theme for the session, either by reviewing past work or providing timely new results. The bulk of the contributed papers were presented in six poster sessions. Every poster was up for an entire day with two hours specifically set aside for poster discussions. Often discussions extended well beyond the allotted time; the international ferroelectrics community is experienced and comfortable with this style of technical session.

The Proceedings contain manuscripts representing more than 80 percent of the 201 papers presented at the Symposium. Under the guidance of the Proceedings Editor, Van Wood, each of these manuscripts was reviewed during the meeting; the session chairmen distributed the manuscripts to participants who swiftly provided critical comments and evaluations of their colleagues' work. Many hours of diligent work stand behind the fine record of the Symposium contained in the Proceedings.

Wallace Arden Smith
Symposium Chairman ISAF86

Ferroelectrics Committee Report

The principal item of interest from the Ferroelectrics Committee is the success of the 1986 ISAF.

The 1986 ISAF was held at Lehigh University, Bethlehem, Pennsylvania, on June 8-11, 1986. There were 360 registered participants in the meeting which set a new attendance record for meetings in the ISAF series. Although financial accounting is not yet final, it is clear at this point that the meeting was a financial as well as a scientific and technological success. Nearly 200 papers were presented by scientists from 16 countries. Much of the success of this meeting is the result of the dedication and hard work of the symposium organizing committee headed by W. A. Smith, General Chairman, and R. E. Newnham, Program Chairman.

A proposal to hold the 1988 ISAF in Zurich, Switzerland, was presented to the Ferroelectrics Committee at its meeting on June 12, 1986. It was proposed that the 1988 ISAF be jointly sponsored by the European Physical Society and the IEEE Ultrasonics, Ferroelectrics and Frequency Control Society, with the bulk of the responsibility for organizing the meeting to be carried out by individuals in Europe. A formal proposal is planned for submission to the UFFC-S Ad Comm in November.

Cecil E. Land, Chairman
UFFC-S Ferroelectrics
Committee

Acknowledgement

The following pictures were chosen from several taken by S.T. Liu of the Honeywell Corporate Solid State Laboratory in Plymouth Minnesota. The editor thanks Mike Liu for the extra time he took to record these events at the Ferroelectrics Symposium.

ISAF Symposium

A Bouquet for Betty

Martin Hammer (Local Arrangements Chairman) presents a surprised Betty Zdinak (Conference Coordinator) with flowers for her untiring efforts in registering, coordinating and consoling the participants.



Laurels for Land

Special recognition was given Cecil Land (Chairman of the Ferroelectrics Committee) for his many years of service to the ferroelectrics community. Bruce McAvoy (left: President of the UFFC-S) and Wally Smith (right: Symposium Chairman) assisted in the presentation.

A Bourd from Bob

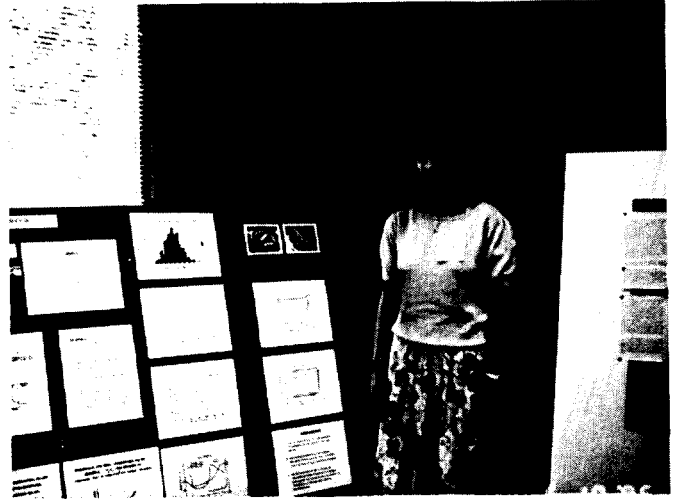
Bob Newnham (Program Chairman) comments on the technical program at the banquet.



ISAF Symposium

POSTER

Miss Dawne Moffatt of Penn State University was one of the many students who participated in the symposium.



BREAK

Martin Hammer explains to Don Smyth that he is responsible for the sunny weather at the coffee breaks.

RECEPTION

Cecil Land (Sandia) and Charles Pulvari (Catholic University) discuss strategies for getting ferroelectrics better aligned.



ISAF Picnic

Picnic

Al Meitzler (Chairman of the Ferroelectrics Standards Committee) and Wally Smith (Symposium Chairman) relax at the evening picnic held on the grounds of Lehigh University.



An international gathering around the picnic table.

The five finalists in the "smiling" contest.



Frequency Control

CALL FOR PAPERS

The 41st Annual Frequency Control Symposium is scheduled to be held on 27, 28 and 29 May 1987 in Philadelphia, PA. Authors are invited to submit papers dealing with recent progress in research, development and applications represented by the following topics:

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

Two copies of a summary in sufficient detail for evaluation of the proposed paper (> 500 words), together with the author's name, address and telephone number should be sent to the Technical Program Chairman:

Dr. Leonard S. Cutler
Hewlett-Packard Laboratories
1651 Page Mill Road
Palo Alto, CA 94304

The deadline for submission of summaries is 19 January 1987.

CALL FOR AWARD NOMINATIONS

Nominations for the Cady and Rabi awards should be sent to Dr. Leonard S. Cutler, at the above address, by 19 January 1987. The Cady Award, named after Walter Guyton Cady, is to recognize outstanding contributions related to piezoelectric frequency control devices. The Rabi Award, named after Professor I. I. Rabi, is to recognize outstanding contributions related to fields such as atomic and molecular frequency standards, time transfer, and frequency and time metrology. Each award consists of \$500.00, and a limited edition original print and certificate in a leather binder. The awards are presented to the recipients at the Frequency Control Symposium Award Dinner.

Either award is open to any worker in any of the fields of endeavor traditionally associated with the Frequency Control Symposium. The nominee should be responsible for significant contributions of a technical nature to the field selected. It is strongly suggested that the nomination not exceed two type-written pages. The selection of the recipient for each award will be made by the Technical Program Committee during the Committee's spring meeting.

40th ANNUAL FREQUENCY CONTROL SYMPOSIUM

The 40th Annual Frequency Control Symposium was held in Philadelphia, PA on 28-30 May 1986. The Symposium was co-sponsored, for the fourth year, by the UFFC-S and the Electronics Technology and Devices Laboratory of the U.S. Army LABCOM.

The Symposium technical program consisted of 19 sessions. The session topics included: quartz resonator design, filters, SAW devices, frequency stability, crystal resonator nonlinearity, time distribution and transfer, cesium beam frequency standards, and hydrogen masers and rubidium oscillators.

The plenary session celebrated the fortieth anniversary of the Annual Frequency Control Symposium. It consisted of historical and anecdotal remarks and reminiscences by old-time experts and pioneers in various frequency control-related activities. Several of the key participants in the first Symposium, Eduard Gerber, Willie Doxey, James King, Marvin Bernstein, Robert Adler, Warren Smith, Norman Ramsey and Gernot Winkler, spoke about early activities. The session, entitled, "Reminiscences of Early Frequency Control Activities in Honor of the 40th Anniversary of the Frequency Control Symposium" was organized by Dr. Eduard A. Gerber.

The proceedings of the 40th Annual Symposium on Frequency Control will be available from the IEEE, Cat. No. 86CH2330-9, starting approximately in October 1986. The cost will be \$59.00.

Raymond L. Filler
Publicity Chairman

1986 AWARD WINNERS

The Frequency Control Symposium Award Dinner was held 29 May. Three awards were presented:

THE CADY AWARD

The Cady Award was presented to Juergen H. Staudte for his pioneering contributions to the photolithographic processing of quartz devices, especially the development and commercialization of quartz tuning forks for timekeeping. The award was presented by Roger Ward, Quartztronics, Inc.

THE RABI AWARD

The Rabi Award was presented to Dr. Jerrold R. Zacharias for his contributions to the development of atomic frequency standards, especially his scientific leadership, pioneering demonstration of the technology, and entrepreneurial initiative which led to the commercialization of atomic standards. The award was presented by Prof. Norman Ramsey, Harvard University.

THE SAWYER AWARD

The Sawyer Award was presented to Dr. Larry E. Halliburton for his contributions toward the characterization of cultured quartz using infrared absorption, electron spin resonance, acoustic loss, and thermoluminescence measurements. The award was presented by Dr. Eduard A. Gerber, U.S. Army Electronics Technology and Devices Laboratory (retired).

Frequency Control Symposium

Roger Ward, Quartztrronics, Inc.,
presenting the Cady Award to
Juergen H. Staudtke, XECO Corp.



Prof. Norman Ramsey, Harvard
University, presenting the Rabi Award
to Prof. Jerrold R. Zacharias, MIT.

Dr. Eduard A. Gerber, U. S. Army
Electronics Technology and Devices
Laboratory (ret.), presenting
the Sawyer Award to Prof. Larry
E. Halliburton, Oklahoma State
University.



Frequency Control Symposium

Nobel Laureate I. I. Rabi praised Jerrold R. Zacharias' pioneering contributions. Rabi's remarks preceded the presentation of the Rabi Award to Zacharias.



The 40th Anniversary cake was cut by John Vig and Len Cutler, at the award dinner celebration.

Symposium chairmen with the award winners: Len Cutler, Technical Program Chairman, Larry Halliburton, Jerrold Zacharias, Juergen Staudte, and John Vig, General Chairmen.



In Memoriam

IN MEMORIAM

EDUARD A. GERBER
1907 - 1986

Dr. Eduard Gerber, a well-known and highly respected member of the frequency control community, died on August 8th while summering in Bridgton, Maine. He was retired from the US Army Electronics Command, Fort Monmouth, NJ where he had been Director of the Electronic Components Laboratory.

Dr. Gerber was a Life-Fellow of the IEEE, a Fellow of the AAAS, a member of U. S. National Committee of URSI, the American Physical Society, and the New York Academy of Sciences. He holds eight U. S. patents and three German patents and has published 38 professional papers and contributions to books. He was also co-editor of the two-volume monograph Precision Frequency Control.

Dr. Gerber received the Department of the Army Decoration for Meritorious Civilian Service in 1965 and 1970, and the C. B. Sawyer Memorial Award in 1981.

Ed Gerber came to the U. S. in 1947, after a career with Zeiss, the year of the first Frequency Control Symposium. Since then he continually played a key, but largely unheralded, role in its nurturing and growth. He had a distinct preference for scientific and engineering work, but because of his management skills and ability to deal amiably and equitably with people, he rose through the administrative ranks. This diminished his scientific output but not the locus or intensity of his interest, particularly his greatly loved field of frequency control. And from his administrative position he was able to encourage the development of the AFCS.

On this Fortieth Anniversary year of the AFCS, he organized and chaired the Plenary Session devoted to "Reminiscences of Early Frequency Control Activities" - many of these activities he himself had helped to mold.

Ed was always filled with scientific enthusiasm, an enthusiasm and zest he never lost; but now we have lost him.

Dr. Gerber's last technical paper will appear in the October 1986 IEEE MTT Transactions, and is entitled, "Advances in Microwave Acoustic Frequency Sources." This gentle man will not be forgotten; Frequency Control Symposium attendees have only to look about them, and in the Proceedings of each year.



* * * * *

IN MEMORIAM

JERROLD R. ZACHARIAS
1905 - 1986

The 1986 Rabi Award winner, Jerrold R. Zacharias, died unexpectedly on July 16, 1986, at his home in Belmont, MA, in his 81st year. Dr. Zacharias' career spanned several areas of physics during his extraordinarily productive life. In the context of time and frequency control, his work on the radio frequency spectra of atoms and his superb competence at experimental work led to the successful development of the first atomic clocks and their subsequent manufacture. During the era beginning in the mid 1940's, prior to the space-age, he foresaw the possibility of testing Einstein's theory of relativity with atomic clocks and began working on clock concepts that directly led to the present cesium devices. He was truly the godfather of the atomic clock.

A service of remembrance of Dr. J. R. Zacharias will be held at the Massachusetts Institute of Technology, Cambridge, Mass., in Auditorium 10-250 at 4:00 PM on Friday, October 24, 1986.

President's Message

It is a pleasure for me to report to you that the size of our Society has been on the increase. While the membership gains have been modest the trend is in the right direction and in time will provide a broader base for Society activities. We are mindful that the administrative committee will have to accommodate and nourish this broadening of interests. Specifically our Awards and Recognition program is going to be reviewed and plans made for possible expansion and identification of weaknesses in the program. Peer recognition, I think, is one very good reason for joining the IEEE. Remember the old maxim, "It matters more what you bring than what you take away?" Well, if that's true then every effort ought to be made to recognize the people who put more in than they get out. At the end of this article is a mini directory of current award information. We will expand on it in the future.

Elsewhere in this newsletter are articles on the Annual Symposium on Frequency Control and the International Symposium on the Applications of Ferroelectrics. Both Symposia were quite successful with full and comprehensive technical programs. The same can be said of the Ultrasonics Symposium to which over 300 papers were again submitted this year. We are deeply grateful to those whose work make these meetings possible and who "bring more in than they take away."

IEEE Awards Nomination Forms	
Wendy Roucco	(212) 705-7882
Fellow Nomination Forms	
Delores Wright	(212) 705-7750
Ultrasonics Awards	
R. Adler	(312) 391-7871
Ferroelectric Awards	
W. A. Smith	(914) 945-6032
Frequency Control Awards	
J. Vig	(201) 544-4275

B. R. McAvoy
President, UFFC-S

Nomination Committee Report

An outstanding slate of eight candidates was nominated to run for the four open seats on the Ultrasonics, Ferroelectrics and Frequency Control Administrative Committee. The term is for three years commencing in January 1987.

In a closely contested race, the following individuals were elected:

Dr. J. J. Gagnepain	Besancon, France
Prof. M. A. Breazeale	University of Tennessee
Dr. W. A. Smith	Philips Laboratories
Dr. J. R. Vig	U.S. Army Electronics Command Fort Monmouth, NJ

These individuals bring expertise in the two new areas - Ferroelectrics and Frequency Control - of our society as well as providing balance with the traditional Ultrasonics area of the group.

Please join me in congratulating these individuals on their election.

The election this year begins the process of broadening the Ad Comm to 12 elected members including three drawn from Regions 8-10. At present, the Ad Comm has nine elected members. Starting in 1987 one new elected member will be added each year until the committee attains its full strength. At the same time, the nominations committee will continue to look to balancing the representation on Ad Comm so all three segments of the Society are represented.

John D. Larson
Chairman,
Nominations Committee

National Lecturer Schedule

A partial list of the IEEE UFFC-S National Lecture Schedule is given below. Contact Dr. Chen S. Tsai, Professor of Electrical Engineering, University of California, Irvine, CA 92717, telephone (213) 856-5144, to make arrangements for him to speak at your university, company or IEEE Chapter meeting.

October 8, 1986
Joint Meeting of IEEE UFFC-S and Optical Society of America, Pittsburgh, PA
Dr. Doug Adam, Westinghouse R and D Center

October 9, 1986
Carnegie-Mellon University, Pittsburgh, PA
Professors Vijaya Kumar and Floyd Humphrey
Department of Electrical Engineering

October 11, 1986
Fall Meeting of American Physical Society of Ohio Section
John Carroll University, University Heights, OH
Professor Klaus Fritsch, Department of Physics

November 1986
Joint Meeting of IEEE UFFC-S, Electron Devices Group, and Circuits/Systems Society, Santa Ana, CA
Dr. Gertrud Katz, Northrop Corp., El Segundo, CA

December 10-16, 1986 (Japan Tour)
Four to five lectures including the talks at IEEE UFFC-S Tokyo Chapter and 7th Symposium on Ultrasonic-Electronics to be held in Kyoto.
Professor Nobuo Mikoshiba
Tohoku University
Sendai, Japan

December 18-20, 1986 (Taiwan Tour)
One to three lectures including the talk at Taiwan Section of IEEE
Dr. C. T. Shih, Director
Institute of Industrial Sciences and Technology
Hsin-Chu, Taiwan

March 11, 1986
IEEE UFFC-S Santa Clara Valley Chapter
Dr. Waguhi Ishak, Hewlett-Packard, Palo Alto, CA

Call for Papers

CALL FOR PAPERS
ULTRASONIC EXPOSIMETRY

The IEEE Transactions on Ultrasonics, Ferro-electrics and Frequency Control invites the submission of papers reporting original research, developments, refinements and standardization in all aspects of ultrasonic exposimetry. Topics include any aspect which could lead to a better understanding of the accuracy, precision and quantification of ultrasonic fields.

This special issue will address the following topics:

- Measurement Devices
- Calibration Techniques
- Calibration and Measurement Uncertainties
- Exposure Information

All papers must conform to the format set for the Transactions which can be found on the back cover of a recent issue.

Contributors are requested to indicate their intentions by submitting a short abstract to one of the Guest Editors by December 1, 1986.

Please submit manuscripts to one of the Guest Editors listed below, by January 1, 1987. This date is firm. All papers will be subjected to the normal peer-review process of the Transactions. The expected publication date is late 1987.

Gerald R. Harris
National Center for Devices and Radiological Health
Food and Drug Administration
Rockville, MD 20857 USA
301/443-6113

Roy C. Preston
Division of Radiation Science and Acoustics
National Physical Laboratory
Teddington, Middlesex
United Kingdom TW11 0LW
01-953-6154

Peter A. Lewin
Department of Biomedical Engineering and Science
Institute
Drexel University
Philadelphia, PA 19104 USA
215/895-1924

Editor Acknowledgements

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 Sue Tallerino for typing the manuscript. Articles of interest to the UFFC-S members are welcomed. For inclusion in the spring issue, please send by March 15, 1987, to Fred Hickernell, Motorola Inc., Government Electronics Group, 8201 E. McDowell Road, Scottsdale, Arizona 85252.

CALL FOR PAPERS
FREQUENCY CONTROL

A special issue of the UFFC Transactions on the subject of Frequency Control is planned for late 1987. Contributed papers on acoustic resonators, materials, and frequency sources (BAW and SAW), atomic and molecular frequency standards, frequency and frequency sources are being solicited. All papers must conform to the format set for the Transactions which can be found on the back cover of recent issues. Co-Guest Editors for this issue are Thomas E. Parker, John R. Vig, Helmut Hellwig, David W. Allan and Gary K. Montress. A written version of Art Ballato's talk on "Frequency and Time Sources", which was given as the National Lecturer, will appear in this special issue. Contributed papers should be sent to:

Thomas E. Parker
Raytheon Research Division
131 Spring St.
Lexington, MA 02173

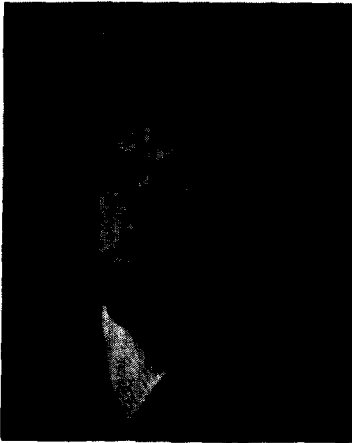
The deadline for submission is January 9, 1987. Of course all papers will be subjected to the normal peer-review process of the Transactions.

ISWASS '86

An International Symposium on Surface Waves in Solid and Layered Structures was held July 1-4, 1986 in Novosibirsk, Siberia, USSR. The symposium was sponsored by the Institute of Semiconductor Physics, Siberian Branch of the USSR Academy of Sciences in cooperation with the Institute of Radio Engineering and Electronics and Department of General Physics and Astronomy, USSR Academy of Sciences. The European Physical Society and the International Scientific Radio Union were co-sponsors of the symposium. The goal of the symposium was the presentation and discussion of recent advances in the physics of wave processes on the surface of solids and related applied research. The symposium was under the leadership of A. V. Rzhanov, Chairman, Yu. V. Gulyaev, Vice-Chairman, I. B. Yakovkin, Vice-Chairman, with assistance from an international organizing committee representing ten countries including the USA. The Local Program Committee was chaired by Yu. V. Gulyaev ably assisted by V. V. Proklov and A. V. Chapik as Vice-Chairman.

The four days of sessions took place in the House of Scientists at Academgorodok, a scientific community with more than 20 research institutes located 35 km from Novosibirsk. Participants also visited the Semiconductor Institute and attended a picnic on an island beach at the nearby Ob lake. Tours of Academgorodok, Novosibirsk and other Institutes were also available. Approximately 300 were in attendance at the conference with a program of 25 invited papers, 40 contributed papers and 125 poster papers. A proceedings of the conference was published which included most of the papers. The major areas covered by the papers were: (1) propagation of surface waves in solids and layered structures, wave interaction and multiwave processes, waves in periodic structures on surfaces and interfaces, acoustooptical interactions in layered structures, surface waves in quasi-two-dimensional electronic structures, spin waves, surface wave spectroscopy and materials for acoustoelectronics, acoustooptics and magnetolectronics. It is planned to have another symposium of this nature within the next two to three years with Bulgaria as the possible host country.

New AdCom Members



JEAN-JACQUES GAGNEPAIN

Jean-Jacques Gagnepain was born in Montbeliard, France in 1942. He received the M.S. degree in physics from the University of Besancon, France in 1964 and the Doctorat d'Etat in 1972 from the same university in physics and metrology.

His doctorate work focused on nonlinearities in piezoelectric materials and quartz crystal resonators. Nonlinear effects still are one of his main subjects of research, the other ones being involved with noise mechanisms in oscillators, with frequency stability and frequency control. He holds several patents and has authored or co-authored about 90 research papers in these fields.

Jean-Jacques Gagnepain is Directeur de Recherche at the Centre National de la Recherche Scientifique (C.N.R.S.) and presently manager of the Laboratoire de Physique et Metrologie des Oscillateurs of C.N.R.S. in Besancon, France. He is also teaching nonlinear mechanics and nonlinear acoustics at the Physics Department of the University of Besancon. He spent, as a visitor scientist, one year at the National Bureau of Standards in 1975-1976 in Boulder, Colorado, in the Time and Frequency Division, and also several months in Ginzton Laboratory at Stanford University.

He was a member, for four years, of the National Scientific Committee of C.N.R.S.

He has been married since 1968 and the Gagnepains have two children (one of each). His favorite outside activities are mountaineering and skiing.



MACK BREAZEALE

Mack A. Breazeale currently is Professor of Physics at The University of Tennessee in Knoxville. Professor Breazeale has authored or coauthored approximately 85 publications and holds two patents on the use of ultrasonics in the study of physical phenomena. He serves as consultant to Oak Ridge National Laboratory and is Associate Editor of the Journal of the Acoustical Society of America, with special interest in Nonlinear Acoustics and Macrosonics.

Professor Breazeale received the Ph.D. in Physics from Michigan State University with the Hiedemann Group and was Fulbright Research Scholar at the Stuttgart Technical University with Professor Kneser. Since then he has served as "Doktor Vater" for twenty-five graduate students of his own. He was Guest Professor at the Technical University of Denmark in 1977 and was CNRS Guest at the University of Paris VI. He is Senior Member of IEEE, is Fellow of the Acoustical Society of America, and is Fellow of the Institute of Acoustics (Great Britain).

He is married to the former Joanne O'Dell and they have three children and two delightful grandsons.

New AdCom Members



WALLACE A. SMITH

Wally Smith was born in Paterson, New Jersey in 1942. He earned a B.A. in physics at Rutgers University in 1964 and completed his formal education with an M.A. in 1966 and Ph.D. in 1970 in physics from Princeton University where he was a Woodrow Wilson Fellow and National Science Foundation Fellow.

From 1969 to 1975 Dr. Smith held research and teaching appointments in the physics departments of New York University and The City University of New York. His research focused on laser physics and hydrodynamic instabilities. Since joining Philips Laboratories in 1975, Wally's research has been directed at problems in dielectric materials and devices. He led a DARPA sponsored project to develop new pyroelectric materials for infrared imaging devices. His present responsibilities encompass leading a research team developing novel piezoelectric materials for medical ultrasonic and naval transducers, as well as related tasks in medical imaging.

Wally is a Senior Member of the IEEE and is active in the professional community, currently serving as General Chairman of the 1986 IEEE International Symposium on Applications of Ferroelectrics, on the Technical Program Committee of the 1986 IEEE Ultrasonics Symposium, on the National Research Council Army Basic Research Committee, on the Office of Naval Research Advisory Committee on Piezoelectric and Electrostrictive Materials Research, and as Treasurer of the Northern Westchester Chapter of Sigma Xi. He is an Associate Editor of the IEEE TRANSACTIONS ON ULTRASONICS, FERROELECTRICS, AND FREQUENCY CONTROL, in addition to serving on the Editorial Boards of the Philips Journal of Research and Ferroelectrics.

Wally's wife, Beverly, is with Pace University and their daughter, Victoria, is beginning the eighth grade. Keeping track of their two cats is a major form of recreation for the Smith Household.



JOHN R. VIG

John Vig was born in Hungary in 1942. He immigrated to the United States in 1957; received his B.S. in physics from CCNY in 1964, and his M.S. and Ph.D. from Rutgers - The State University, in 1966 and 1969, respectively. Since 1969 he has been employed as a research scientist at the Army Electronics Technology and Devices Laboratory, Ft. Monmouth, NJ, working primarily on the experimental aspects of quartz crystal devices. The results of his research have been published in more than 40 papers. He has received 31 patents.

Currently, as Chief of the Frequency Control and Timing Branch, John leads a multidisciplinary research program aimed at the development of high stability frequency control devices and clocks for future Army communication, navigation, identification and radar systems. He has been serving as the General Chairman of the Annual Frequency Control Symposium since 1982.

John has been an environmentalist most of his life. He is chairman of his town's Environmental Commission. His wife is an artist specializing in printmaking. John's favorite pastimes include hiking, and relaxing in his back yard, where he has been growing numerous varieties of hollies, daylilies and other ornamental plants. He recently acquired an Amiga computer with which he has been spending too much time (according to his wife).

Chapter Activities

SANTA CLARA VALLEY

The following is a summary of last year's activity (1985/1986) and the planned schedule for 1986/1987 for the Society on Ultrasonics, Ferroelectrics and Frequency Control in the Santa Clara Valley Chapter.

1985/1986 Talks:

1. Sept. 11, 1985: Professor Peter Fessenden, Stanford University, California. "Practical Aspects of Clinical Hyperthermia"
2. Nov. 13, 1985: Dr. Bob Bray, Hewlett-Packard Company, Santa Rosa, California. "SAW Devices for Instrumentation Applications"
3. Dec. 11, 1985: Dr. Gary Elston, Crystal Technology Inc., Palo Alto, California. "Dynamic Range of Acousto-Optic Bragg Cells"
4. Feb. 12, 1986: Dr. Robbin Giffard, Hewlett-Packard Labs, Palo Alto, California. "Mercury Ion Frequency Standards"
5. March 5, 1986: Professor Robert Newnham, Pennsylvania State University. "Actuators, Sensors and Transducers"
6. April 9, 1986: Dr. Patrick Katzka, United Technology, Sunnyvale, California. "Acousto-Optic Tunable Filters"
7. May 15, 1986: Dr. Don Armstrong, X-CYTE Inc., Mountain View, California. "A SAW-Based Identification System"

1986/1987 Officers:

On May 15, 1986 a general election was held at Stanford University and the following officers were elected for the UFFC-S, Santa Clara Chapter:

Chairman: Dr. Waguish Ishak
Hewlett-Packard Laboratories
1651 Page Mill Road
Palo Alto, California 94304
Tel: (415) 857-4449

Vice Chairman: Dr. Bob Potter
Crystal Technology Inc.
1040 East Meadow Circle
Palo Alto, California 94303
Tel: (415) 856-7916, Ext. 341

Treasurer: Dr. William Shreve
Hewlett-Packard Laboratories
1651 Page Mill Road
Palo Alto, California 94304
Tel: (415) 857-2664

1986/1987 Tentative Schedule:

1. Sept. 10, 1986: Dr. Bill Brooks, Lockheed: "Acousto-Optic Devices"
2. Oct. 8, 1986: Dr. Jim Peterson, Crystal Tech: "SAW Fine Line Lithography"
3. Nov. 12, 1986: Dr. Len Cutler, HP-Labs: "Frequency and Time Standards"
4. Dec. 10, 1986: Professor Bert Auld, Stanford University: "Shear Transverse Wave Devices"

For the rest of the year we are planning talks on medical imaging, acousto-optic devices, Microwave SAW applications and other subjects related to Ultrasonics, Ferroelectrics and Frequency Control. The talks are held at Stanford University, Applied Physics Room 200 at 8:00 PM on the second Wednesday of every month. For more information, please contact the Program Chairman, Dr. Bob Potter, at the above address.

Waguish Ishak
Chapter Chairman

TOKYO CHAPTER

Technical Meetings

Tokyo Chapter held five technical meetings and 30 papers were presented during half a year in 1986 in conjunction with the Technical Group on Ultrasonics of the Institute of Electronics and Communications of Japan as follows:

Date	Papers	Place
January 28	8	Kyoto
February 24	6	Tokyo
March 20	4	Tokyo
April 25	6	Tokyo
May 28	6	Tokyo

The Symposium on Ultrasonic Electronics

The 7th Symposium on Ultrasonic Electronics will be held on December 8-10, 1986, in Kyoto, sponsored by the UFFCS Tokyo Chapter.

National Lecturer in Kyoto

We have invited Professor Chen Tsai to Japan as the IEEE UFFCS National Lecturer for 1986/87 to give an invited paper at the 7th Symposium on Ultrasonic Electronics and several lectures in Kyoto, Osaka and Tokyo.

The China-Japan Joint Conference on Ultrasonics

The China-Japan Joint Conference on Ultrasonics will be held on May 11-14, 1987, in Nanjing, sponsored by the UFFCS Tokyo Chapter.

Nobuo Mikoshiba
Chairman, Tokyo Chapter

PITTSBURGH CHAPTER

A joint chapter of the UFFC and Electron Devices Societies is being formed within the IEEE Pittsburgh Section. Currently Douglas Adam (UFFC) and Tom Maloney (Electron Devices) are co-chairmen.

The first meeting of the 1986/87 program year features Professor Chen Tsai, the UFFC distinguished lecturer, who will talk on "Acousto-Optic Interactions, Devices and Applications." This will be a joint meeting with the Pittsburgh Section of the Optical Society of America and will be held in the Scaife Auditorium, Carnegie-Mellon University, on Wednesday, October 8 at 8:30 PM.

At present there are 19 UFFC members in the Pittsburgh area and we urge them to show their support by attending the October meeting. At this time we can discuss the program for the remainder of the year, select suitable meeting locations and times, and find new committee members.

For further information, please call Douglas Adam (412) 256-1965.

Douglas Adam
Chapter Chairman

BALTIMORE, WASHINGTON AND NORTHERN VIRGINIA

The officers of the Washington Chapter of the UFFC for 1986-87 are:

Chairman: Dr. Manas Roy
Bendix Communications Division
1300 Joppa Road
Baltimore, MD 21204

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

Secretary/Treasurer: Dr. Paul Gammal
Naval Surface Weapons Center
White Oak, Silver Spring, MD
20910

Arrangements Chairman: Mr. Dana Bailey
Westinghouse Defense and
Electronics Center
P. O. Box 1521
Baltimore, MD 21203

Our schedule for the 1986-87 year is:

1. Dr. Robert Wagner (FDA): "Pattern Recognition in Medical Ultrasonic Imaging - Man vs. Machine" October 7
2. Prof. Robert Green (Johns Hopkins Univ.): "Nonlinear Acoustics" December
3. Mr. Michael Driscoll (Westinghouse DEC): "Acoustic Filters and Oscillators" February
4. Prof. Chen Tsai (National Lecturer): "Acousto-Optics" March
5. Speaker to be determined: "Acoustic Charge Transfer" May

In addition, we are planning to have a special course taught by Drs. Arthur Ballato and John Vig on bulk wave acoustic resonators for frequency control and filtering which will probably take place in February or March.

The above schedule is quite tentative at this date. Please contact any of the officers listed for additional information.

Joel Rosenbaum
Post-Chairman

ORLANDO CHAPTER

On May 8, a meeting was held by UFFC-S at the Naval Research Laboratory. The topic was, "Underwater Acoustic Metrology in the USA", presented by Dr. J. E. Blue. The presentation covered sonar transducers and the ongoing research in calibration measurement methodology. There were eight attendees.

In July, new chapter officers were elected for the year of 1987. The listing chapter officers are as follows:

Sunder Gopani - Chairman
Sawtek Inc.
(305) 886-8860

John Hunt - Vice Chairman
Plezo Technology, Inc.
(305) 298-2000

Don Malocha - Secretary/Treasurer
University of Central Florida
(305) 275-2414

On September 15, a UFFC-S meeting is scheduled, at Sawtek Inc. Dr. Don Malocha will discuss the analysis and modeling of SAW bandpass filters.

Planning and organization of various chapter activities have begun. Below is a list of the tentative programs scheduled for the fiscal year 1987. The chapter had a rewarding first year and looks forward to an exciting new year.

September	UCF Presentation
October	Underwater Acoustics
November	Bulk Acoustic Wave Technology
January	UFFC National Lecturer/Dinner Meeting
February	Seminar: Acoustic Charge Transport
March	Sawtek: Surface Wave Technology

Sunder Gopani
Chairman
IEEE-UFFC-S Orlando Chapter

Chapters - Membership

We hope more and more you will experience tangible contact with Chapter-Membership activities. All functions in this area are becoming more active. If you have not heard from us, you will.

First, it is the distinguished lecturer, this year Chen Tsai. He was featured in the Spring Newsletter. His topic is, "Acousto-Optic Interactions, Devices and Applications." If you have not already, be sure to call him to arrange a presentation for your group. He can be contacted at (714) 856-5244. Bill Tanski is the subcommittee chairman in charge of the distinguished lecturer activity. He would like to hear from you at (203) 727-7403 for any ideas for future topics and/or speakers.

Through its symposia, transactions, chapter and other activities, the UFFC-S strives to serve our membership. We can do this best when all the people who are a part of the ultrasonic, ferroelectrics and frequency control technology communities are members of the society. The stronger our financial base, the more service we can provide. You may have noticed membership booths at recent symposiums sponsored by the society. Harry Salvo, membership subcommittee chairman, is making himself as visible as possible through the booths. To encourage membership, the Ultrasonics Symposium provides for using the difference between the member and non-member fee toward IEEE membership if the registrant desires. Also, the society will waive the first year's society dues. This is certainly a good deal and we hope many will take advantage of it.

Leland Solie is busy arranging a speakers' pool for UFFC-S chapters. He is soliciting from various cuts of UFFC-S membership. If you would be interested you should contact Leland at (612) 456-2411. Potential volunteer speakers are asked to give their topic and, because the Society can not underwrite transportation expenses, the geographic area over which they can travel to speak. Leland would like to hear from you if you are interested or need more information on the program than is given in Leland's article elsewhere in this Newsletter.

We feel the activity is moving. Let me hear from you. My one phone number is (301) 765-4027.

R. A. Moore
Committee, Chairman

IEEE TRANSACTIONS ON ULTRASONICS, FERROELECTRICS
AND FREQUENCY CONTROL

Call for Reviewers

Because of the expanded scope of the UFFC Society, the IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control has a pressing need for individuals who are willing to review articles.

If you have an interest, please complete the following and return to the Editor-in-Chief.

William D. O'Brien, Jr.

UFFC Transactions Reviewer Profile

Complete Name _____

Job Title _____

Complete Mailing Address _____

Phone Number () _____

Check your areas of expertise:

Biological and Medical	_____	Measurement and Control Applications	_____
Devices	_____	Nondestructive Evaluation	_____
Ferroelectricity - Applied	_____	Nonresonant SAW Devices	_____
Ferroelectricity - Fundamental	_____	Optical Interaction	_____
Frequency Control - Acoustics	_____	Physical Acoustics	_____
Frequency Control - Atomic and Molecular	_____	Sensors	_____
Frequency and Time Imaging	_____	Systems Applications	_____
Materials	_____	Underwater Sound	_____

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

Invitation to Join the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society

THESE ARE exciting times for the ultrasonics, ferroelectrics, and frequency control profession. The IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society needs your support. During the past year the Society has greatly expanded its scope in order to address what was perceived to be a need. That need was a professional society that could aid in the furthering of ferroelectrics and frequency control. The ultrasonics component of the Society has long been and will continue to be one of its mainstays.

The expansion in the Society's Field of Interest adds a greater dimension to the ways in which the membership can be served. This has been accomplished with the change in name of the Society and with the greatly expanded editorial support of this *TRANSACTIONS*. It is clear that the areas of ferroelectrics and frequency control are now well represented. This is further evidenced by an examination of the inside front cover of this issue, in which you will find a list of 16 technical areas with an equal number of dedicated and expert Associate Editors. Clearly you can see that this Society represents your technical interests.

This letter is an invitation for you to join the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society. One of the principal membership benefits is this *TRANSACTIONS*, which is published bimonthly and provides over 800 pages annually with the latest engineering and scientific advances in ultrasonics, ferroelectrics, and frequency control.

In the past two years, this *TRANSACTIONS* has had five outstanding special issues, each which has become an essential part of our member libraries. These special issues have been the following:

- Digital Acoustic Imaging (July 1984)
- Ultrasonic Hyperthermia (September 1984)
- Acoustic Microscopy (March 1985)
- SAW Convolver and Correlators (September 1985)
- Biological Effects of Ultrasound (March 1986).

We have not stopped there. Within the next few issues will be three additional special issues dealing with the following topics:

- Photoacoustics
- Acoustic Sensors
- Computers in Ultrasound.

Following these there will be special issues on various topics in ferroelectrics and in frequency control, in addition to other topics in ultrasonics.

In addition to the UFFC *Transactions*, the Society provides many other benefits. These include the sponsorship of three symposia:

- Annual Frequency Control Symposium
- Triannual Symposium on the Applications of Ferroelectrics
- Annual Ultrasonics Symposium.

The calendar of dates and locations for these symposia can be found on the inside back cover of this issue.

The abstracts for these three symposia can be found in this *TRANSACTIONS* following the meeting. In the January 1986 issue are included the 1985 Frequency Control Symposium abstracts and the 1985 Ultrasonics Symposium abstracts. And in the latter issues of the UFFC *Transactions* this year will be published the abstracts of the 1986 Frequency Control Symposium and the 1986 International Symposium on the Applications of Ferroelectrics.

Other membership benefits include

- the semiannual Newsletter, which keeps you informed on many of the newsy items;
- the Distinguished Lecturer, which is selected annually and provides a Society-supported, internationally known distinguished lecturer for UFFC Chapters and other appropriate gatherings;
- nine local UFFC Chapters which provide outstanding programs in our technical discipline in your local community; and
- many other opportunities to interact on a technical basis with colleagues.

Joining the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society is easy. An application form is included within this issue. If you are already an IEEE member, the cost to you is only \$7.00, which is one of the best bargains today. If you are not an IEEE member, consult the application form.

If you have any membership related questions, Bob Moore, the Chapters-Membership Chairman, will be pleased to hear from you. His address is on the inside back cover.

Together the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society can make a difference. Join today and be part of this exciting time.

Robert A. Moore, *Membership Chairman*
William D. O'Brien, Jr., *Editor in Chief*

AdCom Briefs

The spring UFFC-S ADCOM Meeting was held on March 25, 1986 at the Holiday Inn O'Hare/Kennedy Hotel, Rosemont, Illinois. The meeting was presided over by Bruce McAvoy. Twenty people attended and took part in an extremely active meeting. Topics of interest to the membership included: a new ex-officio Financial Chairman, a new membership brochure, student travel assistance for symposia, and the new Distinguished Lecturer. The elected members of ADCOM elected Herman van de Vaart the new ex-officio Financial Chairman. This position was created by ADCOM because of the expanded budget of the Ultrasonics, Ferroelectrics, and Frequency Control Society. The society sponsors three major symposium and has an annual budget that is now approaching close to half a million dollars. Harry Salvo has put together a new membership brochure for the Ultrasonics, Ferroelectrics, and Frequency Control Society. This brochure will be available at the membership booths at the Ultrasonics, Ferroelectrics and Frequency Control Symposia. Starting in 1987 ADCOM passed a resolution "that student support for attendance for any UFFC-S Symposium will be the responsibility of the respective Symposium subject to ADCOM guidelines." This resolution was passed so that each symposium could have student travel if they so desired. Professor Chen Tsai, from the University of California at Irvine, was selected as the new Distinguished Lecturer. Professor Tsai is internationally known in the field of acousto-optics and has been extremely active in UFFC-S. His lecture is entitled, "Acousto-Optic Interaction, Devices and Applications."

The meeting was called to order by the President, Bruce McAvoy. He then introduced new elected members who will serve from 1/1/86 to 12/31/88. They were Colin K. Campbell and James G. Miller. Jeff S. Schoenwald was also elected but was unable to attend. Colin K. Campbell was also elected a Fellow of the IEEE for his work on "Surface-Acoustic-Wave Devices and Electrical Engineering Education." Professor Richard M. White, an ADCOM member, has received the Cleo Brunetti Award. Bruce McAvoy then reported on the highlights TAB/TAB OPCOM Meeting. The most

important theme was the conflict between freedom of information and export of technical information. This topic is under examination by the IEEE. William D. O'Brien submitted an extensive final report from the IEEE Engineering on Medicine and Biology Society Task Group on the Research Needs for Biomedical Engineering Systems. This report is published in the January issue of the IEEE Transaction on Biomedical and Engineering. Regarding the Technical Activities, Arthur D. Ballato stated that Eric Kentley published in the Society Transaction "International Electro-technical Commission Standard-SAW Devices." William D. O'Brien's report indicated that the Society Transactions are being published slightly ahead of schedule and in a timely manner. Under Chapter/Membership, Robert A. Moore's committees are extremely active. Leland Solie's Subcommittee on Chapters has generated a form for Chapter guest lecturers. Harry Salvo has a new brochure for membership and William Tanski nominated our new Distinguished Lecturer, Professor Chen Tsai. John D. Larson has implemented the new by-law changes so that we have elected four new ADCOM members and one of which is from region 8-10.

Gerry W. Farnell presented the future Ultrasonic Symposia: 1986 Williamsburg, 1987 Denver, 1988 Chicago, 1989 Montreal, 1990 Hawaii. For 1991, Orlando was selected. For 1992 an offshore symposium was suggested. Tom Parker presented and updated us on the Frequency Control Symposium. Wallace A. Smith talked about the International Symposium on the Application of Ferroelectrics.

The next regular meeting of ADCOM will be held on November 16, 1986 at Williamsburg, Virginia. After setting this date, Bruce McAvoy then adjourned the meeting.

Reynold Kagiwada

Secretary - Treasurer

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