IEEE ULTRASONICS, FERROELECTRICS AND FREQUENCY CONTROL SOCIETY NEWSLETTER

Number 11: April 1991 **Editor: Fred S. Hickernell**

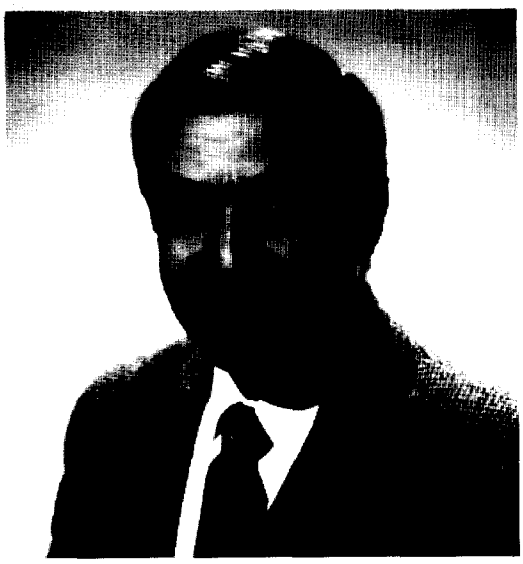
Moisés Levy
UFFC-S Distinguished Lecturer

The Administrative Committee of the Ultrasonics, Ferroelectrics and Frequency Control Society has announced the UFFC-S Lecturer for 1991-1992, Professor Moisés Levy. As the Distinguished Lecturer Professor Levy will be available to speak before UFFC-S chapters, graduate and undergraduate student university seminars and other appropriate local interested groups. His topic is:

Ultrasonics of High T_c and Other Unconventional Superconductors

Moisés is a Professor in the Department of Physics at the University of Wisconsin in Milwaukee. He has been agitating superconducting materials for over 30 years using bulk acoustic waves and surface acoustic waves. This yields some very important information on superconducting materials which Moisés is willing and eager to share with you and your colleagues.

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



Moisés Levy
UFFC-S Distinguished Lecturer 1991-1992

45TH ANNUAL SYMPOSIUM ON FREQUENCY CONTROL
May 29-31, 1991
Los Angeles Airport Marriott
Los Angeles, California

Wednesday, December 11, 1991
Option I: Hidden Treasures of the World Showcase
9:00 am to 2:00 pm
Adult only: $20.00
(17 years and older) (EPCOT ticket additional)

Disney Transport will provide transportation to EPCOT center where we will meet at the "Lost and Found" near the entrance to EPCOT. Our instructor will briefly describe the countries and cultures represented in the World Showcase. A walking field trip (wheel chairs are available) throughout the World Showcase will highlight the art, architecture, landscapes, and costuming. We will get a behind-the-scenes view of some of the Disney illusions. A special area is provided for educators to view materials and programs that are available. Check with the instructor for this information. The program concludes with a question and answer exchange. The group is then free to enjoy the remainder of the day in EPCOT Center with shuttle service provided back to the Hilton. Check for scheduled shuttle times.

Wednesday, December 11, 1991
Option II: Universal Studios, 9:00 am to 4:00 pm
Adult: $40.00 Child (3-11): $33.00

This is your chance to tour the biggest motion picture and television studio outside of Hollywood. You have a chance to see how they create films, to become a star, and to help create a film yourself. You can see the world of "Hanna-Barbera," take a flight with "ET," visit "Kongfrontation," experience the "Nickelodeon" studios, visit the "Ghostbusters" exhibit, and experience the ultimate flight in "Back to the Future." The tour bus will leave the Hilton at 9:00 with a twenty minute travel time to the studios. The escort will take us through the park providing the admission, brochure, and map. Lunch, which is not included in the above amount, can be obtained at one of the many concessions and restaurants within the park which include the Hard Rock Cafe. The tour group will return to the bus around 3:00 and return to the Hilton by 4:00.

Thursday, December 12, 1991
Kennedy Space Center, 9:00 am to 4:00 pm
Adult: $37.00 Child (3-9): $25.00
Lunch is included in the above prices.

"Spaceport USA" is the home of America's space program. Experience the real thing with NASA's guided tours. Tours include the Space Shuttle buildings, three-mile-long landing strip, launch pads, administrative offices, laboratories, and processing facilities for shuttle payloads. The IMAX movie theater presents "The Dream is Alive" which launches you into space in a way only the astronauts themselves experience. "Satellites and You" takes you through a simulated space station.

The tour guide will then take us to the Sand Point Inn in Titusville for lunch. The menu offers flounder, rock shrimp, or lobster tail, salad, rice or potato, dessert, and a beverage. A separate menu will be provided for the children's meal.

After lunch we will visit the United States Astronaut Hall of Fame and the Astronaut Memorial before returning to the Hilton.

Shuttle Schedules

Sea World	Price (round trip) $6.00			
Depart Hilton	8:05	10:05	11:35	
Return Hilton	4:00	7:00		
Universal Studios	Price (round trip) $10.00			
Depart Hilton	8:40	9:40	10:40	1:40
Return Hilton	2:30	5:30	7:30	

Walt Disney World Theme Parks
Frequent shuttles are free for Hilton guests.

EVENING SOCIAL EVENTS

It will soon be our pleasure to welcome you to Orlando! We have planned what we hope will be an exciting, memorable evening program for you, your families, and your guests. Our evening activities will begin Monday night with a pool side party amidst the surrounding Florida foliage with music, hors d'oeuvres, and the companionship of friends and associates. A special dinner party with private shows at Sea World is scheduled for Tuesday night after the park closes. Wednesday night, we hope to offer a night out for the adults to enjoy the music, dancing, comedy clubs, and restaurants at Disney's Pleasure Island. (Children are also welcome.)

Make this symposium the most productive and valuable in recent years. Then, take off your ties, leave your coats in the closet, make yourself comfortable,..., and have fun.

Advance registration is very important to the success of these evening events, so please register early to avoid program changes.

MONDAY, DECEMBER 9: Social Gathering, 6:00 pm - 9:00 pm

On Monday night, relax with your family, friends, and colleagues around the pool reserved for your pleasure across from the Grand Ballroom. Listen to the festive beat of a steel drum band underneath the pines, palm trees, and Florida night sky, while you are served a selection of hot and cold hors d'oeuvres. Have you ever tasted 'gator tail? Don't miss it! Nearby, carving stations will also offer beef and turkey, condiments and other items to tide you over until you are ready for dinner at one of the fine restaurants in the hotel or nearby.

Each full registration will be accompanied by tickets for either two sodas or one cocktail, beer, or glass of wine; several cash bars will be available for additional drinks throughout the evening. Your first night out at the symposium may be shared by a surprise guest or two, adding even more excitement to the pool side party in Florida's semi-tropical paradise.

TUESDAY, DECEMBER 10: Private Dinner and Party at Sea World

Adult: $42.00 Child (3-9): $28.00

For our Tuesday night event, we have planned a special, private dinner and party at Sea World, the world's most outstanding marine life park. Adults and children alike will love this opportunity to enjoy several of the attractions, including the killer whale show, from an uncrowded and close perspective. The more conservative among us may choose a slightly more distant viewpoint when Shamu's family enter-

Biographical Sketch
Moisés Levy

Moisés Levy was born in Concepcion, Chirriqui, Republic of Panama, on April 8, 1930. He received a B.S. in Chemistry and an M.S. in Chemical Engineering from the California Institute of Technology in 1952 and 1955, and a Ph.D. in Physics from the University of California-Los Angeles (UCLA) in 1963.

Moisés started as a chemist at Specialty Resins Co., Los Angeles, and, then at Hughes Aircraft Semiconductor Division - Inglewood, CA. After serving in the U.S. Army and obtaining a Ph.D., he was a NATO postdoctoral fellow at ETH, Zürich, Switzerland, 1962-1963. From there he went to the Physics Department, University of Pennsylvania as an Assistant Professor (1964-1965) and then returned to UCLA as an Assistant Professor in 1965-1970. He joined the Physics Department at the University of Wisconsin-Milwaukee as an Associate Professor in 1971 and became a Professor in 1973. He was elected Chairman of the Physics Department from 1975 to 1978. He has been a Visiting Scientist at the Venezuelan Institute of Scientific Research in 1972, 1976 and 1982 and a Visiting Professor at the University of Sao Paulo, Brazil in 1979 and 1983, and at the Technion University in Israel in 1983-1984. He has been a consultant for Northrop Corporation, Energy Conversion Devices, Miller Brewing Company, and Astronautics Corporation of America.

Moisés has engaged in the ultrasonic investigation of superconducting materials, for over 30 years, most recently the newly discovered high T_c superconductors. He has used bulk waves to investigate type I and type II superconductors, reentrant ternary compound superconductors, and heavy Fermion superconductors. He has used surface acoustic waves to study several types of superconducting films such as beta structure films, rocksalt structure films, amorphous films, granular films and high T_c films. He has also used SAW to couple to a two dimensional electron gas, and to develop frequency tunable SAW filters and dispersion lines using magnetoelastic interaction. He has co-authored over 150 papers on these topics, and has given over 150 colloquia, invited lectures, and presentations at professional meetings. He is the guest editor of a forthcoming volume in the Physical Acoustic Series entitled *Ultrasonics of High T_c and Other Unconventional Superconductors*, (Academic Press). To date, seventeen students have received their Ph.D.'s under his supervision. His research has been funded by AFOSR, NSF and ONR.

Moisés has been associated with the UFFC and its progenitor the Sonics and Ultrasonics Group since 1969. He was the General Chairman of the IEEE Ultrasonics Symposia in Milwaukee (1974), Atlanta (1983), and Co-Chair of the symposium in Hawaii (1990). He has served on the technical program committee of the IEEE Ultrasonics Symposium since 1971 and as chairman of the nominations committee of IEEE Group on Sonics and Ultrasonics. He is presently serving as Associate Editor of the *IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control*, and is on the Administrative Committee of the UFFC. He is a member of the Acoustical Society of America, a Fellow of the American Physical Society, and a senior member of the IEEE. Recently he was one of the recipients of the UWM Foundation/Graduate School Awards for excellence in research.

Moisés can be reached at the Department of Physics, University of Wisconsin-Milwaukee, Milwaukee, WI 53201, Phone (414) 229-4168, FAX (414) 229-5589.

45th Annual Symposium on Frequency Control

The 45th Annual Frequency Control Symposium will be held:

May 29-31, 1991
Los Angeles Airport Marriott
Los Angeles, California

Co-sponsored by: The Institute of Electrical & Electronics Engineers Ultrasonics, Ferroelectrics, and Frequency Control Society and the U. S. Army Laboratory Command Electronics Technology and Devices Laboratory. The Annual Symposium on Frequency Control serves as the leading international forum on frequency control and precision timekeeping, including:

- Fundamental Properties of Quartz and other Piezoelectric Crystals
- Theory, Design and Processing of Quartz and other Piezoelectric Crystals
- Piezoelectric Resonators and Filters (BAW and SAW)
- Stable Oscillators and Synthesizers
- Atomic and Molecular Frequency Standards
- Frequency and Time Coordination and Distribution

Special sessions are scheduled this year for the increasing role of optics and lasers in frequency standards and on high temperature superconductors. There are also eleven invited speakers covering the following topics:

Plenary Speaker:

"Deep Space Tracking and Frequency Standards"
Dr. James Border, JPL

Invited Speakers:

A Survey of Optical Techniques with an Emphasis on Frequency Control, Dr. H. T. Wang, Hughes Research Laboratory

Single Ion Optical Frequency Standards, Dr. James Berquist, NIST

Laser Control of Atoms for Atomic Clocks, Professor Steven Chu, Stanford University

Intensity and Frequency Noise in Semiconductor Lasers, Professor Kerry Vahala, California Institute of Technology

Time and Frequency Requirements for Deep Space Exploration, Dr. Lute Maleki, JPL

Superconducting Resonators for Frequency Control, Dr. James Hollenhorst, Hewlett-Packard Laboratories

Phase Noise Modeling in Frequency Dividers - Summary, Dr. William Eagan, ELS

Stochastic Resonance: A Two-State System Driven by Noise and a Weak Signal, Dr. Frank Moss, University of Missouri at St. Louis

Quartz Resonator Sensors in Extreme Environments, Dr. Errol EerNisse, Quartztronics

The Aging of Bulk Acoustic Wave Resonators and Filters, Dr. John Vig, U. S. Army and Dr. Thrygve Meeker

On May 28th, one day before the start of the Symposium, eight tutorials will be presented:

Introduction to Phase Noise, J. Barnes, Austron

Introduction to Phase Noise Measurements, T. Parker and G. Montress, Raytheon

Introduction to Quartz Frequency Standards, J. Vig, US Army LABCOM

Introduction to Atomic & Molecular Frequency Standards, S. Stein, Ball Corporation

Quartz Crystal Oscillator Design Concepts, M. Driscoll, Westinghouse

Oscillator Design Techniques using Calculated and Measured S Parameters, R. Weber, Iowa State University

Introduction to Frequency Synthesis, V. Reinhardt, K. McNab and K. Gould, Hughes Aircraft

Introduction to Time Transfer and Frequency Calibration with GPS, W. Klepczynski, USNO

The people in charge of this years Frequency Control Symposium are:

General Chairman:

Dr. Raymond L. Filler
U.S. Army LABCOM

Technical Program Chairman:

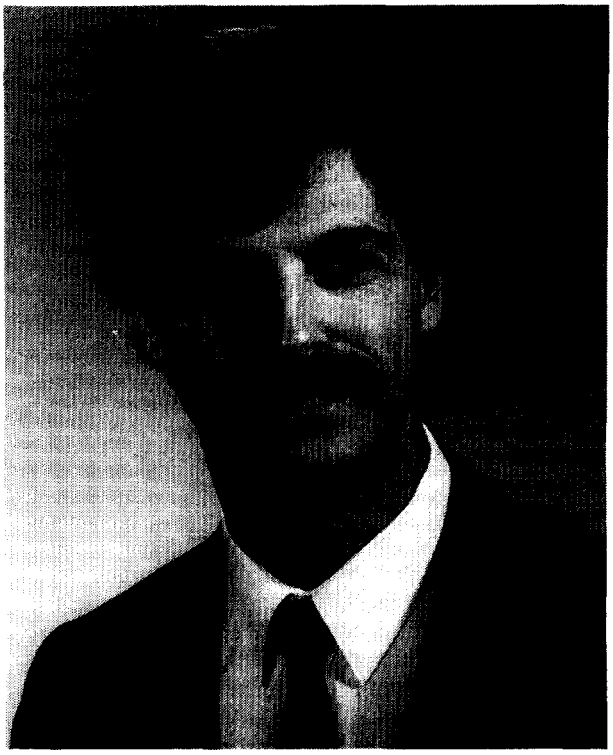
Dr. Thomas E. Parker
Raytheon Research Divison

For more information contact:

Clark Wardrip
Bendix Field Engineering Corp.
P.O. Box 6147
Vandenberg AFB, CA 93437
(805) 865-3214

To obtain an Advance Program:

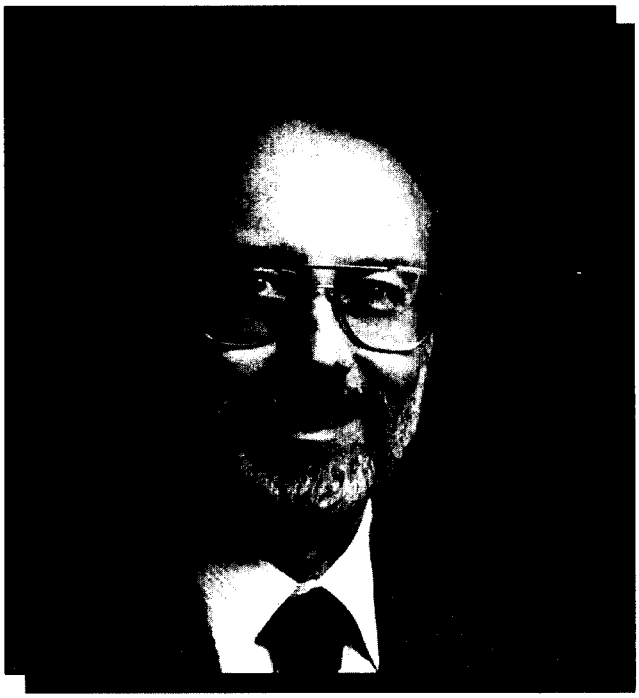
Mike Mirarchi
Synergistic Management, Inc.
3100 Route 138
Wall Township, NJ 07719
(908) 280-2024



Raymond L. Filler
General Chair

Tom Parker
Technical Program Chair

New Adcom Member



Errol P. EerNisse

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

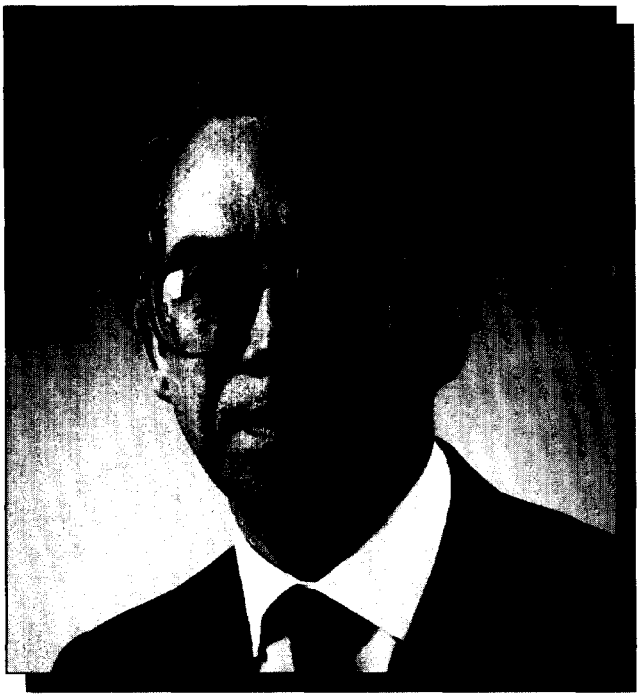
He was at Sandia National Laboratories from 1965 to 1979, where he carried out experimental and theoretical research on ferroelectric, diffuse ferroelectric, and piezoelectric devices. From 1968 to 1979 he supervised various research divisions involved in radiation damage effects of semiconductor devices,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

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

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

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

New Adcom Member



Helmut Hellwig

Helmut Hellwig was born in Berlin, Germany. He received a master's degree in physics and a doctorate in electrical engineering from the Technical University of Berlin. He became a U.S. citizen in 1972.

Following research assignments in his field of atomic frequency standards, maser, and lasers at the U.S. Army Electronics Command, Fort Monmouth, NJ, from 1966 to 1969, and since 1969 at the National Bureau of Standards (NBS) in Boulder, CO, he assumed several positions in management at NBS. In 1979, he was appointed President of Frequency and Time Systems, Inc. in Beverly, MA. In 1986, he returned to NBS (now the National Institute of Standards and Technology, NIST) as Associate Director and also held acting positions as Director of NIST's National Measurement Laboratory and as Principal Advisor to the Under Secretary of Commerce for Technology. Since 1990, he has been Director, Air Force Office of Scientific Research, with responsibility for all basic research in the U.S. Air Force.

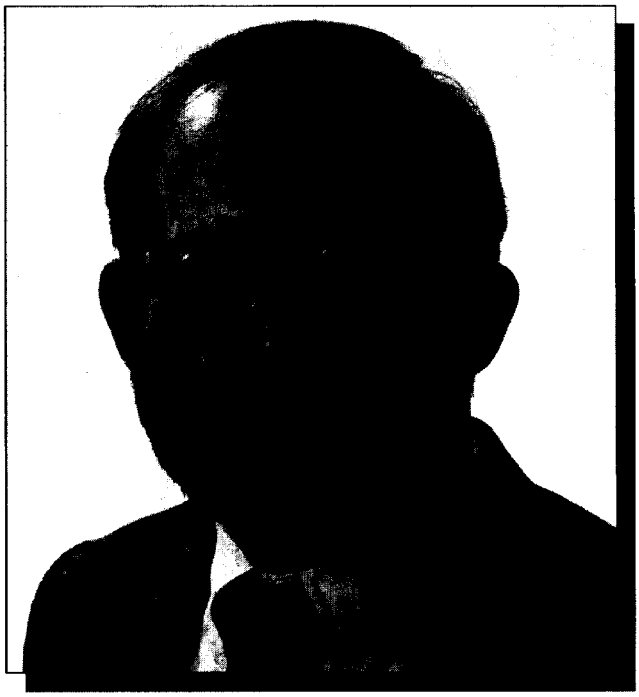
Dr. Hellwig received an honorary doctorate from the University of Besancon, France, in 1989, for his work on frequency standards. He is a Fellow of the IEEE, and a member of the American Physical Society and Sigma Xi.

Dr. Hellwig holds several patents in the field atomic frequency standards and has published about 100 technical and scientific articles and papers. He also is a member of the International Scientific Radio Union (URSI), the International Radio Consultative Committee (CCIR) and the International Astronomical Union (IAU); he was Chairman of Commission A of URSI-US National Committee (1982-1984).

His IEEE activities include the following: Chairman, Standards Coordinating Committee 27; Chairman, Technical Committee 3 on Time and Frequency, I&M Society; serves on committees of the following IEEE sponsored conferences: Annual Symposia on Frequency Control (UFFC), Conferences on Precision Electromagnetic Measurements (I&M), Instrumentation and Measurement Technology Conference (I&M). He is an Associate Editor of the Transactions on UFFC.

Helmut and his wife, Thekla, enjoy the cultural attractions of Washington DC as well as hiking, cross-country skiing, and beach combing accompanied by their springer spaniel.

New Adcom Member



Gary K. Montress

Gary K. Montress (S"66-M"76-SM"87) was born in East Orange, NJ on April 10, 1947. He received the B.S.E.E., M.S.E.E., Electrical Engineer, and Ph.D. degrees from MIT, Cambridge, MA, in 1969, 1971, and 1976, respectively. From 1969 to 1972, while at MIT, he was a Teaching Assistant in the EE Department, teaching courses in solid-state electronics and circuit design, while pursuing research in the area of p-n junction breakdown phenomena. From 1972 to 1975, he was an Instructor in the EE department, teaching and supervising courses in solid-state physics and microelectronics. From 1975 to 1976, while a Research Assistant in the Research Laboratory for Electronics at MIT, he completed his Ph.D. thesis research and dissertation in the area of solid-state microwave devices (BARRITT diodes). From 1976 to 1984, Dr. Montress was a member of the Professional Staff at the United Technologies Research Center, East Hartford, CT, involved in research and development activities related to SAW frequency control and signal processing components. Since October 1984, Dr. Montress has been a member of the Professional Staff at the Research Division, Lexington, MA. His current activities are concentrated on stable VHF, UHF, and microwave frequency sources, including both SAW and dielectric resonator based oscillators and synthesizers. His interests also encompass the development of custom electronic circuitry for application to low noise frequency sources. Dr. Montress is a member of Eta Kappa Nu, Sigma Xi, and Tau Beta Pi. IEEE activities include having served as an officer of the Boston Chapter of UFFCS (1986-89) and as a member, since 1981, of the Technical Program Committee for the annual Ultrasonics Symposium. Dr. Montress served as Technical Program Chairman (TPC) for the 1989 Ultrasonics Symposium in Montreal, is currently serving as TPC for the 1991 Symposium in Orlando, and will serve as TPC for the 1992 Symposium in Tucson.

Dr. Montress received the 1988 Outstanding Transactions Paper Award from the Ultrasonics, Ferroelectric, and Frequency Control Society as a co-author of the papers "Precision Surface-Acoustic-Wave (SAW) Oscillators" and "Extremely Low Phase Noise SAW Resonators and Oscillators: Design and Performance."

In the little bit of spare time available, Gary and Sara, and their ten year old daughter Rebecca, enjoy vacationing and visiting friends and family on Cape Cod. Gary also enjoys reading (almost anything) and playing softball. He continues to be an audio/video enthusiast, although "fancy" equipment seems to have been more affordable as a graduate student than now!

New Adcom Member

Hiroshi Takeuchi

Hiroshi Takeuchi was born on June 26, 1946 in Tokyo, Japan. He received his B.S. and M.S degrees from Waseda University (Toyko) in the field of solid state physics in 1969, and 1971, respectively. He joined the Central Research Laboratory, Hitachi Ltd. in 1971. From 1971 to 1975, he worked on magneto-optical materials used in optical communication, especially rare-earth iron garnets. He developed new materials (bismuth-containing garnets) having a very large Faraday effect and received his Ph.D. degree from Waseda University in this field in 1976. Since 1976, he has been working on piezoelectric materials and devices. He developed Nd-modified lead titanate ceramics having a zero temperature coefficient of delay time for surface acoustic wave (SAW) applications and Sm-modified lead titanate ceramics having an extremely large electromechanical anistropy for medical ultrasonic transducer applications.

Recently, he was engaged in research on ultrasonic probes for both medical and NDE applications using piezo-composites, electrostrictive materials, or piezoelectric thin films. He was a Senior Researcher at Hitachi Central Research Laboratory and was a leader of the medical electronics device research group. He gave invited talks at IEEE Ultrasonics Symposia in 1980, 1985, and 1990, and at IEEE ISAF Meetings in 1983 and 1990. Very recently, he was appointed to a new position as a Senior Engineer at Medical Systems Division (Head Office) of Hitachi Ltd. Besides ultrasonics transducers, his interest extends over optical properties of human tissue.

He is a member of the administrative committee of the Japanese Annual Meeting on Ferroelectric Materials and Their Applications. He has authored or co-authored over 60 papers in the piezoelectric and magneto-optics fields. Dr. Takeuchi is a member of The Physical Society of Japan, The Japan Society of Applied Physics, The Institute of Electronics, Information and Communication Engineers of Japan, The Japan Society of Ultrasonics in Medicine, IEEE (Senior Member), and SPIE.

Hiroshi enjoys a 2 kilometer swim every weekend. He also likes music, (guitar, piano, and "Karaoke" with drinking). His wife, Noriko holds a degree in sociology and likes watching baseball TV programs. His 17 year old daughter, Riho, is now very busy preparing for a university entrance examination.

A Note from the President

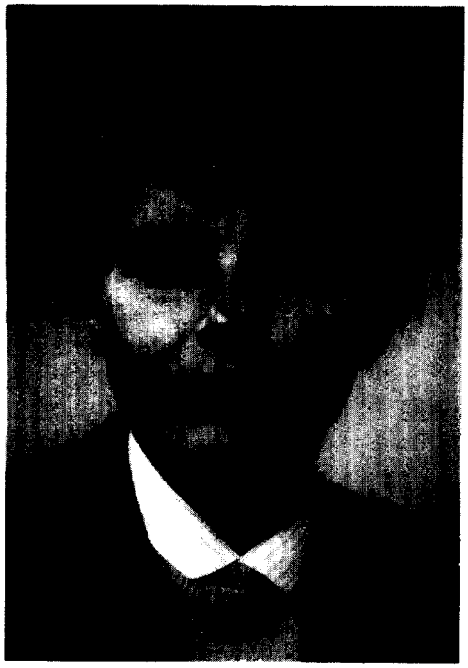
CONGRATULATIONS to all of you for your time and effort in making 1990 an outstanding year! All three conferences were beautifully executed and quite successful. Yes, I know, those of you working behind the scenes still catch your breath as you recall the near disasters such as are inherent in any major undertaking. All the more reason to accept congratulations for your part in producing the seemingly flawless symposia.

In addition to the major symposia sponsored by the UFFC, it is important to recognize all the work done by our standing committees, the behind the scenes work which is the backbone of our Society. Notwithstanding our being one of the smallest societies, we are very active comparatively in the Standards arena. Under the leadership of Art Ballato, there are at least nine major active standard committees and numerous subcommittees. If you are interested in working on standards, feel free to contact Art. He would be happy to put you to work.

Fred Hickernell, our Newsletter Editor, has done a yeoman's job for a number of years. Our Newsletter is an open forum for any of you to present your ideas. Please do not be shy. Fred welcomes all input. The IEEE is now moving to electronic publishing. As such, our newsletter will be our first publication to move to this new format. The Transactions will become electronic in the next year or so. Bill O'Brien, Editor in Chief, and his staff of Associate Editors are to be congratulated for the continuing high standards they impose. Our Transactions ranks as one of the highest in number of pages published per member. You are to all be congratulated for this and your continued publication in the Transactions is encouraged.

Awards under Roger Tancrell, Nominations under Bernie Tittmann, and Finance/Operations under Herman van de Vaart are three committees which seldom receive any recognition and without whom the Society could not function. To let you know how behind the scenes some of these people are, some of the Awards Committee members do not even know who the other members of the committee are. This ensures unbiased voting and prevents any sort of lobbying. Those of you working on these committees this past year please take a moment to stand and pat yourself on the back and know that your work is appreciated. If you would like to suggest possible nominees for the various Society awards or would like to serve on the ADCOM, please feel free to call either Roger or Bernie.

Don Malocha and his committee on Membership Services work hard to ensure that your member needs are being met. In an effort to make both the IEEE and UFFC accessible to our colleagues throughout the world, we have instituted an Ambassador Program to provide memberships to outstanding colleagues in those regions of the world where income and currency restrictions make membership difficult to impossible. Should any of you be traveling to Regions 8 through 10 this year, please contact Don for Ambassador information so that you may present memberships on behalf of UFFC. Membership in the IEEE comes in four main categories: student, member, senior member, and fellow. Our Fellow Committee



Jan Brown
UFFC-S President

under Dick White has been doing an excellent job of promoting your nominations. To become a Senior Member you may nominate yourself. I encourage all of you to become familiar with the criteria to file for this membership upgrade. You may obtain information and the nomination packet by calling IEEE at (908) 562-5512.

The Fellow nomination procedure is somewhat more arduous and you cannot nominate yourself. However, if you feel you meet the criteria for becoming a fellow, I would encourage you to talk with a current Fellow in our Society about the process. A list of UFFC Fellows is presented elsewhere in this Newsletter. By far the largest number of volunteers in our Society serve on the Ultrasonics, Frequency Control, and Ferroelectrics Standing Committees and the associated symposia committees. All of you are to be thanked for your tremendous effort this past year. Our major thrust last year and again this year is to establish parity with these committees. Last year we were successful in getting all the finances of the committees to be handled in a like manner through the Finance and Operations committee so that our interface with IEEE could be streamlined. This year we will be working on committee and conference administration including such items as advertising, use of logos, Conference Proceedings timeliness, mailing list coordination, and ADCOM reporting.

If you are feeling left out because you are not involved in all these activities, please call me at (512) 834-7230, and we'll remedy the situation. With the momentum from last year, we are off and running to a very busy 1991!

Jan Brown
President, UFFC-S

UFFC-S ADCOM BRIEFS

The Administrative Committee (ADCOM) Meeting of the Ultrasonics, Ferro-electrics and Frequency Control Society (UFFC-S) was called to order at 9:10 A.M., December 4, 1990, by J. Brown.

J. Brown reported that IEEE Conference Services is not yet ready to bid on Conference Management Services. They had requested $75K from TAB to start up but they were turned down. She also reported that TAB has not instituted a G&A for next year but it may come in the future.

IEEE Press, in order to become a competitive publisher, has asked for a Society member to be appointed as a liaison with them. J. Brown appointed H.L. Bertoni as the UFFC-S liaison.

J. Brown reported that IEEE is starting a committee to work on the ELF Standard. If any one is interested, they should contact J. Brown for further information. Also the IEEE Educational Activities department is seeking people to be on accreditation committees for engineering schools.

J. Brown reported that based on a survey of members by an external consulting firm, members would like more application oriented papers published. W.D. O'Brien will look into this issue and come back with a suggested format.

A. Ballato suggested that the Symposium Proceedings be reviewed to identify application papers and an effort made to encourage the authors to submit these papers to the Transactions.

ADCOM approved the normal term of office of the Editor-in-Chief of the IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control to be five years with the opportunity for reappointment.

ADCOM also approved a motion that Symposium General Chairs be required to submit a formal budget to ADCOM for approval.

A. Ballato reported that our Society is currently responsible for six standards and five projects. The IEEE Guide for Medical Ultrasound Field Parameter Measurements was issued on July 29, 1990. This standard was turned around in recorded time.

W.D. O'Brien reported that 605 pages were published in 1990. The 1991 page budget is 1000 pages and there continues to be no backlog. There are two special issues scheduled for 1991: Thin Film Ferroelectrics and Ferroelectrics.

W.D. O'Brien is soliciting suggestions for Associate Editors in the following areas:

Ferroelectrics - Applied
Measurement and Control Applications
Nondestructive Evaluation
Optical Interactions
Physical Acoustics

F.S. Hickernell reported that the Newsletter may try electronic publishing soon. The deadline for the Spring issue is March 15, 1991. He thanked all those who submitted pictures and articles for the Fall Newsletter.

H. Van de Vaart presented the operating financial report. He reported that membership dues are below budget and interest income is up because our reserves are up. As of October 31, 1990, our surplus is $150.8K. Our net worth at the end of 1989 was $204.1K. Our net worth as of October 31, 1990, is $354.9K.

L.E. Cross reported that the 1992 ISAF will be held August 31st to September 2, 1992. The committee is looking into holding the meeting at the Ramada Inn in Clemson. He reported that G.H. Haertling, the General Chair, has appointed C.E. Land as Finance Chair.

J. Vig presented an interim financial report on the 44th Annual Symposium on Frequency Control. He indicated that attendance was down. They are projecting a surplus of about $8K.

J. Vig reported that the 45th Annual Symposium on Frequency Control will be held May 28 to May 30, 1991 at the Los Angeles Airport Marriott Hotel. He stated that this year they will offer one day registration in an attempt to attract attendees from the local airspace firms.

The ADCOM approved the budget for the 45th Annual Symposium of Frequency Control. The budget includes $93,255 of income and $85,383 in expenses for a surplus of $7,872.

M. Levy on the 1990 Ultrasonics Symposium. He stated that the advanced registration is 254 and 32 so far on site. We have 56 students and 78 companions which is larger than normal for this point. The short courses are going very well with 149 people attending as of this moment. These numbers are almost on budget.

M. Levy then gave some of the details of the Symposium and praised the cooperation we have been receiving for the staff of the Sheraton Waikiki Hotel.

D.C. Malocha reported on the 1991 Ultrasonics Symposium to be held in Orlando, FL . He stated that there will only be four parallel sessions as that is all the space he has

under contract. ADCOM approved the 1991 Ultrasonics Symposium budget.

F.S. Hickernell reported that the 1992 Ulrasonics Symposium committee is organized except for a Finance Chair. He indicated that the dates for the Symposium have changed to October 20 to 23, 1992.

C. Maerfeld presented a report on the site for the 1994 Ultrasonics Symposium in Cannes, France. An international Airport is located in Nice which is only 25 kilometers away. He stated that in Europe symposia are run slightly different. One contracts only for meeting space and hotel rooms are up to the attendees.

C. Maerfeld requested advice on the choice of hotels and dates for the Symposium. A straw vote indicated a preference for November 2 - 5, 1994.

R.H. Tancrell gave the report on the Awards committee. The 1990 Achievement Award will be presented to Cecil Land. The 1989 Outstanding Paper Award will be presented to Y. Tsukahara, N. Nakaso, J. Kushibiki and N. Chubachi for their paper entitled "An Acoustic Micrometer and its Application to Layer Thickness Measurements."

The Distinguished Lecture for 1990-1991 is Dr. James F. Greenleaf. His topic is "Multidimensional Ultrasonic Imaging and Tissue Characterization."

R. Tancrell mentioned the major IEEE awards and solicited nominations. In particular he mentioned the Education Medal which carries a $10,000 award in addition to the Gold Medal.

D.C. Malocha reported that we show a gain of approximately 50 members over last year. He reported that 25 people were offered 2-year memberships as part of our Outreach program but the applications have not been returned as yet. He stated that the applications must come to him to be forwarded to IEEE. He discussed proposed guidelines for the Outreach Ambassadors.

The 1991 Membership Services Budget was approved by ADCOM. The budget is for $13,600 and includes $12,600 for the Outreach Program.

B.R. Tittmann reported on the election for ADCOM members for 1991-1993. The following were elected:

Gary K. Montress
Helmut Hellwig
Errol P. EerNisse
Hiroshi Takeuchi

J. Greenleaf proposed that we encourage our Symposia to incorporate history exhibits into the program. C. Yeack-Scranton suggested a vertical slice through a field.

J. Greenleaf brought up the idea of video taping the short courses. J. Brown will establish a committee to look into video taping.

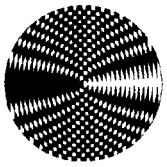
J. Brown was re-elected as President of ADCOM for 1991. J. Greenleaf was re-elected as Vice-President of ADCOM for 1991.

J. Brown presented Certificates of Appreciation to the retiring members of the ADCOM.

The next ADCOM meeting will be held on June 1, 1991, at 9:00 A.M. in Los Angeles, CA. in conjunction with the Frequency Control Symposium.

The UFFC-S ADCOM adjourned at 3:50 PM.

IEEE UFFC-S Members Elected To Fellow Grade



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

Dr. J. Douglas Adam
3371 MacArthur Drive
Murrysville, PA 15668

For contributions to the development of microwave device applications of ferrite thin films.

Dr. George R. Bienvenu
THOMSON-SINTRA ASM
Signal Processing Department
BP 53 CAGNES-SUR-MER
F06801 Paris, Cedex, France

For contributions to the theory and implementation of high-resolution methods in passive sonars.

Dr. Christoph B. Burckhardt
Rebgasse 14
4132 Muttenz, Switzerland

For contributions to diagnostic ultrasound imaging.

Mr. Michael M. Driscoll
8596 Harvest View Court
Ellicott City, MD 21043

For contributions to the development of low-noise acoustic resonator-stabilized oscillators.

Dr. Fred S. Hickernell
Motorola Inc.
Government Electronics Group
8201 E. McDowell Road
Scottsdale, AZ 85252

For contributions to the development of acoustic and optical surface wave devices for electronic systems applications.

Dr. H. Kumar Wickramasinghe
IBM Corporation
T.J. Watson Research Center
P.O. Box 218
Yorktown Heights, NY 10598

For contributions to photoacoustics, scanning tunneling, and scanning force microscopy.

IEEE 1990 Ultrasonics Symposium
HAWAII-90 "Final Report"

When the buses returned from the Cultural Center, the Hawaii-90 symposium committee breathed a sigh of relief; the symposium was over, and our various responsibilities had dwindled to virtually nothing (except for Ted, whose finance job was at fever level). BUT, unbeknownst to us, lurking in the future was yet another deadline crisis, touched off by the newsletter editor who wanted to know where our "final report" was. FINAL REPORT?!?!?!? So one more time, the long distance lines and fax machines hummed (and Federal Express made deliveries) as information was hurriedly gathered from the committee to be summarized for this newsletter, as facts and figures, as well as personal recollections.

Monday or Tuesday (or whenever you got there): Luscious tropical weather greeted us at the Honolulu airport. Those people coming from (or through) snow states took off their winter coats and put on their summer clothes and stopped worrying if the snowstorm in the Midwest was going to wreck their travel arrangements. The Sheraton-Waikiki greeted our attenders staying at the hotel with curbside check-in (just for us!!, what a nice touch). We registered for the conference and stayed to chat with friends and overheard the rumor that "Someone said the best 'bargains' in Hawaii were at Hilo Hattie's." Some of us attended one of the 6 outstanding short courses.

Wednesday: At the Plenary Session of the conference, we were welcomed by the General Co-Chairs, Moisés Levy and Nobuo Mikoshiba, the Technical Program Chair, Harry Salvo, as well as the UFFC-S President, Jan Brown. The Achievement Award was presented to Cecil E. Land; The 1989 UFFC-S Transactions Outstanding Paper Award was presented to Yusuke Tsukahara, Noritaka Nakaso, Jun-ichi Kushibiki and Noriyoshi Chubachi (for "An Acoustic Micrometer and Its Application to Layer Thickness Measurements," May 1989 issue); and the UFFC-S Distinguished Lecturer for 1990-91, James F. Greenleaf, was introduced. IEEE Fellow awards were presented to Mack Breazeale, Bernhard Tittman and Roger Tancrell. And then the President's Speaker, Donald Thomas, from the University of Hawaii at Manoa, gave us insight into the volcanic and mythological history of the Hawaiian Islands as the goddess Pele moved from island to island.

And then the start of the technical sessions. Over the next three days, almost 390 papers on the cutting edge of ultrasonics were presented, including 29 invited papers. The 1990 Symposium had a truly international representation, with significant contributions from the American continents, the European continent, the Middle East, and Asia.

Local treats, fresh apples, bananas and pineapples, made their first appearance at the afternoon coffee break. That night was the first of the evening activities, the cocktail party held on the Diamond Head Lawn.

Thursday: While we were attending the technical sessions, our guests had the opportunity to visit the USS Arizona memorial. In the afternoon, the poster session was held. Almost 100 posters were set up in the foyer and in the Maui room. With no other sessions held in parallel with the posters, the presenters and attenders had ample opportunity to discuss results and theories on a one-to-one basis.
And that evening, the luau . . .

After a sampling of traditional Hawaiian comestibles, we were regaled with tales of the pacific rim presented in the dances of the natives. Who can forget the coconut-shells, the breaking bead skirts, the dazzling fire dance and the "tongue" dance of the Maori men. Several of the audience (hand picked by the only person who ever calls Jan Brown, "Janet") got the opportunity to test their hip joints and dignity on stage, joining the entertainers in a final hula dance. And Don Malocha, General Chair of the 1991 Symposium in Orlando, got his first official opportunity to advertise the next symposium.

Friday: Activity at the registration desk was winding down, but the manuscripts were still coming in. Attendance at the technical sessions remained high, (not surprising as this was an IEE-ENGINEERs' conference). The guest program that day was a visit to Hanauma Bay, for snorkeling in one of the most beautiful locations on Oahu. Toward the end of that day, rough attendance figures were calculated, with approximately 525 attenders, including 75 students. Over 125 guests of the attenders had registered for the guest program. In addition, over 10 companies had sent representatives to display their products and services to the attenders.

The ambience of Hawaii, intellectually, climatically, and socially, had been perfect, just as we all have come to expect at IEEE Ultrasonics Symposiums. So get busy, the next symposium in Orlando is right around the corner. And this time, instead of "Aloha," it's **See you in ORLANDO.**

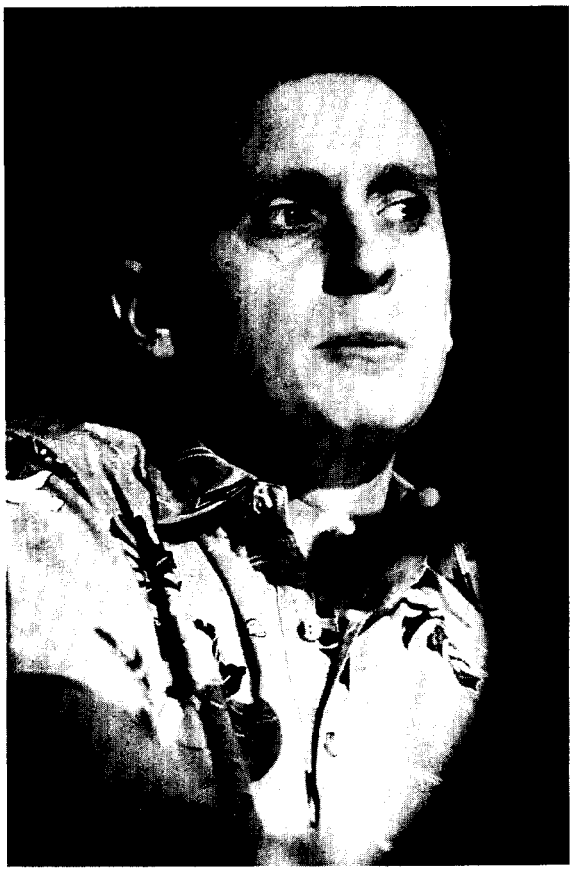
Susan Schneider

1990 IEEE Ultrasonics Symposium

Moisés Levy - General Co-Chair

Nobuo Mikoshiba - General Co-Chair

Harry Salvo - Technical Program Chair



Donald Thomas - UFFC-S President Speaker

AWARDS

Achievement Award

Presented to:

Dr. Cecil E. Land, Fellow, IEEE
Sandia National Laboratories
Albuquerque, New Mexico

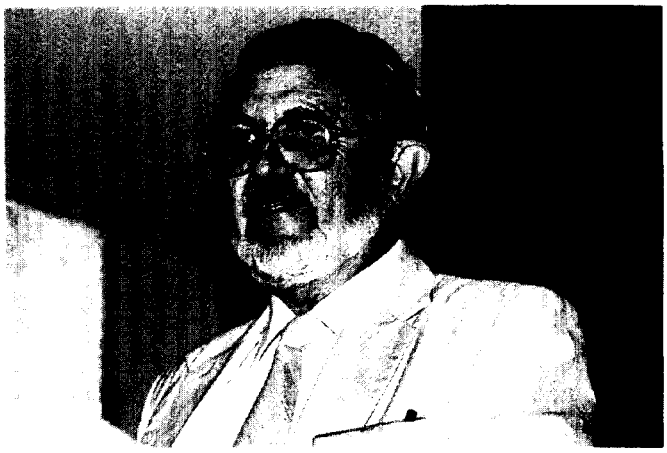
Citation:

"In recognition of his creative and innovative research on ferroelectric and electro-optic phenomena in ceramic materials and devices, and his many years of service to the Society"

• Award was presented at the 1990 Ultrasonics Symposium, in Honolulu.

• Presentation was made by Prof. L. Eric Cross, who highlighted Cecil's contributions in the field of ferroelectricity, and his helpful interaction with colleagues in this field. Cecil became internationally acclaimed for his work on the optical and electro-optical properties of the lead lanthanum zirconate titanate family of transparent ceramics, the PLZTs. For almost 30 years Cecil has been a front runner in this field, now extending his work into the newer thin-film PLZTs.

• Achievement Award consists of a cash award, plaque and certificate.



Eric Cross - Achievement Award Presenter

Cecil Land, UFFC-S Achievement Award Recipient and Priscilla Cross at Symposium Opening Session

Outstanding Paper Award for 1989 Transactions

Presented for the paper:

"An Acoustic Micrometer and Its Application to Layer Thickness Measurements"

by: Yusuke Tsukahara, Noritaka Nakaso,
Jun-ichi Kushibiki and Noriyoshi Chubachi

which appeared in the May issue, 1989

• Presented by Roger Tancrell, Awards Chairman, at the 1990 Ultrasonics Symposium in Honolulu.

• This paper addresses a practical engineering problem. It presents a simple non-destructive ultrasonic instrument for the measurement of the thickness of a layer deposited on a substrate. Significantly, the instrument can be used on-line in an industrial production environment, for rapid and accurate determination of thickness. The paper is written in a clear, concise style.

• Selection is based on: Originality
Interest to membership
Contribution to the field
Clarity of writing
Timeliness

Yusuki Tsukahara receives Outstanding Paper Award from Roger Tancrell

Noritaka Nakaso receives Outstanding Paper Award from Roger Tancrell

Jun-ichi Kushibiki receives Outstanding Paper Award from Roger Tancrell

Noriyoshi Chubachi receives Outstanding Paper Award from Roger Tancrell

Ferroelectrics Award

"Ferroelectrics Certificate of Recognition" Award presented to:

Dr. Frank W. Ainger
Plessey Research (Caswell), Ltd.
Northamptonshire, United Kingdom

Citation:

"for excellent research on ferroelectric, piezoelectric and pyroelectric ceramic materials and devices."

• Presented at the banquet of the International Symposium on Applications of Ferroelectrics (ISAF), held at the University of Illinois, Champaign-Urbana, IL, on June 6-8, 1990.

CERTIFICATE PRESENTATIONS

Jim Greenleaf UFFC-S Distinguished Lecturer receives certificate from President Jan Brown

Bernhard Tittman receives IEEE Fellow certificate from President Jan Brown

Roger Tancrell receives IEEE Fellow certificate from President Jan Brown

Mack Breazeale receives IEEE Fellow certificate from President Jan Brown

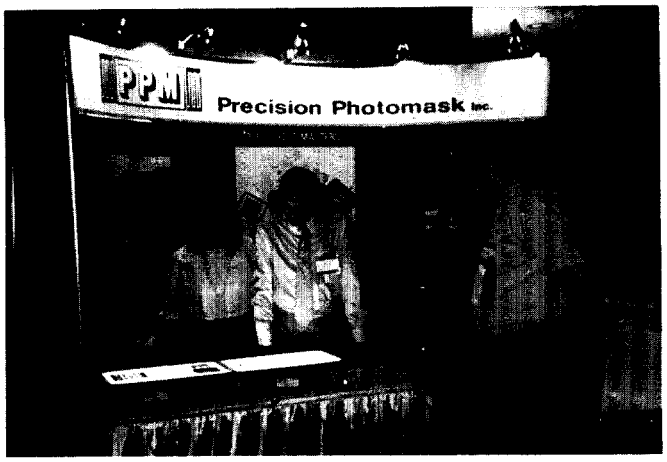
ADCOM MEETING

AdCom meeting before start of symposium

Art is that you down at the end of the table with your tie on?

THE EXHIBITORS

These two guys don't look like Clarion sales reps.



Are Harry and Moisés eyeing the display or the candy dish?

THE LUAU BANQUET

Dancers!!!

Dancer???

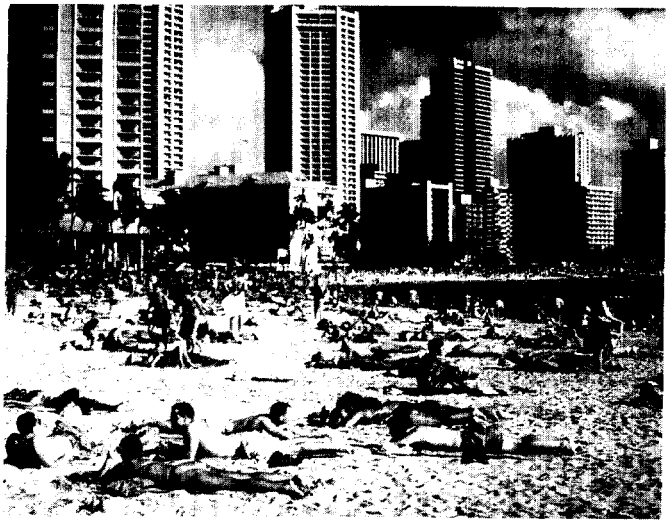
Roast Pig

Ultrasonic Motion

REMEMBERANCES OF HAWAII

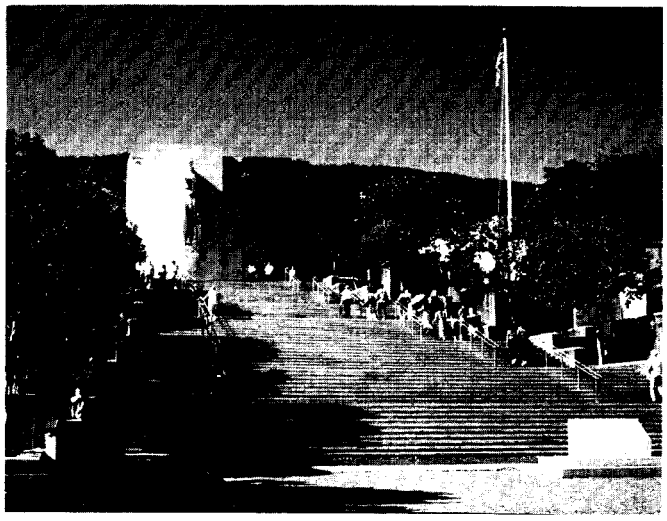
Honolulu, site of the 1990 Ultrasonics Symposium

"On the Road to Hanauma Bay," Nina Levy in the foreground

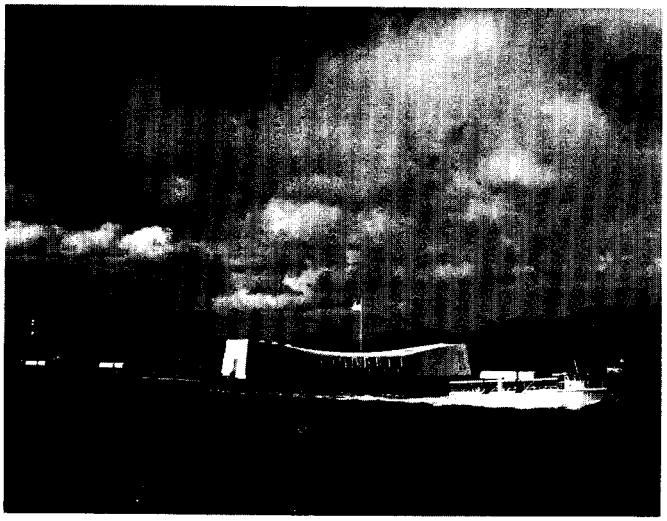


Session BE-A-CH

A sand sculpture memorial
December 7, 1990



Punch Bowl Cemetery



Arizona Memorial

FUTURE SYMPOSIA

1991 IEEE Ultrasonics Symposium
December 8-11, 1991
Orlando, Florida

For information:
D.C. Malocha, General Chair
Department of Electrical Engineering
University of Central Florida
Orlando, FL 32816-0450
(407) 823-2414

1992 IEEE Ultrasonics Symposium
October 20-23, 1992
Tucson, Arizona

For information:
Fred S. Hickernell, General Chair
Motorola, Inc.
Government Electronics Group
8201 E. McDowell Road, MD H1019
Scottsdale, AZ 85252

1993 IEEE Ultrasonics Symposium
November 7-10, 1993
Baltimore, Maryland

For information:
Harry L. Salvo, General Chair
Westinghouse Electric Corporation
Electronic Systems Group
333 Gordon Avenue
Severna Park, MD 21146
(301) 765-4290

1994 IEEE Ultrasonics Symposium
November 1994
Cannes, France

For information:
Charles Maerfeld
Thomson Sintra Dtas
Route 065 Cretes/BP 38
Parc O'Activities De Valbonne
06561 Valbonne Cedex, FRANCE

Update Of Distinguished Lecturer Activities

So far I have given eleven lectures in seven countries, plus ten in the United States. I have about three more lectures to give before the June end of my tenure. Overall, I feel the program is very good, the lectures well attended and received with great appreciation.

James F. Greenleaf, Ph.D.
Professor of Biophysics
Mayo Foundation

Richard W. Damon (1923 - 1991)

Dick Damon, an early contributor to the microwave acoustic area and an active participant in the original IEEE Sonics and Ultrasonics Group, died on February 15, at age 67. He served as President of the IEEE in 1981. Damon also served as Director and on over 20 IEEE committees and advisory boards. At his retirement in 1986 he was director of technology for the Sperry Corporation, now Unisys, in Waltham, Mass.

Damon was born in Concord, Mass. He earned three degrees in applied physics at Harvard University; a B.S., M.A., and Ph.D. in 1944, 1947, and 1952, respectively. During World War II he served as an electronics officer in the U.S. Navy in the Pacific theater. He later worked at the General Electric Research Laboratory and Microwave Associates before joining Sperry in 1962. He served as chairman or as a member of government advisory committees to NASA, the National Bureau of Standards, and the Department of Defense and was the author of more than 30 published papers, principally on microwave magnetic and acoustic devices. In 1968 he was made a Fellow of the IEEE "for contributions to the field of microwave solid state devices."

Publication Announcement

IEEE GUIDE FOR MEDICAL ULTRASOUND FIELD PARAMETER MEASUREMENTS

Sponsor

Subcommittee on Ultrasound in Medicine
of the Standards Activities Committee
of the
IEEE Ultrasonics, Ferroelectrics, and
Frequency Control Society

Abstract: IEEE Std 790-1989, IEEE Guide for Medical Ultrasound Field Parameter Measurements (ANSI), describes procedures for measuring medical ultrasound field parameters such as pressure, power, and intensity. It is intended for use by persons involved in measurement of acoustic fields produced by medical ultrasound instruments.

The guide can be ordered from IEEE Service Center, P.O. Box 1331, Piscataway, New Jersey 08855-1331, USA (order #SH13003) for $57.00. IEEE members receive a 50% discount.

MEMBERSHIP REPORT

As of January 1991, the UFFC-S had a membership enrollment of 2,084 members. The membership grade distributions are as follows:

Fellows	102	Associate Members	235
Senior Members	229	Affiliates	5
Members	1331	Students	182

Membership in our society has had a slight increase over the past year, which is encouraging. We have initiated an Outreach Program in membership to aid outstanding engineers and scientists, in countries where hard currency is a problem, in becoming IEEE and UFFC members. The program was initiated this past year and we have provided memberships to people in countries throughout the world. Anyone who feels they know a person who could qualify for this program should contact Don Malocha.

Your membership committee is composed of the following:

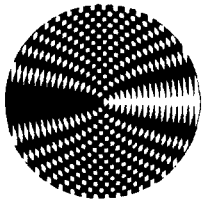
Donald C. Malocha
Membership Chair
Electrical Eng. Dept.
Univ. of Central Florida
Orlando, FL 32816
(407) 823-2414
FAX: 823-5835

Samuel Richie
Membership Development Chair
Electrical Eng. Dept.
Univ. of Central Florida
Orlando, FL 32816
(407) 823-5765
FAX: 823-5835

Celia E. Yeack-Scranton
Chapters Chair
IBM Research Division
650 Harry Road
San Jose, CA 95120
(408) 927-2230
FAX: 927-1230

Please feel free to contact these individuals for help in membership or your local chapter's activities.

We wish to welcome the following new members who joined the society since September 1990.



UFFC-S New Members

September 1990 - March 3, 1991

Abbate, Agostino
Adler, Joseph V.
Ahn, Tae-Won
Akintayo, Oluseun A.
Al-Hokail, Hamad S.
Alexsiejuk, Mikotaj
Allega, Jorge A.
Alvarez, Quirico D.
Anestad, Torbjorn
Antonopoulos, Christos
Ashorian, Mohsen
Avramov, Ivan D.
Ayatollahi, Ahmad

Baker, Carl L.
Bakken, Petter M.
Bakos, James H.
Baumgartner, Horst E.
Berry, Douglas A.
Betancor, Maneul J.
Bilgrien, Steve D.
Biswas, B.N.
Bono, Thomas L.
Boone, James B.
Braudaway, Brian W.
Bressler, John M.
Brown, Kris
Butcher, James S.

Cannell, David S.
Case, Tim J.
Cenci, Sergio T.
Cermak, Jan
Chang, Shi T.
Chapman, C.S.
Chiao, Richard
Chimeh, Abbas A.
Cho, Kyu-Bock
Choi, Jeonghee
Chou, Ing-Min
Christ, Dr. Andreas
Chu, David
Clay Jr., James N.
Cochran, John C.
Cohen, Martin G.
Coleman, Johnathan
Cooney, Thomas K.
Corbett, Scott S.
Criel, Ronald J.
Cruz, Sergio S.
Curtis III, William C.
Czutrin, Peter M.

D'Angelo, Ralph M.
Derman, Richard M.
DeRooij, Nico F.
Desmond, Cynthia A.
DeWalle, Brian S.
Dobnikar, Bojan S.
Donner, Joseph E.
Dorsey, Virginia L.
Easterbrook, Scott W.
Elmo, Philip M.
Eriksson, Hakan B.
Everbach, Erich C.

Feierabend, Stefan
Filipczynski, Leszek
Fish, Peter J.
Flanders, Robert M.
Fonck, Eugene J.
Fowler, Boyd A.
Fox, Peter A.
Frutiger, William A.
Fzambuto, Gracemarie

Ganezer, Kenneth S.
Gates, Judith A.
Georgiadis, Pavlos
Gerard, Prieur F.
Goff, Larry
Greiner, Thomas
Gualtieni, Danial A.
Gudelewicz, Rajmund M.
Gurunath, B.

Hamaguchi, Norihito
Hammerle, James M.
Hartov, Alexander
Hayakawa, Tsuyoshi
Hayden, Leonard A.
Henderson, Terry L.
Hennelly, Patrick J.
Hershelman, Thomas
Hitzler, Johannes
Holland, Christy K.
Holtz, Don A.
Hossack, John A.
Huang, Jin

Isacson, Daniel P.
Ishihara, Ken
Iwasaki, Noboru

Jablonski, Mark K.
Jaffe, Jules S.
Jan, Si-Hyuk
Jaquish, Thomas E.
Johnson, Richard K.
Judy, Jack W.

Kassick, Enio V.
Kennedy, David J.
Kim, Geun-Young
Kim, Jiyoung
King, Chih-Yeh
Kingon, Angus I.
Kitzenmaier, Peter E.
Kling, Terry A.
Komninos, Nick
Kroupa, Venceslav F.
Kudo, Nobuki
Kuhn, Michael H.

Le, Loan N.
Lee, Kyung-Kuk
Lee, Seon-Hee
Lee, Sheng-Hann
Lee, Soonmou
Leng, C.
Lenggenhager, Rene
Lewis, D. Kent
Li, Ming
Loughin, James C.

Maalouf, Ramzi S.
Malek, Benslama
Marantz, Yakov
Martin, Jean K.
Martin, Richard D.
Marty, William A.
Masse, Gerard L.
Masters, Ivan G.
Medina, Richard G.
Melin, Jan O.

Menon, Sankaran M.
Merrell, John G.
Milnes, Thomas D.
Mink, Jeff T.
Mirarchi, Michael R.
Moog, David R.
Morgan, Brent A.
Moros, Eduardo G.
Mundo, Charles J.

Nguyen, Tu-Cuong H.
Nock, Levin
Nomm, Matt
Noz, Anton S.
Nygaard, Brad C.

Odling, Per M.
Ohhashi, Takeichiro
Oppor, Rick L.
Opsasnick, Michael N.

Pabon, Manuel
Pan, Wuyi,
Park, Jongmun
Park, Too W.
Park, Woon-Yong
Patanasethanon, S.
Patel, Mina D.
Peatfield, Gregory H.
Pereyraa, Gustavo A.
Perino, Stan
Peters, Harry E.
Pham, Phuc C.
Pialat, Gerard Y.
Pinton, Phillip G.
Poirier, David W.
Post, John T.
Powell, Gary R.

Radjabi, Bahman
Rajendran, Velayutham
Ramsey, James L.
Randall, Kevin S.
Ranseyer, Mark S.
Rasmussen, Klaus B.
Reaka, C.J.
Reinhardt, Victor S.
Robley, R.C.

Sakuma, Shinzo
Sallick, Rodrigo J.
Samraji, Sambaiah
Sandler, Iosif Z.
Santiago, David G.
Schenck, Arthur J.
Seidel, Durbin L.
Sherman, Jack
Shibusawa, Hideo
Shieh, Ming-Huei
Skinner, Dr. Doyle P.
Smith, Lowell S.
Soufi, Amin A.
Speakman, Stuart P.
Sugiyama, Seiji
Swithers, David J.

Tamra, Yasutaka
Tan, David
Tang, Michael S.
Tasker, Diana M.
Telle, Francois P.
Thomann, Pierre
Toguchi, Minoru
Tsiganos, Panayotis G.
Tung, Chung-Yen

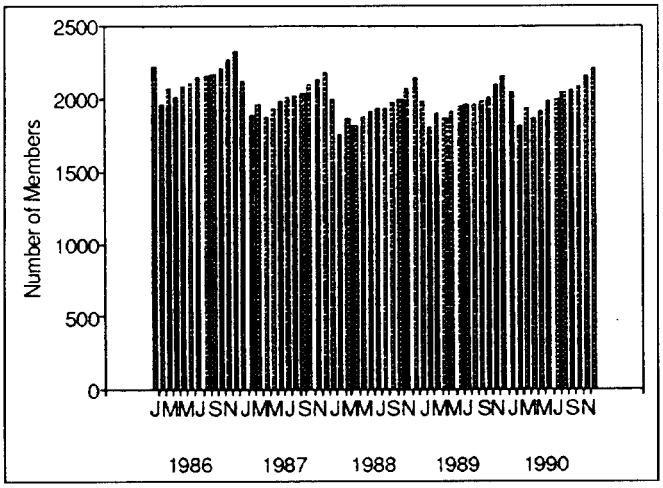
Vaughan, Derek E.
Venis, Marc A.
Vossler, Gerald L.

Walker, Robert S.
Watkins, Grant H.
Wertz, R.D.
Wu, Koa-Far

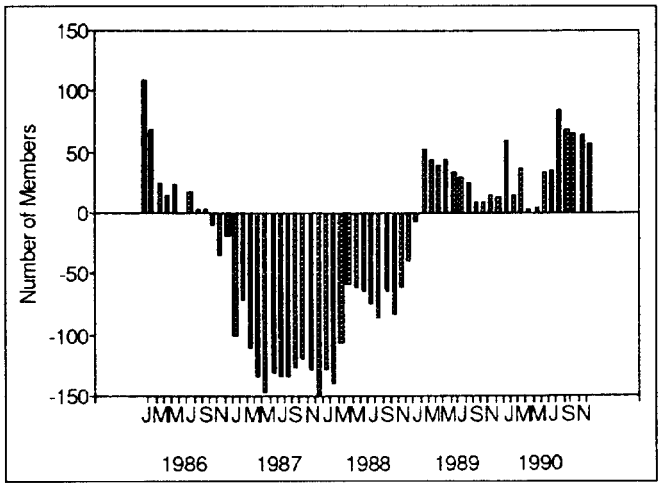
Yang, Chien H.
Yokoi, Atsuya
Yoon, Poong
Young, Donald R.

Zhang, Xiaorong
Ziaudeen, Mr.
Zielinski, Andrzej

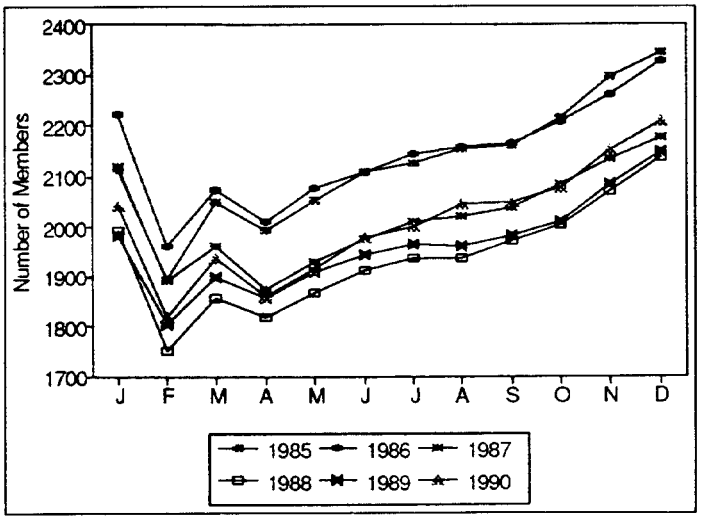
IEEE UFFC-S MEMBERSHIP STATISTICS
1986-1990



IEEE UFFC-S MEMBERSHIP STATISTICS
(Yearly Increase 1986-1990)



IEEE UFFC-S MEMBERSHIP STATISTICS



TOKYO CHAPTER

1991 OFFICERS

The newly elected officers of the Tokyo Chapter for 1991 are:

Chairman: Professor Kazuhiki Yamanouchi
Research Institute of Electrical Communication
Tohoku University
2-1-1 Katahira, Aoba-ku, Sendai-shi 980, Japan
Tel. 022-266-5528

Vice
Chairman: Professor Masatsune Yamaguchi
Faculty of Engineering, Chiba University
1-33 Yayoi-cho, Chiba-shi 260, Japan
Tel. 0472-51-1111 ext. 2837

Secretary: Professor Toshihiro Kojima
Faculty of Engineering, Tamagawa University
Aoba, Aramaki, Aoba-ku, Sendai-shi 980, Japan
Tel. 022-222-1800

Treasurer: Professor Kiyoshi Nakamura
Faculty of Engineering, Tohoku University
Aoba, Aramaki, Aoba-ku, Sendai-shi 980, Japan
Tel. 022-222-1800

USE 90 AND UFFC-S 1990-1991 DISTINGUISHED LECTURER

The Tokyo Chapter sponsored the USE 90 (the 11th Symposium on Ultrasonics Electronics) held in Kyoto on 20-22 November, 1990. About 400 ultrasonics people attended the symposium and about 100 papers were presented including the invited lecture by Dr. J.F. Greenleaf, UFFC-S 1990-1991 Distinguished Lecturer. He delivered an impressive talk on Multidimensional Ultrasonic Imaging and Tissue Characterization.

CONGRATULATIONS ON OUTSTANDING PAPER AWARD

At the Aloha Ultrasonics Symposium, the Outstanding Paper Award for 1989 UFFC-S Transactions was presented for the paper entitled, "An Acoustic Micrometer and Its Application to Layer Thickness Measurements" by Dr. Tsukahara, Mr. Nakaso, Professor Kushibiki and Professor Chubachi.

For this outstanding achievement, the Tokyo Chapter organized a lecture meeting on February 7, 1991 at the main office of Toppan Printing Co., Ltd. Professor Chubachi addressed more than 140 attendees and delivered a lecture on the future of acoustic microspectroscopy, and Dr. Tsukahara gave a talk on ultrasonics measurements of layer thickness. After the lecture, the participants enjoyed a cocktail party.

Prof. Kushibiki, Prof. Chubachi, Dr. Tsukahara and Mr. Nakaso at the special Toyko Chapter meeting honoring the UFFC-S Outstanding Paper Awardees

TECHNICAL MEETING

The following six technical meetings on ultrasonics were held during the past half year.

1)	21 August	6 papers	Shimizu	4)	27 November	5 papers	Tokyo
2)	18 September	8 papers	Toyohashi	5)	11 December	5 papers	Tokyo
3)	18 October	10 papers	Sendai	6)	24-25 January, 1991	17 papers	Osaka

Masatsune Yamaguchi
Vice Chairman

UFFC A Sponsor of the Journal of Lightwave Technology (JLT)

Optical techniques now seem to pervade every technical research arena. Regardless of whether that may be an overstatement, there is no doubt about the interest in employing the advantages of optics in many areas. Optics can provide advantages such as:

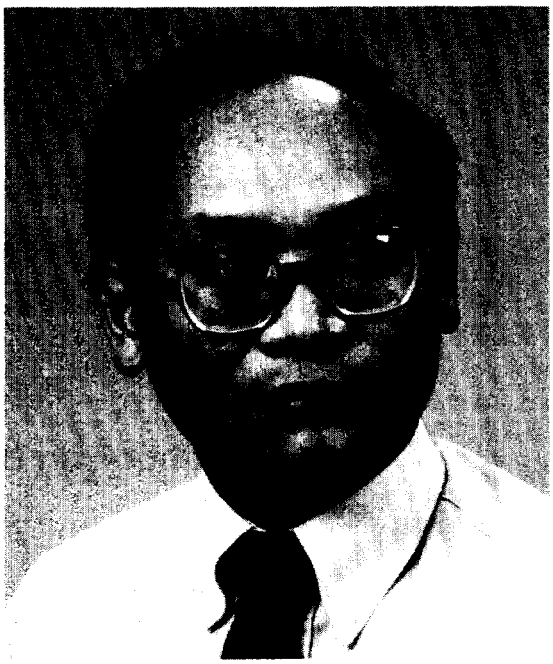
- Wide-bandwidth information channels that are also lightweight and low power, e.g., in the case of fiber optic components and systems.
- Absence of interchannel interference even as two beams intersect.
- Methods for non-invasive probing of physical parameters and non-contact readout of memories such as optical disks.

The introduction of optics into a variety of technologies, however, is not usually straightforward or even obvious; it generally must be an interactive, interdisciplinary process. Without a readership of "outsiders," publications with ideas of value to another field will be missed. These are among the fundamental reasons the UFFC Society is one of seven IEEE Societies, along with the Optical Society of America, that sponsors the publication of the *Journal of Lightwave Technology* (JLT). This article reviews the background of the JLT and summarizes why this sponsorship is of potential interest to a significant portion of the Society membership.

The goal of the JLT is to publish significant original contributions on all aspects of optical guided-wave science, technology, and engineering. The JLT commenced publishing in 1982, with the aforementioned multiple sponsorship. The rationale for multi-society sponsorship was the developments in photonics (or lightwave) technology spanned such a large number of R&D and application areas, and the technology was of such an interdisciplinary nature, that no single then-existing IEEE publication or society covered all the topics needed by researchers in photonics or provided a comprehensive coverage of the new development. For example, with optical modulation of light beams feasible at microwave frequencies, near-revolutionary impacts occurred in both microwave and communications applications, e.g., radar signal generation and distribution for the former, and a push for much wider communication bandwidths in optical fiber systems for the latter. Thus both the Microwave Theory and Techniques Society and the Communications Society were motivated to also be co-sponsors. Other IEEE co-sponsors are: the Instrumentation and Measurements Society, and the Electron Devices Society. The JLT is thus an exemplar of IEEE Societies cooperatively working to disseminate information over the maximum readership.

Many examples of topics in JLT that may be of interest to UFFC readership can be cited.

- Acousto-optics. This area has the most obvious relationship to UFFC interests. JLT covers topics such as acousto-optic materials and devices, especially involving SAW's. Recent publications cover fiber and optical waveguide tapped delay lines, acousto-optical tunable filters for optical wavelength-division multiplexing for fiber-optic communication, acousto-optic frequency shifters and phase modulation techniques, and techniques for optical filtering with fibers.



John N. Lee

- Distribution of precision frequency signals using fiber optic techniques.
- Ultrasound sensors, especially using optical fibers.
- Underwater acoustic transducers, e.g., hydrophones.
- Microwave frequency modulation and oscillators, including methods for control of semiconductor laser light frequency.
- Piezoelectric films on optical waveguide devices.

An IEEE Steering Committee, consisting of two members from each of the sponsoring Societies, set policy for the JLT, including areas of technological emphasis and suggestions for Special Topical Issues which may also be Joint Issues with sponsoring Societies when there is sufficiently strong overlap of interests. The UFFC representatives to the Steering Committee are Dr. David Hecht of Xerox and Dr. John N. Lee of Naval Research Laboratory. Presently, Dr. Lee also serves as Chairman of the Steering Committee. The Committee Secretary is Dr. Rod Alferness of Bell Labs, and the Treasurer is Dr. Paul Shumate of Bellcore. Since the IEEE has responsibility for the printing and distribution of the JLT, the Steering Committee also has budgetary oversight. An IEEE-OSA coordinating committee sets page budgets and selects the Editor and Associate Editors; Dr. Shumate is presently Chairman of the Coordinating Committee. The present JLT Editor is Dr. Donald Keck of Corning Glass. (The past editor was Dr. Tom Giallorenzi, former UFFC representative.)

The annual membership renewal for UFFC members offers the option for subscribing to the JLT. Otherwise, subscription information is available on the inside cover. The UFFC looks forward to a lasting and active relationship with JLT.

John N. Lee
Naval Research Laboratory
Washington, D.C. 20375

HANDBOOK ON ULTRASONICS

Professor Farnell is considering the preparation of a HANDBOOK ON ULTRASONICS. Since he is not completely convinced that such a handbook is opportune, he is seeking advice as to the format in which it might be compiled and whether or not the resulting book would be of general use to those working in the ultrasonics field and in related areas.

Presumably a Handbook on Ultrasonics would treat most of the areas covered by the Ultrasonics Symposium, with some topics being much more amenable to summary and tabulation than others. Each section could contain a textual summary of the topic, a compendium of appropriate formulae, and tables of data. In view of the omnipresence of the PC and workstation in our working environments, one would visualize that an important part of such work could consist of a disk or two allowing the evaluation of certain formulae (e.g. a Mason model for bulk transducers, simple diffraction patterns, rotation of elastic tensors, velocity calculations etc.) and display of some updatable data bases and bibliographies.

To help decide on the usefulness of a Handbook on Ultrasonics and on the material which could be included in it, he is asking that you complete the attached questionnaire. If you think such a Handbook worthwhile, it is important to know what kind of material would be most useful to one working in or near your specialization. Please feel free to copy the questionaire and share it with a colleague.

Handbook on Ultrasonics, Questionnaire

1. Do you think it would be useful to have a Handbook on Ultrasonics in your or your companies library? YES... NO...

2. For Chapter headings of such a handbook, would the Subject Classifications used for the Ultrasonics Symposium be reasonable..., too many..., too few..., (what is missing?)...

For the following, please use a separate page.

3. What descriptive material would it be useful to include to summarize your field?

4. What categories of numerical data would it be useful to include for your field?

5. What types of formula should be included?

6. What procedures would be useful in dynamic form?

7. Which types of formulae should be evaluated by internal programs?

8. Do you have any data or bibliographies which would be generally useful and which could be included?

9. Do you have any software which would be useful and which could be included?

Optional Information

NAME _____

FIELD OF ACTIVITY _____

ADDRESS _____

_____

_____

TELEPHONE _____ FAX _____

Please send questionnaire to: Professor G.W. Farnell
Department of Electrical Engineering
McGill University
3480 University Street
Montreal, P.Q.
CANADA H3A 2A7

UFFC FINANCE

The Ultrasonics, Ferroelectrics, and Frequency Control Society continues to remain in good financial shape. As can be seen from the 1990 Operating Statement shown below, we had a surplus of $141.1K against a budgeted surplus of $97.5K. As was the case in 1989, the larger than expected surplus was partially the result of a large surplus from the Transactions. AdCom budgeted for 1000 pages, but the actual number of pages published for 1990 was only 600. Despite the low number of papers published, AdCom decided to keep the number of budgeted pages for 1991 at 1000 since several special issues are planned by the Editor and we still expect the number of papers to pick up now that the backlog has disappeared. The voluntary page charge return for 1990 was 41% and the number of pages falling under the "overlength" classification was 40%.

Both the symposia income and expenses were far below budget. This is a result of the fact that the final reports for the 1990 Frequency Control Symposium (FCS) and the 1990 Symposium on Applications of Ferroelectrics (ISAF) were not completed in time to be included in the 1990 statement. However, FCS did show a $9K surplus and ISAF is expected to show a surplus of about $10K. These amounts will be credited to our account in 1991. In any case, the actual symposia surplus for 1990 was very close to budget due to a $32.3K surplus for the 1989 Ultrasonics Symposium and a late Bookbroker payment of $12.6K from the 1988 Ultrasonics Symposium.

With the surplus of $141.1K, the UFFC reserves as of 12/31/90 were $345.2K. This is about 50% of our operating budget, which is considered adequate for a Society of our size.

H. van de Vaart
Chairman, UFFC-S Finance and Operations
March 4, 1991

	INCOME		EXPENSE		NET	
UFFC	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
MEMBERSHIP FEES	31.0	29.1	0.0	0.0	31.0	29.1
INTEREST	10.2	18.7	0.0	0.0	10.2	18.7
TRANSACTIONS	256.5	223.8	205.5	134.2	51.0	89.6
NEWSLETTER	0.0	0.0	6.4	5.5	-6.4	-5.5
NON-PERIODICALS	3.3	1.7	5.5	4.8	-2.2	-3.1
SYMPOSIA	359.2	198.1	310.3	153.2	48.9	44.9
ADMINISTRATION	0.0	0.0	9.9	11.2	-9.9	-11.2
OTHER	-1.0	-0.2	24.1	21.2	-25.1	-21.4
TOTAL	**659.2**	**471.2**	**561.7**	**330.1**	**97.5**	**141.1**

	INCOME		EXPENSE		NET	
TRANSACTIONS	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
INDIVIDUAL NM SUBS.	67.7	71.4	0.0	0.0	67.6	71.4
ALL TRANS. PACKAGE	90.9	82.8	0.0	0.0	90.0	82.8
VOL. PAGE CHARGES	45.8	27.1	8.3	5.4	37.5	21.7
OVERLENGTH PAGE CH.	52.1	41.9	0.0	1.0	52.1	40.9
PRINTING & MAILING	0.0	0.0	123.5	77.8	-123.5	-77.8
EDITING	0.0	0.0	42.7	26.6	-42.7	-26.6
PUB. ADMINISTRATION	0.0	0.0	16.8	13.9	-16.8	-13.9
UFFC EDITOR	0.0	0.0	11.0	6.1	-11.0	-6.1
MISCELLANEOUS	0.1	0.6	3.2	3.4	-3.1	-2.8
TOTAL	**256.5**	**223.8**	**205.5**	**134.2**	**51.0**	**89.6**

	INCOME		EXPENSE		NET	
SYMPOSIA	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
1989 ULTRASONICS	176.9	185.5	144.5	153.2	32.4	32.3
1990 FREQ. CONTROL	69.2	0.0	63.3	0.0	5.9	0.0
1990 ISAF	113.1	0.0	102.5	0.0	10.6	0.0
1988 BOOKBROKER	0.0	12.6	0.0	0.0	0.0	12.6
TOTAL	**359.2**	**198.1**	**310.3**	**153.2**	**48.9**	**44.9**

IEEE 1991 ULTRASONICS SYMPOSIUM

December 8-11, 1991
Lake Buena Vista, Florida

General Information

This year's IEEE Ultrasonics Symposium will be held at the Hilton Hotel at Walt Disney World Village, Lake Buena Vista, Florida. The Short Courses are scheduled for Sunday, December 8, 1991, followed by three days of technical sessions scheduled for Monday through Wednesday, December 9-11. The members of the Technical Program Committee are working hard toward providing the attendees an exciting technical program and a memorable and enjoyable "after-hours" experience.

Orlando is rapidly becoming a hub for vacationers from around the world. Due to the large number of Florida visitors, the airlines provide some of the most competitive rates for travel to the Orlando International Airport for both foreign and domestic flights. In addition, there are now direct flights from Europe (Frankfurt to Orlando) which are convenient for our European attendees.

The Hilton Hotel at Walt Disney World Village is one the most outstanding hotels in the Orlando area, located directly on Disney property. The hotel is approximately 25 minutes by ground transportation from the airport. The hotel room rates are $110 (US) per night, which is a substantial reduction over normally available rates. The rate is valid for two persons or a family (up to four persons per room). The hotel is directly across the street from the Walt Disney World Village and Marketplace at Lake Buena Vista, which offers a wide variety of shops and restaurants for your enjoyment. Because the conference is hosted by an official Disney World hotel, all ground transportation (bus, boat, or monorail) provided within Disney property is available, *without charge to registered guests* of the Hilton Hotel at Walt Disney World Village, for travel to various theme parks (Magic Kingdom, EPCOT, MGM Studios) and activities (Typhoon Lagoon, Pleasure Island, Discovery Island, River Country, Fort Wilderness, dinner shows, etc.) within Walt Disney World. In addition, buses run on regular schedules to many other local area attractions, such as Sea World, Universal Studios, etc., for your entertainment and convenience.

The weather in Orlando in early December is typically very lovely, with average daily high and low temperatures of 72° and 52°, respectively. We hope to have clear skies and warm weather temperatures, in the mid-70°F to mid-80°F during the day, and slightly cooler at night.

Social Program

A cocktail party is planned for Monday evening in the Hilton Hotel's Grand Ballroom, and all registrants and their guests are invited. Every paid registrant will receive two free tickets for drinks, and mucho hors d'oeuvres and munchies will be provided (continuing the tradition of Chicago, Montreal, and Honolulu). This informal evening is planned for everyone to mingle and talk with old friends and to meet new ones.

A special evening is currently being planned for Tuesday night. Entertainment and dinner options are being investigated for a memorable experience for those attending. Details will be provided in the Advanced Program Booklet (available by mid-September).

Guest Program

The final detail of the Guest's Program are still being formalized. Each registered guest will be invited to a morning continental breakfast to meet new and old friends, and to plan and review the days activities. It is being planned to offer some activities which can only be obtained through groups. Plans are being discussed with Disney to have some special tours of their unique facilities and attractions. These will be enjoyable for everyone of all ages. Disney tickets will be available and we are attempting to get the information on the best type of package we can.

For those attendees bringing children, the Hilton does have a "Youth Hotel" where the children can be supervised if you wish to "explore" without children. This service is provided at a cost (approximately $6 per hour) by the Hilton Hotel. The Youth's facilities are very nice (and the children will probably have a better time without you!)

Exhibits

The IEEE Ultrasonics Symposium will once again have an exhibits area with booths this year. We are contacting many former exhibitors and will attempt to add new exhibitors. Orlando is known for its tourist industry, but the Central Florida area is also quickly becoming a large, high technology area. Companies in the immediate area include Martin Marietta, Harris, AT&T's custom IC facility, the Naval Training Systems Center, and a large electro-optics industry, to name a few. We will be advertising locally to support the symposium, and expect to have many engineers and scientists from the local areas attending. This offers the exhibitors an excellent opportunity to introduce their products to the Central Florida community. If your company is interested in further information of assistance in exhibiting, please contact Larry Whicker, LRW Associates at (301) 647-1591.

Registration

Registration fees for the 1991 IEEE Ultrasonics Symposium have been set as follows:

Members	Advance	$265.00	Onsite	$295.00
Non-members	Advance	$325.00	Onsite	$355.00
Students	Advance	$ 25.00	Onsite	$ 40.00
Guests	Advance	$ 20.0	Onsite	$ 30.00

(Includes Breakfast)

The fees quoted are all in US dollars. Registration fees ***must*** be paid in US dollars, checks drawn on US banks, money orders, VISA or Master Card. No foreign checks or currency will be accepted for pre-registration or at on-site registration. Please make note of these rules, and also note that registration fees may now be charged directly on either your VISA or Mastercard.

Finally, on behalf of the entire Symposium Organizing and Technical Program Committees, we look forward to seeing you in Florida this December, and promise an exciting and productive series of technical sessions as well as a golden opportunity to partake in the unique attractions of Walt Disney World and the surrounding Orlando area. Further details and additional information will be provided in the Advanced Program Booklet for the 1991 IEEE Ultrasonics Symposium; please contact the General Program Chairman for the conference, Prof. Donald C. Malocha. If you should need additional information related to abstract preparation and submission, please contact the Technical Program Chairman for the conference, Dr. Gary K. Montress.

Sincerely,

Donald C. Malocha
General Program Chairman
1991 IEEE Ultrasonics Symposium

Gary K. Montress
Technical Program Chairman
1991 IEEE Ultrasonics Symposium

Mike Driscoll, Marvin Frerking and Ray Filler at Frequency Control Symposium Meeting

"But it's my abstract and I think it should be in the program"

Ted Lukasek, Bruce McAvoy and Bob Moore at the 1991 Ultrasonics Symposium Committee Meeting

Gerard Quentin turns on the French charm at the 1991 Ultrasonics Symposium Committee Meeting

1991 IEEE ULTRASONIC SYMPOSIUM
SHORT COURSES
Sunday, 8 December 1991

A series of six courses will be offered in conjunction with the 1991 IEEE Ultrasonics Symposium. These courses will be held in two parallel sessions beginning on Sunday Morning, 8 December 1991. The Advance Program Booklet (available by mid-September 1991) for the 1991 IEEE Ultrasonics Symposium will include complete registration information and a registration form for the short courses. Registration for the short courses will be on a first-received, first-processed basis. The Symposium's Organizing Committee reserves the right to cancel any or all short courses due to insufficient pre-registration. The fee for ***each*** short course is $120 for IEEE members ($150 for non-IEEE members and $50 for students). There will be a $10 discount (for *each* short course) if the registration fee(s) is(are) paid before 8 November 1991.

Course 1: Piezocomposites for Acoustic Transducers
Instructor: Wallace A. Smith
Office of Naval Research
Time: Sunday Morning, 8 December 1991
8:00 am - 12:00 noon

This tutorial will describe the application of composite piezoelectric materials to acoustic transducers. It will begin by surveying the spectrum of new properties achievable by combining a piezoelectric ceramic with a passive polymer to create a new piezomaterial. These new materials are then compared with conventional piezoelectric ceramics (i.e., lead zirconate-titanate, lead metaniobate, barium titanate, and modified lead titanate) and polymers (polyvinylidene difluoride, and its copolymer with trifluoroethylene), as well as with new ceramic materials at the forefront of current research (lead zinc niobate and electrostrictive lead magnesium niobate). Material fabrication techniques will be surveyed for composite structures, ranging from ceramic powder in polymer matrix, through aligned ceramic rods held parallel by a polymer, to ceramics containing ordered air-filled voids. The benefits that promise to enhance the performance of existing transducer designs (single-element, annular array, linear array, and phased array), as well as to make novel devices feasible (bi-plane phased array, two-dimensional array, and actively addressed array), will be identified. Tradeoffs in material properties and transducer design will be presented. The focus will be on ultrasonic applications for medical imaging and non-destructive testing, with sonar and air-ranging applications mentioned only briefly. A useful introduction to this tutorial, as well as an extensive bibliography for background reading, is provided in the paper "The Role of Piezocomposites in Ultrasonic Transducers," by W. A. Smith, which appeared in the *Proceedings of the IEEE Ultrasonics Symposium*, 1989, pp. 755-766.

Wallace A. Smith (M'84-SM'86) serves as a Scientific Officer with the Materials Division of the Office of Naval Research, where his responsibilities span electronic and optical materials for acoustic transducers, radar absorption, electronic packaging, and electro-optics, as well as the new high-temperature superconducting ceramics. He received a B.A. degree in 1964 from Rutgers University, and both the M.A. in 1966 and Ph.D. in 1970 from Princeton University, all in Physics. His research training involved experimental work in high energy particle physics, and nuclear and electron magnetic resonance, culminating in a theoretical thesis in the area of quantum statistical mechanics. He served on the faculties of New York University and the City University of New York, where he pursued theoretical research on quantum electrodynamics, laser physics, and hydrodynamic instabilities. For more than a decade he lead a research team at Philips Laboratories, Briarcliff Manor, NY, focusing on materials for pyroelectric infrared imaging and medical ultrasonic imaging, with excursions into tissue characterization. Dr. Smith has served as Chairman of the 1986 IEEE International Symposium on Applications of Ferroelectrics, as an elected member of the Administrative Committee of the *IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society* (1987-1989), and as an Associate Editor of the *IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control* (1986-1990). Dr. Smith's Personal research currently focuses on modeling composite piezoelectric materials; he expends considerable effort in trying to establish a commercial base for piezocomposites in order to hasten their exploitation in naval sonar applications.

Course 2: Fundamentals of the Finite Element Method for Piezoelectric Resonators
Instructor: Yook-Kong Yong
Rutgers University
Time: Sunday Afternoon, 8 December 1991
1:00 pm - 5:00 pm

The advent of inexpensive but powerful microcomputers has made widely available the use of finite element methods for numerical modeling and simulation. This course will provide the fundamentals of the finite element method as applied to vibrations of piezoelectric resonators. A basic knowledge of elasticity and piezoelectricity is assumed. The course will, for the sake of clarity, focus on the development of finite element equations for a one-dimensional piezoelectric resonator using the weak form and Galerkin formulation. Interpolating shape functions, Gauss quadrature, calculation of element matrices, and equations, boundary conditions and element assembly will be discussed. Program codes for a one-dimensional problem will be given to participants. Topics for discussion also include algorithms for assembling element matrices, factoring the stiffness and mass matrices, and minimizing storage requirements. If time permits, the course will also cover finite element formulations for higher-dimensional problems.

Yook-Kong Yong (M'86) received the Ph.D. degree in Structures and Mechanics from Princeton University. He then joined the faculty of Rutgers University, where he is presently an Associate Professor. He has taught finite element courses, at both the undergraduate and graduate levels, in the Department of Civil and Environmental Engineering for the last five years. His research papers include the use of finite element modeling for low- and high-frequency quartz resonators. His current research interests are finite element applications in piezoelectric resonators, and theoretical and numerical simulation of noise in quartz resonators. He is a regular contributor to the *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, the *Proceedings of the IEEE Ultrasonics Symposium*, and the *Proceedings of the Annual Symposium on Frequency Control*. He has authored more than twenty-three publications.

Course 3: Flow Instrumentation - Design, Performance and Applications
Instructor: Lawrence C. Lynnworth
Panametrics, Inc.
Time: Sunday Evening, 8 December 1991
6:00 pm - 10:00 pm

In order to understand and improve upon most of the existing ultrasonic measurements of fluid flow in closed conduits and in open channels, one needs to know at least three things: 1) how fluids flow; 2) how flow can influence the propagation of ultrasound; and 3) how one can measure said propagation. The course will begin with a review of fluid flow, particularly flow profiles in ducts as a function of Reynolds number. We will then compare flow situations and industrial measurement problems in liquids, gases, and in intermittently-two-phase fluids as often encountered at temperature extremes. Next we will look at how flow modulates propagation in the fluid or

in its container, i.e., how flow changes the amplitude, phase, or frequency of an interrogating wave. This leads us to consider the design and placement of transmitter and receiver transducers either on the outside of the container or in nonrefracting contact with the fluid, along with selection of transmission, reflection or other active/passive methods. To find out why and where industry likes (or dislikes) ultrasonic flowmeters, we will look at performance (including shortcomings) of equipment in the calibration lab and in field installations, thereby completing this tutorial.

Lawrence C. Lynnworth (S'55-M'59-SM'70) received the B.S.E.E. in 1958 and M.S.E.E. in 1959, from New York University and Stanford University, respectively. He was introduced to industrial ultrasonics at Avco, where he worked In NDE from 1959 to 1962. Since 1962 he has worked at Panametrics, Inc., in ultrasonics, where he is now Vice President - Special Research Projects/Ultrasonic Process Control. Recent projects have dealt with measuring flow velocity and mass flowrate at temperature extremes, noninvasively measuring the average molecular weight of binary gas mixtures, and measuring temperature, density, and interfaces. He has served as an Associate Editor for the *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* since 1980. He has been granted thirty-three patents and has published more than one hundred papers, including a chapter on Ultrasonic Flowmeters in Volume 14 of the Physical Acoustics series (1979). In 1989 Academic Press published his book entitled Ultrasonic Measurements for Process Control (720 pages).

Course 4: Interdigital Transducers for SAW Devices
Instructor: David P. Morgan
SAW Device Consultant
Time: Sunday Morning, 8 December 1991
8:00 am - 12:00 noon

Interdigital transducers are fundamental to SAW devices since, in addition to SAW generation and detection, they also provide signal processing operations (e.g., bandpass or chirp filtering). This topic is very extensive owing to the variety of transducer types (e.g., apodised, withdrawal-weighted, chirped, directional, etc.), the variety of information needed (e.g., frequency response, admittance, reflection coefficient, etc.), and the variety of second-order effects. This course will first review transducer types, behavior, design principles and second-order effects, and the quasi-static analysis is covered. This approach offers both theoretical rigour and convenience of practical usage, giving all the transducer parameters needed, and is applicable to most common transducer types. For most transducers an element factor can be defined and the analysis is related to the simple delta-function model. For transducers affected by electrode interactions (i.e., single-electrode transducers) the quasi-static method is extended by incorporating a Reflective Array Model, thereby resulting in a comprehensive analysis. This model is also applicable to electrode or grooved arrays, as used in resonators. Cascading techniques, suitable for devices such as resonators and SPUDTs, are included. Other topics will include bulk wave excitation, devices using leaky surface waves or SSBWs, high-frequency low-loss devices, SPUDTs, and NSPUDTs.

David P. Morgan (S'67-M'72) received B.A. and M.S. degrees in Physics from Cambridge and London Universities, respectively, and the Ph.D. degree in Electrical Engineering from University College, London University. He subsequently held Research and Development positions at the Nippon Electric Company (Kawasaki, Japan), Edinburgh University, and Plessey Research (Caswell, UK), where he led the SAW development group. He now consults internationally on SAW devices. He has published on a wide variety of SAW topics including bandpass filters, pulse compression and convolvers, and is the author of a book titled Surface-Wave Devices for Signal Processing, published by Elsevier in 1985, and re-printed in paperback in 1991.

Course 5: High Stability SAW Oscillators:
Design and Performance
Instructors: Gary K. Montress and Thomas E. Parker
Raytheon Company, Research Division
Time: Sunday Afternoon, 8 December 1991
1:00 pm - 5:00 pm

This short course will describe the design, fabrication, and testing of high performance surface acoustic wave (SAW) resonator and delay line based oscillators which incorporate state-of-the-art SAW device designs, as well as low noise circuit design techniques and components. For those not completely familiar with the basics of SAW resonator and delay line device design, background material will be included. A simple feedback loop architecture will serve as the basis for several specific design examples that will be presented in detail. Important advances in the performance of high stability, SAW oscillators have occurred during the last four or five years. The "All Quartz Package" (AQP) has been a key factor in achieving improved oscillator performance. Performance enhancements include the ability to accurately trim the resonant frequency of a sealed SAW resonator device, as well as significant improvements in the short-term stability of SAW oscillators. Engineering prototype SAW resonator oscillators at 500 MHz have demonstrated white PM noise floors of -184 dbc/Hz for carrier offset frequencies greater than 100 kHz, while flicker FM noise levels of -83 dBc/Hz at 10 Hz carrier offset have been achieved. In addition, prototype 400 MHz SAW delay line VCOs with tuning ranges of ±150 kHz (±375 ppm) have demonstrated white PM noise floors of -170 dBc/Hz, along with flicker FM noise levels of -70 dBc/Hz at 10 Hz carrier offset.For properly packaged hybrid circuit SAW oscillators, vibration sensitivities as low as 1×10^{-10}/g have been demonstrated. The typical long-term fractional frequency stability for SAW resonator oscillators continues to be consistently better than ±1 ppm/year. A wide variety of SAW oscillator performance characteristics will be described, including: fractional frequency variation versus temperature, load pulling, voltage pushing, spurious levels, etc. Finally, residual phase noise measurements at the component level have recently come to play an increasingly significant role in achieving improvements in an oscillator's phase noise spectrum. Therefore, the course will also briefly cover residual phase noise measurement techniques which are capable of characterizing high power RF amplifiers, electronic phase shifters, SAW resonators and delay lines, etc., with unprecedented accuracy and sensitivity.

Gary K. Montress (S'66-M'76-SM'87) was born in East Orange, NJ, on April 10, 1947. He received the B.S.E.E., M.S.E.E., Electrical Engineer, and Ph.D. degrees from the Massachusetts Institute of Technology, in 1969, 1971, 1971, and 1976, respectively. From 1969 to 1972, while at MIT, he was a Teaching Assistant in the E.E. Department where he taught courses on solid-state electronics and circuit design and also pursued research in the area of p-n junction breakdown phenomena. From 1972 to 1975, he was an Instructor in the E.E. Department, teaching and supervising courses in solid-state physics and microelectronics. From 1975 to 1976, while a Research Assistant in the Research Laboratory for Electronics at MIT, he completed his Ph.D. thesis research and dissertation in the area of solid-state microwave devices (BARRITT diodes). From 1976 to 1984, Dr. Montress was a member of the Professional Staff at the United Technologies Research Center, East Hartford, CT, where he was involved in research and development activities related to solid-state electronics, SAW frequency and control and signal processing components, and GaAs material and device technologies for SAW and electronic device applications. Since October 1984, Montress has been a member of the Professional Staff at the Raytheon Research Division, Lexington, MA. He is currently engaged in research and development activities related to stable VHF, UHF, and microwave frequency sources, including both SAW and dielectric based oscillators and synthesizers. His research interests also include the development of low noise hybrid and MMIC circuitry incorporating silicon bipolar transistors, for application to extremely low noise frequency sources. Dr. Montress is a member of Eta Kappa Nu, Sigma XI and Tau Beta Pi. His IEEE activities include having served as an officer of the Boston Chapter of UFFCS (1986-89) and as a member, since 1981, of the Technical Program Committee for the annual Ultrasonics Symposium. He served as Technical Program Chairman for the 1989 Ultrasonics Symposium in Montreal, is currently serving as Technical Program Chairman for the 1991

Ultrasonics Symposium in Orlando, and will serve as Technical Program Chairman for the 1992 Ultra-sonics Symposium in Tuscon. Dr. Montress was recently elected to serve a three year term on the *Ultrasonics, Ferroelectrics, and Frequency Control Society's* Administrative Committee (AdCom) (1991-1993).

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 Professional Staff of the Raytheon Research Division, Lexington, Massachusetts, working with the Generalized Filters and Microwave Acoustics (now Stable Sources) Group. Initially, his work was primarily related to the development of improved temperature stable surface acoustic wave materials. More recently, Dr. Parker has been responsible for several surface acoustic wave oscillator programs at the Research Division. His primary interest has been oscillator frequency stability, with emphasis on 1/f noise, vibration sensitivity, and aging. Dr. Parker is a member of IEEE, Sigma Pi Sigma, and Sigma Xi. He served as an elected member of the Administrative Committee of the *IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society* (1988-1990). He has served on the Technical Program Committees for both the Ultrasonics Symposium and the Annual Symposium on Frequency Control. He was Finance Chairman for the 1980 Ultrasonics Symposium and is the current Finance Chairman for the Annual Symposium on Frequency Control. Dr. Parker served as Technical Program Chairman for the 44th Annual Symposium on Frequency Control (1990), and is currently serving in this capacity for the 45th Annual Symposium on Frequency Control (1991).

Drs. Montress and Parker received the 1988 Outstanding Transactions Paper Award from the IEEE's *Ultrasonics, Ferroelectrics, and Frequency Control Society* as co-authors of the papers "Precision Surface-Acoustic-Wave (SAW) Oscillators" and "Extremely Low Phase Noise SAW Resonators and Oscillators: Design and Performance," which appeared in the May 1988 and November 1988 issues of the Transactions, respectively.

Course 6: Applications of SAW Devices
Instructor: Clinton S. Hartmann
Hartmann Research, Inc.
Time: Sunday Evening, 8 December 1991
6:00 pm - 10:00 pm

This course will summarize the application of SAW devices to RF systems. The discussion will cover: 1) consumer electronic applications such as TV receivers, VCRs, garage door openers, and pocket pagers; 2) commercial electronic applications such as digital telecom modems, RF test equipment, CATV headends, and local area networks (LANs); and 3) military electronic applications such as radar, ESM, ECCM, navigation, fuses, and missile seekers. The signal processing functions performed by the SAW device will be discussed for each of these applications. Important circuit design considerations in using SAW devices will also be covered.

Clinton S. Hartmann (S'66-M'67-M'77) received the B.S.E.E. from the University of Texas, and both the M.S.E.E. and Electrical Engineer degrees from the Massachusetts Institute of Technology. He is currently President of Hartmann Research, Inc., a company devoted to research on new SAW devices and applications. From 1979 to 1985 he was Chief Scientist of RF Monolithics, Inc., a major manufacturer of SAW devices and SAW based RF modules. From 1969 to 1979 he was in charge of SAW device research at Texas Instruments, Inc., where he also held the position of TI Fellow. In 1976 he was named the Outstanding Young Electrical Engineer in the United States by Eta Kappa Nu. Mr. Hartmann is the inventor of many SAW devices which are in common use today, including the low loss SAW filter, the SAW resonator, the SAW controlled oscillator, and many others. At the present time, he holds twenty-eight issued U.S. patents, plus numerous foreign patents. He has published more than twenty major technical papers, as well as many short papers.

1991 IEEE Ultrasonics Symposium

December 8-11,1991 Lake Buena Vista, Florida

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Deadline for Abstract Submission: Friday, May 31, 1991

Papers are solicited describing original work in the field of Ultrasonics. Papers concerned with mechanical wave phenomena, including but not limited to the Subject Classification listed below, will be considered.

ABS	Arrays & Beam Steering
ACE	Acoustic-Electric Effects & Devices
AE	Acoustic Emission
AM	Acoustic Microscopy
AO	Acousto-Optic Effects & Devices
AOS	Acousto-Optic Signal Processing
BB	Bio-Effects & Bio-Physics
BW	Bulk Wave Effects & Devices
DMC	Defect & Material Characterization
ED	Exposimetry/Dosimetry
FM	Flow Measurement
GA	Geophysical Acoustics
HT	Hyperthermia
HTS	High Temperature Superconductors
IS	Inverse Scattering
IU	Industrial Ultrasonics
MI	Medical Imaging
MSP	Medical Ultrasound Signal Processing
MSW	Magnetostatic Waves & Devices
NDE	Nondestructive Evaluation
NSP	NDE Signal Processing
PA	Physical Acoustics
PAS	Photo-Acoustics
PF	Piezoelectric & Ferroelectric Materials
PMC	Process Monitoring & Control
SEN	Sensors
SEP	Sonically Enhanced Processing
SFT	SAW Filters & Transducers
SMP	SAW Materials & Propagation
SP	Speckle
SRO	SAW Resonators & Oscillators
SSA	SAW System Applications
SSP	SAW Signal Processing
TC	Tissue Characterization
TFP	Thin Films (Bulk & Optical Devices)
TFS	Thin Films (SAW Devices)
TH	Therapeutics
TM	Tomography
US	Underwater Sound

Authors of Contributed and Invited Papers are **required** to submit an abstract. Carefully follow the **PREPARATION OF ABSTRACT** instructions on the following page and send to:

Dr. Gary K. Montress
c/o LRW Associates
1218 Balfour Drive
Arnold, MD 21012-2150
U.S.A.

The abstract **original** (unfolded) and **two (2) copies** should be provided.
The deadline for receipt of abstracts is Friday, May 31, 1991.

Each abstract will receive careful review and evaluation. A good abstract **must clearly explain** the intent and content of the paper. Evaluation criteria will include, but not necessarily be limited to: **CONTRIBUTION TO THE STATE-OF-THE-ART, ORIGINALITY OF THE WORK, CLARITY OF THE ABSTRACT IN CONVEYING SALIENT TECHNICAL DETAILS AND PURPOSE/APPLICATION FOR THE WORK, AND POTENTIAL OVERALL INTEREST TO THE ULTRASONICS COMMUNITY.**

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STUDENT TRAVEL SUPPORT—Limited funds are available to support student attendance at the 1991 IEEE Ultrasonics Symposium. Awards will be made on a competitive basis. Further information and application forms can be obtained from Prof. Gerald W. Farnell, Department of Electrical Engineering, McGill University, McConnell Engineering Building, 3480 University Street, Montreal, Quebec H3A 2A7, Canada. **The deadline for applications is June 30, 1991.**

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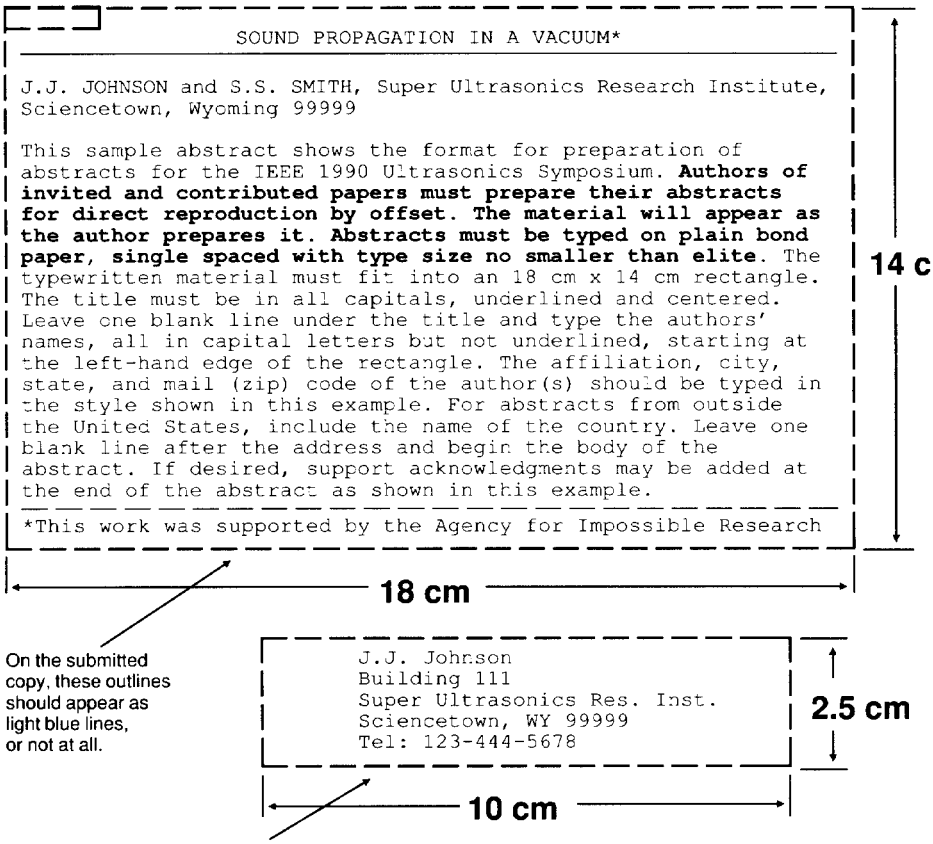

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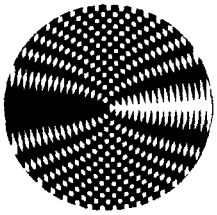

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Editor's Note

You will notice a new and refreshing look to your spring issue of the newsletter. We have entered the electronic publishing era in cooperation with the IEEE publishing services. I appreciate everyone's response in sending articles on disk where possible and in good legible print otherwise. Kathy Nolan did a remarkable job of getting disk and paper contributions onto one disk. Thanks Kathy, for a job well done. The photography staff for the newsletter continues to grow as do the number of photographs. Sorry I couldn't get them all in but thanks to Jan, Harry, Susan and Bruce. Don't forget to attend the Frequency Control Symposium in May and the Ultrasonics Symposium in Orlando. Please have your input for the fall newsletter to me by the end of August. Enjoy your summer.

Fred S. Hickernell
Newsletter Editor

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