



**IEEE
ULTRASONICS,
FERROELECTRICS,
AND
FREQUENCY CONTROL
SOCIETY
NEWSLETTER**



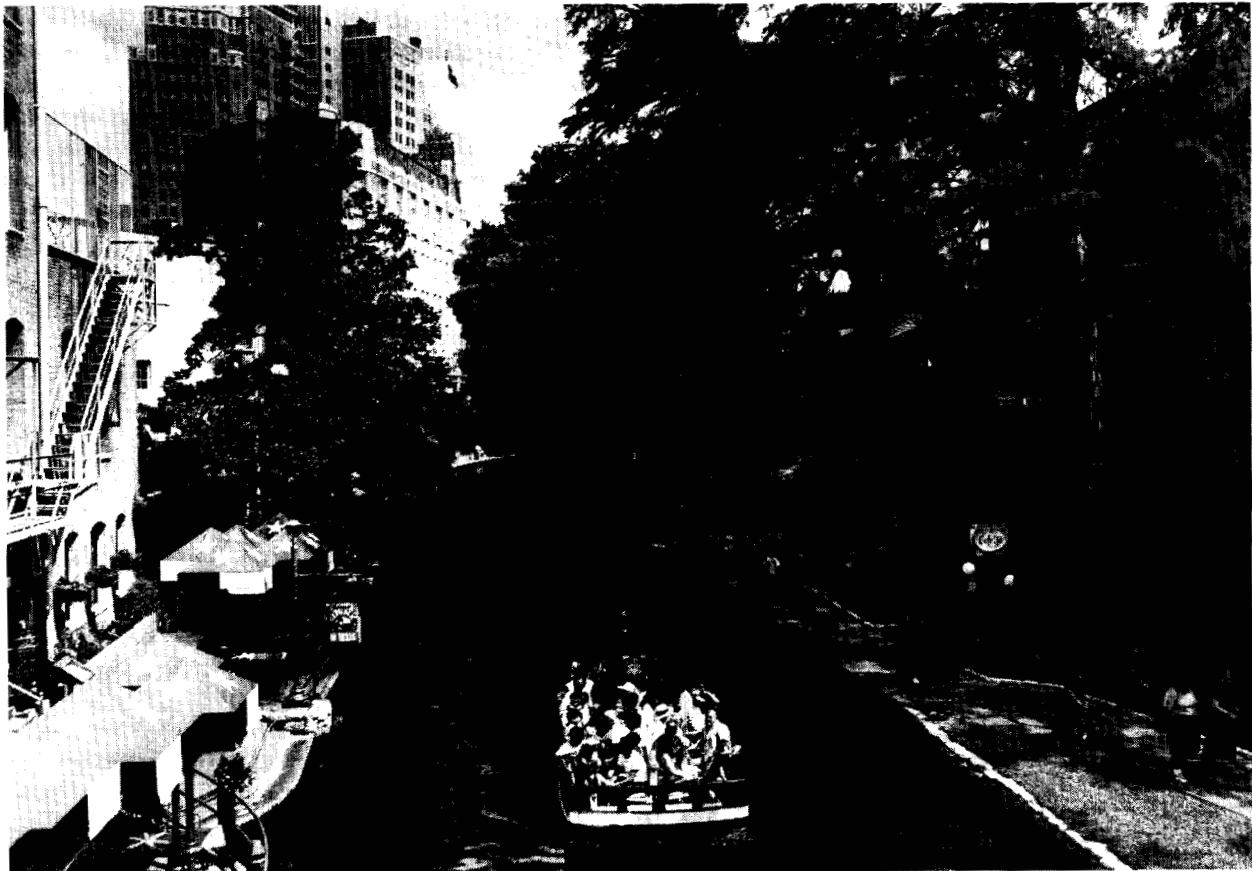
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San Antonio, Texas

November 3–6, 1996



**1996 IEEE
International Ultrasonics Symposium**

1996 IEEE INTERNATIONAL ULTRASONICS SYMPOSIUM

INVITATION FROM THE GENERAL CHAIR

It is my pleasure and privilege to invite you to take part in the 1996 IEEE International Ultrasonics Symposium. As of this writing, it appears that we are headed for a record submission of papers. This surely attests to the global robustness of the ultrasonics community.

While the technical sessions are the core of our conference, I have often thought that the social functions give our annual meeting its heart and soul. A reception will be held on Monday early evening with hearty hors d'oeuvres - a great opportunity to relax with long-time colleagues from all over the world, and to make new acquaintances. Tuesday evening's banquet promises to be exciting for its culinary variety, and perhaps a few surprises. I heartily urge you to take part in these for the change in pace they offer. Guest tours of San Antonio and its environs are planned for each day of the technical sessions.

I wish to draw special attention to the Banquet, as it promises to be an excellent social, culinary, cultural and entertainment experience:

Tuesday, November 5, 1996 INTERNATIONAL FIESTA INSTITUTE OF TEXAN CULTURES

**7:00 pm to 10:00 pm Price per person: \$45
Shuttle busses will leave the hotel beginning at 6:30 pm**

The major social event of the Symposium week is an evening at the Institute of Texan Cultures. We can promise you an exciting evening of excellent food, cultural enrichment, cinema, delightful music and dancing entertainment - well worth the price. The Institute is a short walk from the Hotel (10 - 15 minutes) through Hemisfair Park. Those requiring transportation assistance should contact the Registration Desk, as shuttle service will be arranged.

With tables set amid the exhibits which document the contributions of the varied ethnic, religious and cultural natives, pioneers, explorers and settlers of Texas, we shall enjoy a "culinary cruise" among the several islands of international style foods, each dedicated to the cuisine of a different Texan culture. These will include American West (carved Turkey and chopped BBQ Brisket), Mexican (Southwestern Paella), Texas Gulf Coast Shrimp, Italian (pasta with assorted sauces), and an International Dessert Bazaar.

Entertainment will include the Institute's Dome Show, "The Many Faces of Texas," a panoramic screen short documentary projected on the Institute's Dome, introducing the

many cultures that make up modern Texas, and live music and dance with the Ballet Folklorico Stage Show.

An Open Bar, serving beer, wine, Texas margaritas on the rocks and soft drinks will be served throughout the evening, included with admission to the banquet.

This is the first Ultrasonics Symposium to be held in San Antonio. Despite being the tenth largest city in the United States, it retains a casual and warm atmosphere. It combines the spirit and cultures of the Old South, the Wild West, Indian and pioneer legacies, and the influence of Spanish, French, German, Scandinavian and many other national and ethnic cultures that built the State of Texas. The weather is very pleasant in November. The days are typically sunny and warm, and a sweater for the evenings should be more than sufficient. San Antonio is the home of the Southwest Research Institute and we are grateful for the gracious and friendly local support they have provided.

I am truly fortunate to have the expertise and tireless support of my Symposium Organizing Committee. As volunteers, they demonstrate their deep commitment to the Society and the Symposium: B. T. Khuri-Yakub, Bob Potter, Jerry Jackson, Doron Kishoni, Jian-yu Lu, Janpu Hou, and Moises Levy. Special thanks are due to Beatrice Moreno of Southwest Research Institute, who worked tirelessly on many of the details that will make this gathering so enjoyable.

The excellence of the technical sessions depends entirely on the efforts of the Technical Program Committee, and the Symposium Organizing Committee wishes to express its deepest gratitude to the TPC for assuming its responsibility with a strong sense of commitment. The Administrative Committee of the Ultrasonics, Ferroelectrics and Frequency Control Society (UFFC-S) has provided timely guidance and valuable experience, and The Institute of Electrical and Electronic Engineers has graciously provided financial backing to make this a successful meeting.

To all attendees and their guests, let me say Bienvenidos!

Jeff Schoenwald
General Chair

1996 International Ultrasonics Symposium

ARRANGEMENTS and OPPORTUNITIES

San Antonio is a city full of paradoxes. While it is the tenth largest city in the United States, it is proud of its relaxed, casual and warm attitude. San Antonio is not just a combination of the Old South and Wild West, with Indian and cowboy/pioneer history, but a blend of Spanish, French, German and many other national and ethnic cultures that built the State of Texas. Located in the hill country of southwestern Texas, San Antonio has a delightfully moderate and comfortable climate in store for our Symposium. The days are sunny and warm, with temperatures in the eighties quite common. Evenings are quite moderate, and a sweater should be more than enough for outdoor strolling on the famed Riverwalk, which you can also experience by river taxi, and sample the delights of cafés,

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restaurants, shops, stall vendors, and street entertainers. Beyond the Riverwalk lies a broad variety of entertainment, historical and cultural opportunities. The famed Alamo, a short walk from the sumptuous Hyatt Regency Hotel, is only the start of many sites that invite you to the Fiesta that is San Antonio.

LOCAL ARRANGEMENTS/ Jerry Jackson

HOTEL: The Hyatt Regency Hotel, at 123 Losoya Street, San Antonio, is located in the heart of the Riverwalk District, one block from the famed Alamo and backing directly onto one of San Antonio's centerpiece attractions: the Riverwalk. It is 15 minutes from the San Antonio International Airport. By day or night, the Riverwalk is an oasis of pleasant sights, sounds and smells offering hours of diversion right at the doors of the hotel. Centrally located near the famed San Antonio Missions, King William Historic District, La Villita Spanish Village, Hemisfair Plaza, San Antonio Museum of Art, shopping, dining and entertainment, the Hyatt is a full service hotel, complete with health club, dining and concierge services to fill your needs. Special Symposium rates have been arranged with the Hyatt: \$139/single or double occupancy, plus tax. For reservations and information, call 800 233 1234 or (direct to the hotel) 210 222 1234. The hotel FAX number is 210 227 4925. Please indicate your affiliation with the IEEE International Ultrasonics Symposium.

Transportation

San Antonio International Airport is served by all major US carriers, including American, Delta, United, Northwest, Southwest, Continental and Trans World Airlines. At this time we are still negotiating discount fares with one or more of the Airlines. Details will appear in the Advanced Program and Registration material. You may obtain further details by contacting IEEE Travel Services at 800-TRY-IEEE (800-879-4333) within the U.S. Outside the U.S., call collect 908-562-5389 between 8:30 am and 5:30 pm EDST, Monday through Friday. Please indicate your affiliation with the IEEE International Ultrasonics Symposium. You may FAX your travel requirements to 908-562-8815, indicating your travel dates, departure time, phone and your own FAX number. A travel counselor will contact you as soon as possible.

Guest Program/Bea Moreno

A guest program is being developed that will immerse you in San Antonio's history, culture and attractions. In cooperation with the San Antonio Visitor's and Convention Bureau, we plan to arrange an introductory slide show on Monday morning to set the stage for a round of tours of San Antonio that will include the famed Alamo, the King William Historic District, the Institute of Texan Cultures, and other historic and repository sites. A combination Riverwalk shopping/sight-seeing tour and luncheon served aboard a river taxi is being planned. If interest is sufficient, a day trip to Sea World of Texas will be arranged. Please call Bea Moreno at the Southwest Research Institute (SWRI) at 210 522 2260 for more information, and to let her know of your interests.

SPECIAL INVITATION FROM SOUTHWEST RESEARCH INSTITUTE

Mr. Jerry Jackson, Manager, Nondestructive Evaluation, Southwest Research Institute, San Antonio, Texas, and Symposium Local Arrangements Chair, cordially invites all interested attendees and guests to tour the Institute (SRI) on Thursday Nov. 7, the day following the Symposium. Please call him at 210 522 2957 to advise him of your interest so tour arrangements can be planned. Transportation to/from the Institute can be arranged. Details of timing, directions, etc. will be announced at the Symposium Plenary Session, and available from the Registration Booth.

REGISTRATION DESK

The symposium registration desk is located in the Los Rio Foyer of the 2nd floor (B-Level) of the Hyatt, between the Technical Sessions (Regency Ballrooms) and the Exhibits/coffee break area in the Rio Grande Ballroom. Registration desk hours are:

Saturday (Short Courses)	5:00 pm - 9:00 pm
Sunday (Short Courses)	7:30 am - 10:00 am
Sunday	5:00 pm - 9:00 pm
Monday - Tuesday	7:30 am - 5:00 pm
Wednesday	7:30 am - 12:00 noon

IEEE & UFFC-S ENROLLMENT

If you wish to join the IEEE when registering for the Symposium, you may register at the member rate and receive one year of free membership in the Ultrasonics, Ferroelectrics, and Frequency Control Society (UFFC-S).

If you are a current IEEE member and wish to become a first-time member of the UFFC-S, free membership is offered at the time of registration. You will receive your choice of the UFFC-S Transactions or the Journal of Solid-State Circuits, and all UFFC-S Newsletters published in 1997.

For your convenience, an IEEE and UFFC-S Membership Application form may be found in the center of this Advance Program. An IEEE/UFFC-S enrollment and information booth is located in the exhibit area.

MESSAGE DESK

Messages may be left at the Symposium Registration Desk for attendees and guests by calling the Hyatt Hotel at 210 222 1234 and asking for extension . A Message Board is located near the Registration Desk.

PROCEEDINGS

The Symposium Proceedings will be available in early 1997. A soft-cover copy will be shipped to all paid registrants except students, retirees, guests and one day registrants. A hard-cover copy may be ordered for an additional \$35 at the time of registration.

This year the proceedings will include a CD-ROM version included with full conference registration or purchase of the Proceedings separately. This is experimental for 1996. In

future years it is likely that the CD-ROM will be available separately.

Extra copies of the Symposium Proceedings may also be ordered at the registration desk. Prices are:

Soft-Cover (w/CD-ROM) \$95

Hard-cover (w/CD-ROM) \$130

For overseas mailing addresses, an additional \$55 per copy is required to defray the air and freight mailing costs.

Please note that only those papers which are presented at the Symposium will be included in the Proceedings.

REGISTRATION & FEES

All Symposium participants and guests must register and are requested to wear badges. The Symposium fee includes admittance to all technical sessions, the Monday evening reception, and a soft-cover copy of the Symposium Proceedings (except for students, retirees, one-day and guest registrants). The guest fee includes a continental breakfast each morning and the Monday evening reception. Details of evening and social events are provided in the Social Program section.

Symposium Fees:	Advance	On-Site
IEEE Members (a)	\$320	\$350
Non-Members (a)	\$400	\$420
Students & Retirees (b)	\$25	\$40
Guests, Adult (b)	\$30	\$35
Children Under 12 (b)	\$10	\$15
One-day Registration (b)	\$150	\$150
Life Members (b)	N/C	N/C

Short Course Fees:	Advance	On-Site
IEEE Members	\$110	\$120
Non-Members	\$140	\$150
Students & Retirees	\$40	\$50

The reduced rates for advance registration are available only by completing the form located at the center of this Advance Program, enclosing proper payment and mailing to:
1996 IEEE International Ultrasonics Symposium
c/o LRW Associates
1218 Balfour Drive
Arnold, MD 21012-2150

The Advance Registration must be received at LRW Associates by Oct. 14, 1996. Postmarks do not apply. Each registration must complete a separate Advance Registration Form. The remittance is payable, in US Dollars only, by personal or company check drawn on a US Bank money orders, VISA or Master Card. Bank drafts, foreign currency and purchase orders will not be accepted for either advance or on-site registration. For advance registration, the remittance must accompany the Advance Registration Form.

Refund Policy

There will be a \$25.00 service charge to process refunds for those who have pre-registered but who are unable, for whatever reason, to attend the symposium. A letter requesting the refund should state the registrant's name and to whom the refund check should be made payable. No refunds will be given for requests received after October 16, 1996.

MESSAGE FROM THE TECHNICAL CHAIR

This year's meeting was the first to ask for electronic submission of abstracts. This trend for electronic submission and eventually evaluation, and reply to the authors will continue. Some of the problems we had, like multiple media submissions and duplication will go away and we will end up with a faster and more efficient system. This year we had 475 total papers submitted which is a slight reduction from last year. However, the international flavor of the symposium gets stronger every year. Over 40% of the submissions came from America (U.S.A, Canada, Mexico, and central and south America), over 40% came from Europe (East and West), 17% from Asia (Japan, China, and the rest of the continent) and .2% from Australia.

The contributions continue to increase with respect to the other groups. Nearly 40% of the submissions are in Medical Ultrasound, with NDE & Industrial Applications, and Surface Acoustic Waves holding at over 20% while the Physical Acoustics group saw a slight reduction to a little over 17%. This represents a slight shift in the interest of the group as many of us have interests in several different areas of research in Ultrasonics.

The San Antonio meeting promises to be very exciting in both technical and social events and we look forward to seeing all of you in San Antonio in November.

B. T. Khuri-Yakub

Technical Program Chair

**1996 IEEE International Sonics and
Ultrasonics Symposium**

SHORT COURSES

Course 1: Piezoelectric Materials Properties, Measurement Techniques, and Recent Developments

Instructor: T. R. (Raj) Gururaja, Hewlett-Packard Company
Sunday, (8:00 am - 12:00 noon)

Course 2: Modeling of Bulk Waves, Massloading, Cross-Talk, and other Second-Order Effects in SAW Devices

Instructor: Ali-Reza Baghai-Wadji, Motorola, Inc.
Sunday (1:00 - 5:00 pm)

Course 3: SAW Devices for Public Communication Systems

Instructor: Jurgen Machui, Siemens Matsushita Components
Sunday (6:00 - 10:00pm)

Course 4: Medical Ultrasonic Transducer Array Design and Applications

Instructor: Charles S. Desilets, UltraSound Solutions
Sunday (8:00 am- 12:00 noon)

Course 5: Doppler Ultrasound

Instructor: Peter N. Burns, Medical Biophysics, U. of Toronto
Sunday (1:00 - 5:00 pm)

Course 6: Therapeutic Ultrasound

Instructor: Leon Frizzell, U. of Illinois
Sunday (6:00 -10:00 pm)

INVITED SPEAKERS and TOPICS

PLENARY TALK

Ernst-August Seyfarth, Utilizing Strain: Biomechanical Sensors in Multilegged Walking.

GROUP 1: MEDICAL ULTRASONICS

Natesa Pandian, 3D Echocardiography: Current Status and Future Directions

Ignacio Perez, Characterization of Ultrasonic Transducers by Laser Heterodyne Interferometry

Leon Frizzell, Sparse Random Ultrasound Array for Focal Surgery

Helmut Ermert, Signal Processing and Image Reconstruction for High Frequency Ultrasonic Imaging

Nico de Jong, Characteristics of Contrast Agents and 2-Dimensional Imaging

Kai Thomenius, Evolution of Ultrasound System Architecture

Thomas Shrout, Characteristics of Relaxor-based Materials for Transducers

GROUP 2: NDE & INDUSTRIAL APPLICATIONS

Tom Taylor, Two Novel Approaches to NDE Inspection Needs for Nuclear Power Industry

R. Bruce Thompson, Ultrasonic Measurement of Mechanical Properties

Stephen Martin, Gas Phase Chemical Sensors

N. Hsu and D. Xiang, Multi-Dimensional (X,Y,Z,Theta,f) Ultrasonic Material Scans

Kevin Parker, Sonoelasticity of Elastic Materials and Tissues

Walter Arnold, Acoustical Imaging with Nanometer Resolution Using Atomic Force Microscopy

GROUP 3: PHYSICAL ACOUSTICS

Gottfried Arlt, Loss Mechanisms in Ceramics

James Wolfe, Acoustic Wavefronts in Crystalline Solids

Joseph Dickey, Anderson Localization in One-Dimensional Acoustic Systems

Albert Migliori, Resonant Ultrasound Spectroscopy for New Materials and Nondestructive Testing

James Greenleaf, Direct Visualization of Strain Waves by Magnetic Resonance Elastography

Arthur Ballato, Piezoelectricity, New Thrusts

I. C. Chang, Progress of Acousto-Optic Tunable Filters

GROUP 4: SURFACE ACOUSTIC WAVES

Oswald Maenner, Advanced Numerical Methods for the Simulation of SAW Devices

Fred Hickernell, Measurement Techniques for Evaluating Piezoelectric Thin Films

Mauricio P. da Cunha, High Velocity Pseudo-Surface Waves

Yoshihiko Shibata, Piezoelectric LiNbO₃ and LiTaO₃ Films for SAW Device Applications

GUEST PROGRAM

A varied program is being planned to entertain and inform visitors who register for the Symposium as guests. Registration permits you to enjoy our continental breakfast each morning as well as the Monday evening Social Reception. A tour program, individually priced, is being developed that will immerse you in San Antonio's history, culture and attractions. In cooperation with the San Antonio Visitor's and Convention Bureau and Ms. Beatrice Moreno, Administrative Assistant at Southwest Research Institute, we plan to arrange an introductory slide show on Monday morning to set the stage for a round of tours of San Antonio that will include the famed Alamo, the King William Historic District, the Institute of Texan Cultures, and other historic and repository sites. A combination Riverwalk shopping/sightseeing tour and luncheon served aboard a river taxi is being planned.

Detailed schedules for all activities including breakfast location, exact times, prices, departure points, etc. will be available in the Symposium registration area, as well as at each breakfast.

GUEST TOURS

Monday, November 4, 1996

Full Day Tour of Historic San Antonio

Price per person (including lunch): \$35.00

Visit the sites that highlight the history of San Antonio. The Alamo, of course, will be the first stop. No visit to San Antonio is complete otherwise. Next stop is the San Jose Mission, the crown jewel of San Antonio area missions.

Lunch will follow at the Guenther House, a restored hotel and restaurant in the King William Historic Neighborhood, a tour of which follows afterwards to view its beautiful homes and streets.

Coming full circle, we stop next at La Villita, the original site of San Antonio. You will find historic rustic houses in this quarter, now home to artisans creating and selling their products. Browse, shop and enjoy.

Tuesday, November 5, 1996

Full Day Tour - Art in San Antonio

Price per person (including lunch): \$40.00

Today's tour will visit the two principal art museums of San Antonio. The McNay Art Institute was the residence of Elisabeth McNay. It was turned over to the city to house her art collection. The grounds surrounding the house are an attraction as popular as the interior.

Lunch will follow at Los Patios Restaurant. This tea room restaurant is very popular with the citizenry as well as visitors. The grounds of this scenic locale contains several boutiques to browse and shop in.

Following lunch, The San Antonio Museum will be the final stop. The museum was an old brewery, renovated to its present splendor and turned into a very special art museum.

Wednesday, November 6, 1996

Half-Day Shopping Tour

Price per person: \$15.00

Today's activity is a walking floating tour close to the hotel. We begin with a visit to the Made by Hand Mall. Here you can find many hand-crafted, one-of-a-kind gift items. One can find many Texas theme gift items in a broad range of prices.

Next comes what many believe is the jewel attraction for adults in San Antonio: Riverwalk. We will take a ride on one of the many river barges and watch the hotels, stores, street vendors and people as we float past. Then touch land again and plow the Riverwalk's many shops. The tour will conclude at one of the Riverwalk's many delightful restaurants.

Advance registration for tours is encouraged and should be made on the Advance Registration Form. Note that the tours have minimum registration levels in order to be offered, so your help in planning is appreciated!

EXHIBITS

The Exhibit Display will be in the Los Rios Foyer on the B-Level (Second Floor) of the Hyatt Regency Hotel. Companies will display their products, and representatives will be on hand to meet symposium attendees. The Exhibits will be in place from Monday morning until noon Wednesday.

As of July 26, the following firms have confirmed their intentions to exhibit their products:

- Boston Piezo-Optics, Inc.
- Ferroperm A/S
- MATEC Instruments, Inc.
- Material Systems, Inc.
- Panametrics, Inc.
- P.R. Hoffman Materials Processing, Inc.
- RITEC, Inc.
- Sawyer Research Products, Inc.
- Valpey-Fisher, Inc.
- W.L. Gore & Associates, Inc.
- UFFC Society

We welcome these organizations to the Symposium and wish them well. Any other companies interested in participating should contact LRW Associates.

ORGANIZING COMMITTEE

GENERAL CHAIR

Jeff Schoenwald
Thousand Oaks, Calif.

TECHNICAL CHAIR

B.T. Khuri-Yakub
Stanford University

FINANCE

Bob R. Potter
Vectron Technologies

LOCAL ARRANGEMENTS

Jerry Jackson
Southwest Research Institute

PUBLICITY

Doron Kishoni
Business Solutions - USA

EXHIBITS

Jian-yu Lu
Mayo Clinic

SHORT COURSES

Janpu Hou
Allied Signal Inc.

PROCEEDINGS

Moises Levy
University of Wisconsin-Mil.

SYMPOSIUM MANAGEMENT

LRW Associates

GUEST TOURS

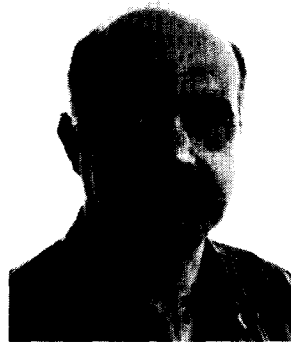
Beatrice Moreno
Southwest Research Institute

GENERAL CHAIR - Jeff Schoenwald

Dr. Schoenwald has twenty two years of experience as a research scientist specializing in fiber optics, ultrasonics, acoustics, radio frequency devices and computer automated optical inspection systems. For the last eleven years his special areas of interest have been acoustic and fiber optic sensors. He initiated sensor activity for robotics research development and established optics and acoustic sensor and device research at the Science Center, Rockwell Corporation. Dr. Schoenwald has sixty-six publications to his list as well as four patents, three of which are for fiber optic devices. The most recent patents are for fiber optic rotary and linear encoder position sensors.



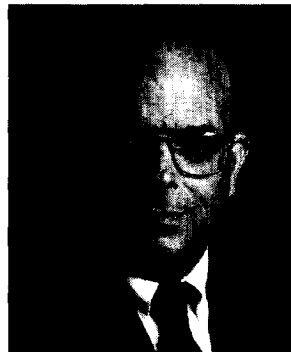
Jeff Schoenwald



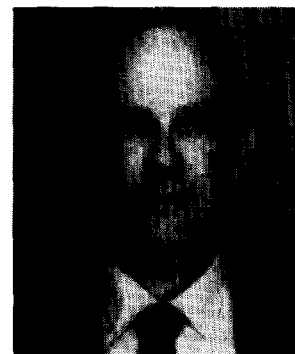
B.T. Khuri-Yakub



Bob R. Potter



Jerry Jackson



Doron Kishoni



Jian-yu Lu



Janpu Hou



Moises Levy



Beatrice Moreno

Dr. Schoenwald has been on multiple advisory boards including the Ultrasonics, Ferroelectrics and Frequency Control Society, Board of Directors of Southern California Region of the American Vacuum Society, Associate Editor for Sensors of the IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control and is a former Associate Editor for Sensors of the IEEE Journal of Robotics and Automation. He is internationally recognized and has been on the Advisory Committee for the British journal Ultrasonics. He chairs the IEEE standards subcommittee on ultrasonic sensors.

Jeff is also President of the Men's Club of his synagogue, which includes responsibilities like organizing the annual family picnic, planting trees for grounds beautification, raising money to support the education of Ethiopians evacuated to Israel several years ago, and fostering a softball team of aging boys of summer who even won a game last year.

On the lighter side, Jeff likes a good book, but he hasn't had the time to read one in years. Web Surfing has become an addiction, but Jeff prefers downhill skiing, if you want to know

the truth. Jeff's wife of 20 years, Sheri, is a psychologist, and is convinced that Jeff is crazy. His two kids, Elyse, 13, and Josh, 16, have always known this, but then kids know everything, don't they?

TECHNICAL CHAIR - Butrus (Pierre) Khuri-Yakub

Butrus T. Khuri-Yakub was born in Beirut, Lebanon. He received the B.S. degree in 1970 from the American University of Beirut, the M.S. degree in 1972 from Dartmouth College, and the Ph.D. degree in 1975 from Stanford University, all in electrical engineering. He joined the research staff at the E. L. Ginzton Laboratory of Stanford University in 1976 as a research associate. He was promoted to a Senior Research Associate in 1978, and to a Professor of Electrical Engineering (Research) in 1982. He has served on many university committees such as graduate admissions, undergraduate academic council of the school of engineering, and others.

Prof. Khuri-Yakub has been teaching both at the graduate and undergraduate levels for over 15 years, and his current

research interests include in-situ acoustic sensors (temperature, film thickness, resist cure, ...) for monitoring and control of integrated circuits manufacturing processes, micromachining silicon to make acoustic materials and devices such as air borne and water immersion ultrasonic transducers and arrays, and fluid ejectors, and in the field of ultrasonic nondestructive evaluation and acoustic imaging and microscopy.

Professor Khuri-Yakub is a fellow of the IEEE, a senior member of the Acoustical Society of America, and a member of Tau Beta Pi. He is associate editor of *Research in Nondestructive Evaluation*, a Journal of the American Society for Nondestructive Testing; and a member of the Ad-Com of the IEEE group on Ultrasonics Ferroelectrics and Frequency Control (1/1/94 - 1/1/97).

Professor Khuri-Yakub has authored about 300 publications and has been principal inventor or co-inventor on over 30 patents. He received the Stanford University School of Engineering Distinguished Advisor Award, June 1987, and the Medal of the City of Bordeaux for contributions to NDE, 1983.

FINANCE — Bob Potter

Bob R. Potter (M'72) was born in Salina, Oklahoma. He received his B.S. degree in EE from California State University at Long Beach in 1967, and the M.S. Degree in EE from Brigham Young University in 1970.

He serves as a Senior SAW Design engineer for Vectron Technologies in Hudson, New Hampshire. He entered the SAW field in 1973 at Texas Instruments Central Research laboratories and has spent the last 23 years in the SAW device field — 12 of those years as a director of engineering. He is the author of 20 technical articles and 2 patents.

Mr. Potter served as the Finance Chair for the 1980 IEEE Ultrasonics Symposium held in San Diego, Ca. In 1984-85 he served as the Technical Program Chair for the Bay Area UFFC Chapter and Chairman of the Chapter in 1986-87. In 1988 he formed the first UFFC Chapter in the Dallas, Texas area and remained Chairman of the chapter for several years. He has served on the Technical Program Committee for the International Ultrasonics Symposium since 1987 and is the Finance Chair for the 1996 Ultrasonics Symposium to be held in San Antonio, Texas.

LOCAL ARRANGEMENTS - Jerry Jackson

Mr. Jackson is the Director of the Nondestructive Evaluation (NDE) Research and Development Department. This Department conducts contracts aimed at developing new NDE sensors and systems and transferring the results to practical use in industry. The Department serves an international client base and Mr. Jackson frequently travels throughout the United States and many Asian and European countries.

Mr. Jackson's technical background and interests center on the electromechanical design of ultrasonic transducers and their interface to instrumentation, the calculation of acoustic fields produced in parts, and the use of elastic waves to measure flaw and material characteristics. He is a member of

IEEE, ASNT, ASM, and ASA. His recreational activities include skiing, flying, and reading.

PUBLICITY — Doron Kishoni

Dr. Kishoni received his Ph.D. from the department of Theoretical and Applied Mechanics at Cornell University, Ithaca, NY, where he conducted research in ultrasonic NDE. Prior to that he received his Practical Engineer degree in Mechanics and Electro-Optics from Ort Technikum Givataim; a B.Sc. from the department of Mechanical Engineering at the Technion, Haifa; and M.Sc. from the department of mechanics, materials, and structures, at Tel-Aviv University, where he worked on fatigue and residual stresses measurements, using destructive and nondestructive measurements methods.

Some of his professional career include founding and managing an electronics manufacturing company, serving as an officer in the military, and having an extensive industrial experience in diverse engineering fields.

As a recipient of National Research Council (NRC) awards three years consecutively ('84 - '87), he worked as a Resident Research Associate at NASA Langley, where he conducted research in advanced ultrasonic NDE and signal processing of composite materials, and received NASA group achievement awards.

Since then, he continued to work on developing advanced methods and techniques in NDE and signal processing for the Aging Aircraft and the Advanced Composites programs, through NASA grants and contracts as a Senior Research Scientist and a Research Professor in the department of Physics in the College of William and Mary. Since '92 he was also serving as an Adjunct Professor in the Applied Science Program in the College of William and Mary, teaching Data Acquisition and Signal Processing.

Among his current activities, he shares his time consulting with industrial companies; advising on organizational work flow analysis, process definitions and improvements, and quality improvements; advising on computer applications and networking, and developing customized computer programs.

Dr. Kishoni is holding ASNT level III certifications in several methods (UT, MT, PT, VT, AET). He is serving on the technical program committee of the IEEE Ultrasonics Symposium, as well as serving as the elected treasurer for the IEEE Hampton Roads Section.

EXHIBITS - Jian-Yu Lu

Jian-yu Lu (M'88) was born in Fuzhou, Fujian Province, People's Republic of China. He received the B.S. degree in electrical engineering in February, 1982, from Fudan University, Shanghai, China, the M.S. degree in 1985, from Tongji University, Shanghai, China, and Ph.D. degree in 1988, from Southeast University, Nanjing, China.

He has been an Assistant Professor of Biophysics at the Mayo Medical School since 1991, and an Associate Consultant at the Biodynamics Research Unit, Department of Physiology and Biophysics, Mayo Clinic, Rochester, MN, since 1992. From March, 1990 to December, 1991, he was a Re-

search Associate at the Biodynamics Research Unit, and from December, 1988, to February, 1990, he was a postdoctoral Research Fellow there. Prior to that, he was a faculty member of the Department of Biomedical Engineering, Southeast University, Nanjing, China and worked with Prof. Yu Wei. His research interests are in acoustic imaging and tissue characterization, medical ultrasonic transducers, and ultrasonic beam forming and propagation.

Dr. Lu is a recipient of the Outstanding Paper Award for two papers published in the 1992 IEEE Transactions on the UFFC, a recipient of the NIH FIRST Award, a recipient of the Biomedical Engineering Research Grant Award from the Whitaker Foundation, and a recipient of the 1992 Edward C. Kendall Award from Mayo Alumni Association, Mayo Foundation. He is a member of the IEEE UFFC Society, American Institute of Ultrasound in Medicine and Sigma Xi.

SHORT COURSES — Janpu Hou

Janpu Hou was born in Taipei, Taiwan. He received his B.S. degree from Cheng Kung University, and his M.S. and Ph.D. degree in Applied Mechanics from Princeton University, Princeton, New Jersey. His Ph.D. thesis work involved the development of a theoretical model to study the interaction between acoustic waves and electric fields in piezoelectric crystals.

Since joining AlliedSignal Inc. in Morristown, New Jersey in 1984, he has been involved in the design, fabrication and testing of acoustic wave devices and other RF/Microwave components. He also has been involved in the evaluation of new piezoelectric materials and their application to frequency control and signal processing devices. He is currently Manager-Asia of lighting system engineering of AlliedSignal MicroOptic Devices Inc. He has authored or co-authored more than twenty technical publications, and he has six U.S. patents and two European patents to his credits. He has been a member of the Ultrasonic Symposium Technical Program Committee since 1987.

Janpu, his wife Yumei, and their sons Dennis and Raymond reside in Bridgewater, New Jersey. He is active in community services and has been listed in American Leaders in Achievement for contribution to the Asian American Community in the U.S. He was the President of the Chinese Institute of Engineers in USA, Greater New York Chapter. He currently serves on the National Council of Chinese Institute of Engineers-USA.

PROCEEDINGS — Moisés Levy

Moisés Levy was born in Concepcion, Chiriqui, Republic of Panama, on April 8, 1930. He received a B.S. in Chemistry and an M.S. in Chemical Engineering from Cal Tech in 1952 and 1955, a Ph.D. in Physics from UCLA in 1963. Following industrial, military and academic positions 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.

Moisés has engaged in the ultrasonic investigation of superconducting materials, most recently 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 superconducting films.

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 in 1974, and in Atlanta in 1983. He was the General Co-Chairman for the IEEE 1990 Ultrasonics Symposium which was held in Hawaii. He has served on the technical program committee of the IEEE Ultrasonics Symposium and as chairman of the nominations committee of the IEEE Group of Sonics and Ultrasonics. He was Associate Editor of the IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control. He is presently co-editor of the *IEEE Ultrasonics Symposium Proceedings*. He is a Fellow of the Acoustical Society of America, of the American Physical Society and of the IEEE. He was one of the recipients of the UWM Foundation/Graduate School Awards for excellence in research. He was the Distinguished Lecturer for the IEEE-UFFCS in 1991-1992.

GUEST TOURS — Beatrice Moreno

Miss Moreno is responsible for overseeing and managing technical conferences, symposiums, meetings and workshops. These gatherings have had international, national, local and in-house meeting sites. The clients have included corporate, professional organizations and societies, government agencies, in-house project overviews, civic and educational organizations, and specialized subject data programs. Meetings may have required her presence or they may have been planned by her and carried out by the conference staff. Her involvement ranges from pre-conference to post conference workings.

Professional chronology: Clerk, Office of the City Clerk, City of San Antonio, 1966-1969. Clerk, Personnel Office, Southwest Research Institute, 1969-1972. Department secretary, Public Relations Department, SwRI, 1972-1982. Meeting Planner, Public Relations Department, SwRI, 1982-1993. Senior Conference Specialist, Department of Communications and Publications, SwRI, 1993-present. Certified Meeting Professional designation from the Convention Liaison Council in August, 1993.

Memberships: Meeting Planners International, 1982-present; (International board members, 1986-1988), Texas Hill Country chapter of MPI, 1982-present. (Charter member, officer, and board member, 1984-1992 and Meeting Planner of the year, 1993-1994). International Association of Hispanic Meeting Planners, 1994-present; (Charter member, and officer).

1996 IEEE Frequency Control Symposium 50th Anniversary Meeting

The 50th annual IEEE International Frequency Control Symposium (FCS) was held this year at the Hilton Hawaiian Village in Honolulu, Hawaii. This was probably the most pleasant conference setting of any FCS, being located on Waikiki beach within view of Diamond Head. In attendance, FCS 96 was the largest ever with 362 present, but only just so since FCS 95 had 358 participants. However, when measured by the 187 submitted papers, this year's FCS was far larger than previous meetings, surpassing FCS 96 by 57 papers. The location gave equal access to all Pacific Rim nations attracting 129 foreign participants from 28 countries worldwide.

The FCS is an IEEE sponsored meeting dealing with all aspects of precision frequency sources. FCS 96 emphasized: i) Time Scale Algorithms for incorporating super clocks; ii) Sub-nanosecond time dissemination, and iii) Resonant sensors, micro-resonators, and microwave resonators. These subjects and many others were covered in 15 different tutorial sessions which followed the regular FCS meeting. This year 141 FCS conferees attended these tutorials.

Three IEEE awards were presented at this conference. The W. G. Cady Award went to Albert Benjaminson, for his contributions to quartz resonator sensors, quartz crystal oscillators, dual-mode oscillators, and computer-aided design of oscillators. The I. I. Rabi Award was shared by Andre Clairon and Robert E. Drullinger, for significant contributions to the improvement of the SI second through the realization of superior accuracy primary standards. The C. B. Sawyer Memorial Award went to Charles J. Jensik, for leadership in the manufacture and design of precision AT, BT and SC-cut quartz resonators and oscillators.

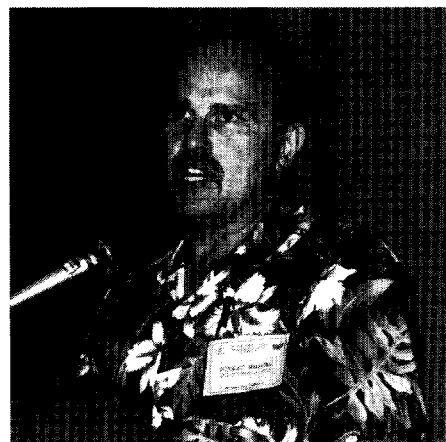
Next year's meeting will be held May 28-30 in Orlando, Florida at the Disneyworld Hilton. To request more information call 908-280-2024 or FAX 908-681-9314. A full summary of all previous FCS meetings can be found at <http://bul.eecs.umich.edu/~haddadin/uffc/>.

John Prestage
Publicity Chairman

Scenes from the 1996 IEEE Frequency Control Symposium



John Vig – General Co-Chair, Chuck Jensik, Mike Driscoll and Fred Walls – Technical Program Chair.



Don Malocha, president of the UFFC-Society, brings greetings to the FCS



Some guys just didn't get the message in the advance program, i.e., that "The general chairmen reserve the right to cut off the necktie of anyone who shows up in the sessions wearing a tie."



Mike Driscoll presenting the Sawyer Award to Chuck (Charles J.) Jensik.



**Professor Yamanouchi – General Co-Chair, Brian Rose – Presenter,
Al Benjaminson – Cady Award, and John Vig – General Co-Chair**



Al Benjaminson – Cady Award



Mr. and Mrs. Al Benjaminson

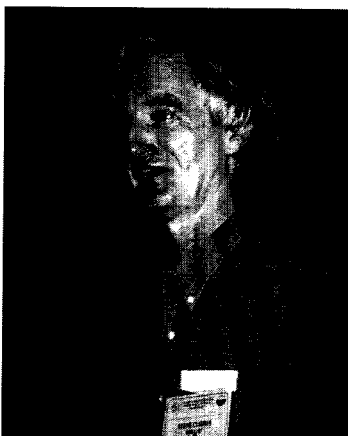
Scenes from the 1996 IEEE Frequency Control Symposium



Bob Drullinger – Rabi Award



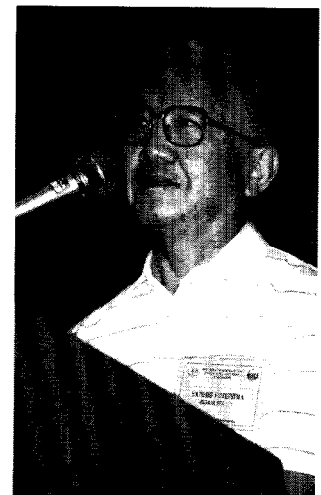
**Bob Drullinger – Rabi Award, Andrea DeMarchi – Presenter,
André Clairon – Rabi Award, Fred Walls – Technical Program Chairman**



André Clairon – Rabi Award



**President Malocha congratulates Dr. Fujishima
on his Fellow Award.**

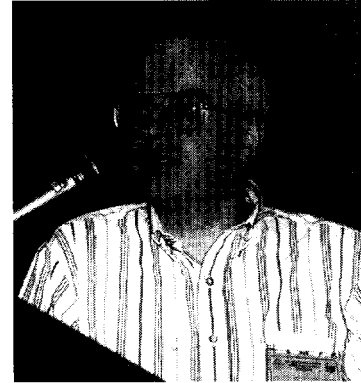


**Dr. Satoru Fujishima –
Fellow Award**

Scenes from the 1996 IEEE Frequency Control Symposium



President Malocha congratulates Dr. Parker as the UFFC-Society Distinguished Lecturer.



Tom Parker – UFFC-Society Distinguished Lecturer

OUTSTANDING PAPER AWARD

Winners of the Outstanding Paper Award for the 1995 Transactions on UFFC received their awards on June 5 at awards ceremonies during the Frequency Control Symposium in Honolulu, Hawaii. The winners are:

Robert C. Taber and Curt A. Flory

Hewlett-Packard Laboratories, Palo Alto, California

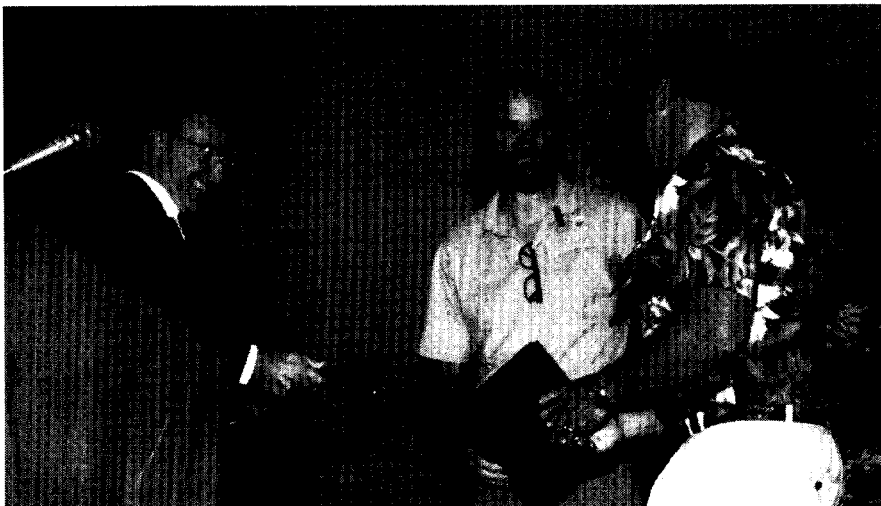
*"Microwave Oscillators Incorporating
Cryogenic Sapphire Dielectric Resonators"*

Pages 111-119, January 1995

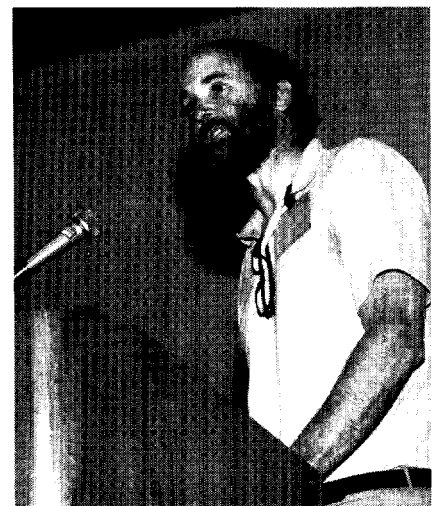
This paper describes the development of a commercially-viable high purity X-band signal source incorporating a sapphire dielectric resonator operated at low temperature. A key issue addressed in the paper was the elimination of undesired spurious resonance modes, accomplished with the aid of a very accurate and complete analysis model. Using the model as a precise guide, the authors were able to design a "window" in the frequency domain where no unwanted modes exist, and accurately place the desired mode in the center of this region.

The paper was selected for the Award because of its original work and the methodical development of each aspect of the device's design. In addition, the text flows smoothly without becoming bogged down in detail. The writing style of the paper is a model of clarity and conciseness. The authors tackled both the theoretical and experimental phases of their work with comprehensive techniques, and carried these out in rigorous detail. Material "constants" for sapphire needed to exercise the theoretical model were obtained to high accuracy in a special set of measurements over a broad range of temperatures. The authors were able to rearrange an overabundance of resonances via judicious choice of sapphire geometry. The authors' results on the finished signal-source resonator are among the most unambiguous measurements of noise in X-band devices reported in the literature.

By fortunate happenstance, selection of this paper for the Society-wide Outstanding Paper Award coincided with the 50th anniversary of the Frequency Control Symposium.



Outstanding Paper Award presented by Don Malocha to Curt Flory and Robert Taber of Hewlett-Packard Laboratories.



Robert Taber,
Outstanding Paper Awardee

ARTHUR W. WARNER, JR. 1915-1996

Thomas A. McClelland
Frequency Electronics, Inc.
55 Charles Lindbergh Blvd.
Mitchel Field, NY 11553
July 2, 1996

Arthur Woodward Warner, one of the giants of the frequency control field, died on June 27, 1996, at the age of eighty. He had been one of the first recipients of the Sawyer Award, in 1969, and of the Cady Award, in 1984. In 1995, he was also awarded the UFFC Society's Lifetime Achievement Award.

Art Warner was born on December 11, 1915. He received a BA degree in physics and mathematics from the University of Delaware in 1940, and an MA degree in physics from the University of Maryland in 1942. He began study towards a Ph.D. in physics at Lehigh University in the fall of 1941, where he was simultaneously employed as an instructor in the Physics Department.

He spent one year at Lehigh University. During this year a representative from Western Electric visited the campus to interview undergraduate students for jobs after graduation. This representative showed interest in several of Mr. Warner's students. Mr. Warner inquired as to whether Western Electric might also be interested in him. The representative asked about his particular technical experience, and upon learning that Mr. Warner had cut crystalline quartz, and was in the process of making measurements with the resulting crystal samples, hired him on the spot. Wartime needs for radio transmitters had resulted in a huge demand for quartz crystal technology. Western Electric crystal production skyrocketed during the war to a daily rate surpassing the pre-war annual production rate.

Mr. Warner worked for Western Electric from 1942 to 1943. During this time he actually spent considerable time at the Bell Telephone Laboratories, in Whippany, NJ. In 1943, he was hired by Bell Labs, where he spent the next 34 years of his professional career as a Member of the Technical Staff.

Initially at Bell Labs, he worked on improvements to the GT cut crystal plate, which during World War II represented the best frequency-temperature performance available in quartz crystals. However, he soon became interested in what was then the high frequency range for quartz crystals: 1 to 10 MHz. During the following years Mr. Warner made a series of discoveries which revolutionized the field of quartz crystal resonator technology. He was first to apply direct plating of electrodes onto crystal blanks in oscillator-crystal applications, as well as the first to use pure gold electrodes. He first recognized the advantage of contoured resonators, discovering that

although resistance might increase, resonator Q also increased. This led him to the study of high overtone modes which, like the contoured blank, had been considered the wrong approach because of the increase

in resistance with overtone. He was motivated in this study by the improved impedance match to available oscillator circuits of a 100 to 200 ohm crystal compared to a 10 ohm fundamental crystal. This line of study led Mr. Warner to the development of the 5 MHz, fifth overtone, AT-cut resonator. He systematically perfected this and similar designs during the 1950's and 60's. Many improvements, which are now part of the standard processing of precision crystals, were first implemented and perfected by Mr. Warner during this period: surface polishing, chemical etching, and high vacuum enclosures, to name a few.

During the late 60's and early 70's he began to work more and more on the development of new materials, and in particular on electro-optic materials for use in the development of fiber optics. He received numerous patents for devices related to this work, including a low insertion loss connector for optical fibers which was produced in large quantities for use in early fiber optic systems.

In 1977 he retired from Bell Laboratories, and began to work for Frequency Electronics, Inc. as a technical consultant. He worked at Frequency Electronics, Inc. in this capacity continuously from 1977 to 1995. During this time he actively participated in (and in many ways led) the development of practical doubly-rotated quartz crystal resonators with much improved acceleration sensitivity, and fast thermal stabilization. More recently he led the development of lateral field excitation designs for SC-cut resonators, for which he received a patent. He continued to participate in the development of quartz crystal resonator technology at FEI, where his experience, technical insight, and never flagging desire to "roll up his sleeves and get his hands dirty" bore fruit right up to his retirement last year (1995).

In his long career, Mr. Warner authored over 50 papers related to quartz and its application in precision frequency sources. In addition, he holds 14 patents related to this field. His pioneering work on precision quartz resonators represents the foundation upon which most advances in this field in the last 30 years have been built.



IEEE

Ultrasonics, Ferroelectrics, and Frequency Control Society

Administrative Committee

IEEE HEADQUARTERS

Director, Division IX	M. Kayton*
Secretary, TAB	R. T. Wangemann*
General Manager, IEEE	D. J. Senese*

SOCIETY OFFICERS

President	D. C. Malocha	<i>University of Central Florida, Orlando</i>
Vice-President	J. R. Vig	<i>U. S. Army Research Laboratory, Fort Monmouth</i>
Secretary-Treasurer	G. K. Montress	<i>Raytheon Company, Research Division</i>

ELECTED COMMITTEE MEMBERS

1994 - 1996	G. R. Johnson	<i>Sawyer Research Products Inc.</i>
1994 - 1996	B. T. Khuri-Yakub	<i>Stanford University</i>
1994 - 1996	R. Lerch	<i>University of Linz, Linz, Austria</i>
1994 - 1996	R. E. Newnham	<i>The Pennsylvania State University</i>
1995 - 1997	G. A. Alers	<i>National Institute of Standards & Technology</i>
1995 - 1997	J. Brown	<i>JB Consultants</i>
1995 - 1997	N. Chubachi	<i>Tohoku University</i>
1995 - 1997	J. R. Vig	<i>U. S. Army Research Laboratory, Fort Monmouth</i>
1996 - 1998	K. W. Ferrara	<i>University of Virginia, Charlottesville</i>
1996 - 1998	D. A. Hutchins	<i>University of Warwick</i>
1996 - 1998	T. Shoup	<i>Hewlett-Packard Company, Hewlett-Packard Labs</i>
1996 - 1998	J. G. Smits	<i>Boston University</i>

EX-OFFICIO COMMITTEE MEMBERS

Awards	R. H. Tancrell	<i>Tancrell Associates</i>
Chapters-Membership	E. S. Furgason	<i>Purdue University</i>
Fellows	R. M. White	<i>University of California, Berkeley</i>
Ferroelectrics	L. E. Cross	<i>The Pennsylvania State University</i>
Finance	H. van de Vaart	
Frequency Control	T. E. Parker	<i>National Institute of Standards & Technology</i>
Long Range Planning	J. F. Greenleaf	<i>Mayo Clinic</i>
Newsletter	F. S. Hickernell	<i>Motorola, Inc., SSTG</i>
Nominations	B. R. Tittmann	<i>The Pennsylvania State University</i>
Standards	A. Ballato	<i>U. S. Army Research Laboratory, Fort Monmouth</i>
Transactions	W. D. O'Brien, Jr.	<i>University of Illinois, Urbana</i>
Ultrasonics	G. W. Farnell	<i>McGill University, Montreal</i>
Past President (1994 - 1996)	J. F. Greenleaf	<i>Mayo Clinic</i>
Past President (1996 - 1998)	H. L. Salvo, Jr.	<i>Northrup Grumman Corp., Electronic Sensors & Systems Group</i>

*Non-Voting Member

President's Message

The society has been very busy making significant changes as to the way we do business. First, an adhoc Publications Board was formed to address issues related to all our publications and their formats (electronic, CD-ROM, etc.). The Board is chaired by Jan Brown and consists of the Transaction's Editor (Bill O'Brien), Newsletter Editor (Fred Hickernell), Vice-president (John Vig), junior past President (Harry Salvo), and myself (Don Malocha). At the last Administrative Committee (AdCom) meeting of the UFFC-S in Hawaii in June, it was approved to move the layout and manuscript processing of our transactions from the IEEE to a new group, the American Dairy Science Association (ADSA). There were three primary issues which were considered in the decision: quality of our publication, timeliness to publication, and cost. Several Board members visited both the IEEE and ADSA operations and there were considerable discussions before the vote. In summary, the Board and AdCom felt that both groups could provide comparable quality, that ADSA offered a shorter time to publication, and that the ADSA quote was significantly lower than the IEEE. Jan Brown made a successful presentation at two IEEE Technical Activities Board (TAB) meetings and did an excellent job in convincing TAB that our society had fully investigated this initiative and had met all the TAB policies for outside publishing. TAB approved at the June meeting and we hope to have our first ADSA manuscripts in the January issue. The UFFC Transactions will be an IEEE publication and this initiative will be completely transparent to our members. I should also note that the IEEE publications group was very cooperative and that if we find that ADSA is unable to meet our requirements, we can transition back to the IEEE for manuscript preparation.



After FCS'96 President Malocha, assisted by his wife Karen and son Curtis, toured the islands in search of new UFFC-S members.

The last issue of the Newsletter contained a final draft of the UFFC Constitution. There were no comments and the final draft is being submitted to IEEE TAB and HQ for their approval. The changes to the UFFC Bylaws should be presented to AdCom in November and a final draft presented to the membership in the Spring 1997 Newsletter.

The AdCom has become much more productive throughout the year by the use of email. Issues can be discussed and motions can be made and voted on without a formal meeting. Important issues are still being delayed to the actual AdCom meetings for a more thorough debate. A summary of the AdCom minutes is presented by the Secretary in this Newsletter.

The International Frequency Control Symposium in Hawaii in June was very successful and great fun. It marked the 50th Anniversary of the symposium and had an excellent historical session as a highlight. The 1996 International Symposium on Applications of Ferroelectrics was held in East Brunswick, New Jersey on August 18-21. The 1996 International Ultrasonics Symposium will be held in San Antonio, Texas on November 3-6, so get your boots and hats on and come join us.

I will give you a few other highlights of activities within the society:

- The society Home Page is on the Ethernet (<http://bul.eecs.umich.edu/uffc/>). This should provide the latest information on symposia, issues, etc. This activity is being coordinated through the UFFC Long Range Planning Committee and Emad Ebbini has provided considerable effort in its establishment and current form. Thanks to Emad and his students.
- The IEEE is continuing the process of a reorganization which will be very extensive and may continue for over a decade. Some details have been published in the IEEE Institute over the past several months for those who are interested in the details.
- AdCom has approved the 2000 IEEE Ultrasonics Symposium for Puerto Rico to be chaired by Madjid Belkerdid.
- AdCom approved the spending of \$8,750 for the 1996 Ultrasonics Symposium Committee to cost share expenses for publication of these Proceedings in CDROM format; in addition to the printed form.

If you would like to be considered for nomination as an UFFC Administrative Committee member, please contact Bernie Tittmann (b.tittmann@ieee.org). There are also a number of IEEE committee positions which are available to UFFC members who wish to serve. If you are interested please contact me for further details. The inside covers of the UFFC Transaction has useful addresses and information on committee chairs and AdCom members if you wish to contact them directly for comments or information.

Don Malocha
UFFC President
dcm@ece.engr.ucf.edu

NEW ADMINISTRATIVE COMMITTEE MEMBERS

Katherine Ferrara

Katherine Whittaker Ferrara (M'87) received the B.S. Degree in physical therapy in 1976 from the University of Pittsburgh, Pittsburgh, PA, the B.S. and M.S. in electrical engineering in 1982 and 1983, respectively, from the California State University, Sacramento, and the Ph.D. in electrical engineering and computer science in 1989 from the University of California, Davis.



From 1976 to 1980, she practiced physical therapy at Akron Children's Hospital and the Home for Crippled Children, Pittsburgh, PA. From 1983 to 1988, she worked for Sound Imaging, Inc. Folsom, CA and for General Electric Medical Systems, Rancho Cordova, CA in the areas of magnetic resonance and ultrasound imaging. From 1989-1993, she was an Associate Professor in the Dept. of Electrical Engineering at California State University, Sacramento. From 1993-1995, she was a principal member of the research staff at the Riverside Research Institute, New York, NY, and an Adjunct Associate Professor at Cornell University Medical School. She is currently an Associate Professor in the Department of Biomedical Engineering at the University of Virginia, Charlottesville. Her research interests are in the fields of biomedical signal and image processing and particularly in the use of ultrasound to map blood flow.

Dr. Ferrara is an Associate Editor of the *IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control* in the area of flow measurement techniques and applications. She is vice-chair of the technical program committee of the *IEEE Ultrasonics Symposium* in the area of medical ultrasonics and transducers.

David A. Hutchins

David A. Hutchins (M '81) received his B. Sc. and Ph. D. degrees in 1975 and 1978 respectively. He then worked as a Visiting Scientist at the H. C. Orsted Institute, Copenhagen, Denmark, investigating acoustic emission (AE) techniques. Postdoctoral Fellowships then followed at the University of Hull, England, researching into ultrasonic generation by pulsed lasers, and the Technical University of Nova Scotia, Canada, to study noise control engineering. In 1982 he joined the Department of Physics, Queen's University, Ontario, Canada as an Assistant Professor, and was promoted to Associate Professor in 1985. This was funded by the University Research Fellowship (URF) scheme. In 1988 he joined the Department of Engineering, University of Warwick, England, where he is currently a Reader in Engineering. He was appointed as an Adjunct Professor at Queen's University, Canada, in 1991, and was a Guest Professor at the Catholic University of Leuven, Belgium, in 1992.

He is an Associate Editor of the *IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control*, and a

member of the International Advisory Board of *Ultrasonics* and *Journal of Nondestructive Testing and Evaluation*. He has been a Guest Editor of a special issue of the *IEEE Transactions on Sonics and Ultrasonics*. He is a Fellow of the British Institute of Nondestructive Testing, and a member of the IEEE, the Acoustical Society of America and the Institute of Physics.

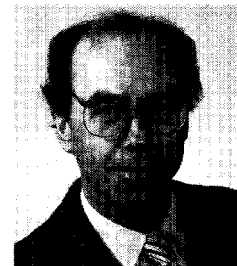
His current research interests include non-contact ultrasonic techniques, involving laser generation, and various detection methods for applications in NDE. Recent work has investigated micromachined air-coupled transducers. Other interests include tomographic ultrasonic imaging, high temperature applications, and the evaluation of materials such as fibre-reinforced composites and ceramics.

Thomas A. Shoup

Born in Washington, Pennsylvania, attended Washington and Jefferson College as an undergraduate and Washington University in St. Louis for graduate school, earning a PhD in physics. My dissertation topic was ultrasonic imaging for both materials and medical application. Joined Hewlett-Packard Laboratories upon graduation in 1981, concentrating on phased-array transducer design for medical imaging. Transferred to HP's medical group in 1984 to develop tissue characterization products specific to cardiac ultrasound. Is named inventor of HP's Acoustic Quantification product which measures real-time areas and volumes of the heart. Other products include phased-array CW Doppler transducers, high frequency pediatric transducers, and a 64x2 pediatric biplane transducer. Returned to HP Labs in 1996 as department manager for interactive media technology: high data rate communications to the home.

Jan G. Smits

Jan G. Smits (B.S. Physics 1966), Leyden University, the Netherlands (M.S. Physics 1970), Leyden University, the Netherlands; Ph.D. Electrical Engineering, University of Twente, the Netherlands, 1978) was born and educated in the Netherlands. In his Ph.D. thesis he devised a new method to characterize piezoelectric materials, to include accurate measurements of the real and imaginary parts of piezoelectric materials constants.



He has worked on thin film ZnO on Silicon as a Visiting Professor at Stanford University with Professor James Angell, Professor Pierre Khuri-Yakub, and Professor Gordon Kino in 1979 and 1980.

Since 1985 he is Associate Professor at Boston University, Boston, Massachusetts, where he works on microelectromechanical silicon devices. He is currently the Director of the Microelectronics Fabrication Laboratory, which includes the Sensors, Actuators and Micromechanics Laboratory. He was the first to make integrated piezoelectric bimorphs on

silicon by using piezoelectric ZnO on top of sputtered silicon nitride. He works on integrated piezoelectric bimorphs for use as accelerometers, tactile sensors, strain gauges, laser beam deflectors and the like. His work also includes extensive studies of the anisotropic etching properties of bulk silicon. He has published 21 refereed papers, 30 conference proceedings and holds 5 patents in this field.

He is a Senior Member of the IEEE, and teaches courses in electronics and silicon processing. He is Chairman of the IEEE Standards Committee on Actuators and Transducers, and

Member of the IEEE Standards Committee on Piezoelectric and Ultrasonics Based Sensors. He is the former Chairman of the Boston Chapter of the Ultrasonics, Ferroelectrics and Frequency Control Society. He is the Associate Editor of the IEEE Transactions on UFFC for the area of piezoelectric thin films, silicon processing, microelectromechanical systems.

With his wife Else, an artist, he takes care of their four cats. He and Else are avid museum visitors and collectors of old and new prints and paintings. He can open and close the button on his right sleeve cuff with one hand.

ADCOM BRIEFS

The Administrative Committee (AdCom) meeting of the Ultrasonics, Ferroelectrics and Frequency Control Society (UFFC-S) was called to order at 9:10 A.M., June 4th, 1996, by D. C. Malocha, UFFC-S AdCom President, at the Hilton Hawaiian Village Hotel, Honolulu, Hawaii. Introductions of attending members were conducted.

H. L. Salvo, Jr., moved to approve the minutes of the November 7th, 1995 UFFC-S AdCom meeting, with one correction noted. The motion was seconded by G. R. Johnson. The motion passed.

G. K. Montress, UFFC-S Secretary/Treasurer, reported that six motions were handled by e-mail balloting since the last UFFC-S AdCom meeting. Procedures have been put in place to properly record the results of e-mail (or FAX) ballots, and include the results in the minutes of the next scheduled UFFC-Society AdCom meeting.

D. C. Malocha indicated that UFFC-S Chapters are now functioning in Russia and Germany. The German UFFC-S Chapter has a WWW Home Page.

D. C. Malocha reported on the most recent IEEE TAB meeting which he attended. Organizational changes are currently underway at IEEE headquarters, although the process is seen to be evolutionary, rather than revolutionary. There will be a change in the deadline for Submission of IEEE Fellow nomination forms in 1997, and plans are also in process to have the necessary forms available earlier than in the past.

G. K. Montress reported that the UFFC-S Conference Manual is now available, and has been sent to the General Chairs and Technical Program Chairs for several upcoming symposia. Copies have also been sent to the UFFC-S Standing Committee Chairs (Ultrasonics, Ferroelectrics, and Frequency Control).

F. S. Hickernell reported that he is still working on arrangements for the UFFC-S Membership Directory, which was approved at the last UFFC-S AdCom meeting. The status of the membership directory will be updated at the next UFFC-S AdCom meeting.

W. D. O'Brien, Jr. and J. Brown moderated a discussion of publishing the UFFC-S Transactions outside of IEEE Publishing Services. The UFFC-S AdCom approved a motion to proceed with arrangements for outside preparation and print-

ing of the UFFC-S Transactions by the American Dairy Science Association (ADSA). This transfer is to be accomplished by January 1st, 1997. J. Brown, UFFC-S Publications Board Chair, will be responsible for implementing this decisions such that the January 1997 issue of the UFFC-S Transactions will be prepared and printed by ADSA.

F. S. Hickernell, UFFC-S Newsletter Editor-in-Chief, presented an oral report. The deadline for submission of material for the October 1996 (Fall) issue of the UFFC-S Newsletter is August 15th, 1996.

H. van de Vaart, UFFC-S Finance & Operations Committee Chair, presented oral and written reports. The UFFC-S AdCom approved the 1997 UFFC-S budget as submitted. The UFFC-S has a surplus of approximately \$615k at this time.

R. E. Newnham indicated that the 1994 International Symposium on Applications of Ferroelectrics (ISAF) is complete, now that the Final Financial Report and audit are done. The surplus was approximately \$20k. The venue for the 1998 ISAF will be selected later this year.

J. R. Vig reported that the 1995 IEEE International Frequency Control Symposium's technical program and activities were very successful; however, due to a decrease in anticipated outside support for foreign participant travel, a loss of approximately \$3k was incurred. The Final Financial Report and audit have been completed, thereby closing-out this symposium.

J. R. Vig reported that arrangements for the 1996 IEEE International Frequency Control Symposium (the 50th anniversary) in Honolulu, Hawaii, are proceeding well. The advance registration is very good, and the tutorial sessions are popular as well.

T. E. Parker, UFFC-S Frequency Control Standing Committee Chair, reported that the 1997 symposium will be in Orlando, FL, the 1998 symposium will be in Los Angeles, CA, and the 1999 symposium will be held jointly with the European Frequency & Time Forum, in Besancon, France.

H. van de Vaart provided an oral report on the 1994 IEEE International Ultrasonics Symposium, held in Cannes, France. The meeting was extremely successful; however, due to some unanticipated additional expenses, there will be a loss of approximately \$3k. The Final Financial Report and audit will be submitted shortly.

F. S. Foster reported that arrangements for the 1997 IEEE International Ultrasonics Symposium (Toronto, Ontario, Canada) are proceeding nicely. The Hotel will be the Marriott. K. W. Ferrara has agreed to serve as Technical Program Chair. The dates for the conference are 5-8 October 1997.

N. Chubachi is preparing a proposal to hold the 1998 IEEE International Ultrasonics Symposium in Sendai, Japan. The proposal will be discussed at the next UFFC-S AdCom meeting.

B. T. Khuri-Yakub is preparing a proposal to hold the 1999 IEEE International Ultrasonics Symposium in San Francisco, California.

M. A. Belkerdid is investigating the possibility of holding the 2000 IEEE International Ultrasonics Symposium in San Juan, Puerto Rico. Potential dates are September 24-26, 2000.

A motion was approved to continue UFFC-S AdCom matching funds to support student and foreign attendees at the three 1996 UFFC-S sponsored symposia (Frequency Control, Applications of Ferroelectrics, and Ultrasonics). A second motion was approved, providing matching funds to support student and foreign travel beginning in 1997, and continuing until such time as the UFFC-S AdCom should decide to alter or otherwise terminate the matching funds for travel support.

E. S. Furgason, UFFC-S Chapter/Membership Services Committee Chair, presented oral and written reports. The UFFC-S's membership continues to grow at a modest rate, although IEEE membership has been dropping in recent years.

R. M. White, UFFC-S Fellows Committee Chair, reported that two UFFC-S members were elected 1996 IEEE Fellows, namely: J. M. Crowley and S. Fujishima. Nomination paperwork has been submitted for nine UFFC-S candidates to be considered for 1997 IEEE Fellow selection. Those selected will be announced in early 1997.

B. R. Tittmann, UFFC-S Nominations Committee Chair, presented oral and written reports. The 1997 election for new UFFC-S AdCom members will be held this Summer (1996). The slate of candidates was approved by the UFFC-S AdCom. The candidates for election are: A. Safari, K. Uchino, D. R. Pape, Y.-K. Yong, R. Potter, and W. Hunt from IEEE Regions 1-7, and K. Yamanouchi and Y. Shimizu from IEEE Regions 8-10. Three candidates from Regions 1-7 will be elected, along with one candidate from Regions 8-10.

The UFFC-S Bylaw revisions were tabled until the next UFFC-S AdCom meeting since J. F. Greenleaf, UFFC-S Long Range Planning Committee (Ad Hoc) Chair, was unable to attend this UFFC-S AdCom meeting.

A motion was introduced that the next UFFC-S AdCom meeting be held at 9:00 A.M., on November 3rd 1996, in conjunction with the 1996 IEEE International Ultrasonics Symposium, in San Antonio, Texas. The motion passed.

The UFFC-S AdCom meeting adjourned at 5:14 P.M.

Gary K. Montress
UFFC-S Secretary/Treasurer, 1996

Chapter Activities

Boston Chapter

The Boston section had a full season of 8 speakers for the 1995-96 season. Attendance ranged from 15 to an astounding 55 for Stuart Foster's talk. As in past years, Raytheon Company provided space for our monthly meetings. Following is a list of our speakers and their talks:

- September 14, 1995
Chemical Sensing with Surface Acoustic Wave Devices
Robert Falconer - Andersen Laboratories, Inc.
- October 25, 1995
Three-Dimensional Echocardiography
Natesa G. Pandian, MD, Tufts University - New England Medical Center
- December 6, 1995
Micromachined PZT on Silicon for Underwater Acoustic Imaging
J. Bernstein, K. Houston, L. Niles - Draper Laboratories
- January 17, 1996
Field Biased Pyroelectrics for Uncooled Infrared Imaging
Bernard Kulwicki - Texas Instruments
- February 13, 1996
Medical and Biological Imaging with High Frequency Ultrasound
F. Stuart Foster, Distinguished Lecturer for the UFFC-S
Sunnybrook Health Science Center, University of Toronto
- March 14, 1996
Real Time Measurements in Echocardiography
Sharon Gadonniex - Hewlett-Packard Co.
- April 17, 1996
Ultrasound-mediated Transdermal Drug Delivery
Samir Mitragotri - MIT Dept. of Chemical Engineering
- May 22, 1996
Physical Vapor Deposition of PZT films for Multi-layer Ultrasonic Transducer Fabrication
Robert Kline-Schoder - Creare, Incorporated

Our officers for the year were Bill Ossmann, Chairman; Jerry Jennings, Vice-chairman; and Gary Montress, Secretary-Treasurer. Our Officers for the 1996-97 season are Jerry Jennings, Chairman; Gary Montress, Vice-chairman; and Bob Potter, Secretary-Treasurer.

Bill Ossmann
1995-96 Chapter Chairman
UFFC, Boston Section

WELCOME NEW UFFC-S MEMBERS

We welcome the following new members to the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society who have joined in the past five months.

ARIZONA

Anderson, Clifford L.
Attarian, Robert G.
Ivanov, Vadim
Newhouse, Michael N.

CALIFORNIA

Buhler, Steven A.
Condit, Jeff
Demmin, Jeffrey C.
Her, Lang C.
Hildebrant, Paul D.
Karasoff, Michael D.
Price III, Frank M.
Thakoor, Sarita
Waqar, Rafat

FLORIDA

Ewart, Lynn M.
Miliani, Pablo R.
Proulx, Robert R.
Whitney, John D.

GEORGIA

Wang, Johnny

ILLINOIS

Holloway, Owen F.

KENTUCKY

Murthy, Ashok

LOUISIANA

Keynton, Robert S.

MASSACHUSETTS

Brown, David A.
Fallon, John P.
Kern, Robert H.
Serra, Michael J.
Wang, Liang-min

MARYLAND

Chang, Victoria Y.

MICHIGAN

Baltaji, Fawaz
Brei, Diann E.
Duda, Jr., Edward C.

MINNISOTA

Talpade, Dynanesh

NORTH CAROLINA

Handa, Minoru
Mathur, Amitabh
Mills, David M.
Nishimori, Yasushi

Ogawa, Sinji
Patel, Raj M.
Shinohara, Genta
Tokuda, Koji
Yano, Koji
Zhang, Jimin

NEW HAMPSHIRE

Chen, Dongpei

NEW JERSEY

Kelly, Joseph M.
Safari, Ahmad
Sundburg, William J.

NEW MEXICO

Vangala, Reddy

NEW YORK

Altizer, James C.
Feleppa, Ernest J.
Pomyalov, Andrei
Williams, Kurt E.

OHIO

Reid, Jr., James R.

OKLAHOMA

Ross, Robby M.

OREGON

Grimes, Kenneth M.

PENNSYLVANIA

Georgiou, Georgia
Ho, James

TENNESSEE

Wooden, Scott E.

TEXAS

Hauser, Matt R.
Rutherford, Arthur R.
Subramanian, Rajan

VIRGINIA

Saliba, Solly N.

WASHINGTON

Brown, Patrick R.
Shetlar, Thomas J.
Wiesner, Dirk

ARGENTINA

Callegare, Moira L.
Corradini, Javier P.
Pucci, Ivana Silvia

AUSTRALIA

Battle, David J.

BOTSWANA

Motsoela, Tsietsi,

BRAZIL

Barbar, Jamil S.
Guimaraes E. Silva, Luiz C.
Suzuki, Carlos K.
Vieira Neto, Joao B.

BULGARIA

Trifondv, Tihomir S.

CANADA

Hyland, William A.
Kentley, Eric W.
Kipens, George A.
Lam, Kwok Wai
Scepanovic, Dragan
Smith, Jeremy

COLOMBIA

Blandon, Jaime A.

CUBA

Moreno, Eduardo

DENMARK

Poulsen, Jens K.

EL SALVADOR

Ruiz Cerna, Gustavao E.

FRANCE

Picon, Odile
Remy, Claverie
Wiegandt, Caroline

GERMANY

Chilla, Edward
Duhamel, Andre
Enderlein, Janos
Harbach, Friedrich
Hesjedal, Thorsten
John, Christoph
Junguickel, Frank R.
Maier, Hans Peter
Vogt, Michael
Wall, Bert
Weinmann, Michael R.

INDIA

Chordia, Alok
Pillay, Radhamani V.

INDONESIA

Tjahjadi, Laode W.

IRAN

Fatemizadeh, Emad

ISRAEL

Tevlin, Maksim

ITALY

Bellineto, Enrico
Faella, Francesco
Fasolo, Daniele

JAPAN

Ieki, Hideharu
Koyama, Mitsuaki
Tanaka, Masako
Yamauchi, Satoshi

KOREA

Dokko, Philip C.
Kang, Chong-Yun
Kim, Hoyong
Kim, Keecheon
Kim, Kyung Jo
Kim, Yoonho
Lee, Kyungwoo
Lee, Young Jin
Park, Jongchul
Yoo, Ju Hyum

MALAYSIA

Awang, Zaiki

POLAND

Lamperski, Jan

RUSSIA

Ionov, Boris P.
Krasnikova, Svetlana
Sandler, Moisey S.
Sveshnikov, Boris V.

SCOTLAND

Nandi, Asoke K.
Walker, Virginia A.

SPAIN

Ruiz, Jose L.

SWEDEN

Johannessen, Ole G.

TAIWAN

Jya, Pen-Tin

TURKEY

Turali, Tung

UKRAINE

Shmaly, Yury S.

ZIMBABWE

Tachiona, G.

Call for Manuscripts

Solicitation of Manuscripts for IEEE Potentials Magazine

The IEEE Potentials Magazine is soliciting manuscripts for all aspects of electrical/electronic/computer engineering and computer science the IEEE Potentials Magazine goes to all student members of the IEEE (USA and Canada), presently about 40,000. The level of the article is addressed to the undergraduate student and has several objectives : interesting the student in a topic for further study, explaining technological advances in an area, a forum for technical ideas, articles of interest technically. It should be stressed that the article should not try to mystify the student but to enable the student to learn more about technical material that he/she may/may not become acquainted with in their formal course work. Length of article can be no more than 10 manuscript pages (8 1/2-11) reduced by number of figures—shorter papers also acceptable. The manuscripts are reviewed by: students, faculty, researchers in area and then a decision is made as to whether to publish or not. If interested, contact:

Dr. George W. Zobrist
Editor, IEEE Potentials Magazine
Department of Computer Science
1870 Miner Circle
University of Missouri-Rolla
Rolla, MO 65409
phone: 573-341-4492
fax: 573-341-4501
email: zobrist@umr.edu

Further information can be found at:
<http://www.cs.umsr.edu/potentials>

IEEE FELLOW NOMINATIONS

It is not too early to be thinking about Senior Members of the UFFC-Society that you would like to nominate for the Fellow grade. Nominations will be due in March of 1997 and forms will be ready by November, 1996. To refresh your memory on the process it is described in the paragraphs that follow which focuses on the IEEE Fellow Committee and how it operates.

The IEEE Bylaws define the Fellow grade as one of unusual distinction in the profession, to be conferred only by initiation of the Board of Directors upon a person of outstanding and extraordinary qualifications and experience in the IEEE designated fields, who has made important individual contributions to one or more of those fields. A nominee must be a Senior Member of the Institute and have been a member in any grade for at least five years prior to January 1 of the year of election.

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

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

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

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

The Fellow Committee depends upon the Fellow grade references to comment on the candidate's specific

achievements which they are qualified to judge.

The Fellow Committee will consider brief letters of endorsement from IEEE sections, chapters and committees.

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

1. Individual contributions as engineer, scientist, originator, technical leaders, or educator.
2. Evaluation by an IEEE society. Note that only one IEEE society evaluation is to be submitted for each candidate. The nominator is responsible for selecting the IEEE society that best reflects the candidate's field of technical accomplishments.
3. Tangible and verifiable evidence of technical accomplishments, such as technical publications, patents, reports, or published descriptions of products, facilities, and/or service.
4. Opinions of confidential Fellow references who are qualified to judge the work of the candidate (where possible, these should be associated with other than the candidate's own organization).
5. Service to IEEE and its predecessors, the AIEE or IRE.
6. Professional engineering service other than the IEEE.
7. Opinions of endorsers.
8. Total years in the profession.

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

If you are interested in nominating one of our UFFC Society members you may obtain the necessary forms from Joann Kilyk, IEEE Fellow Committee, 445 Hoes Lane, Piscataway, NJ 08854, (908) 562-3843.

The following is a list of members of the UFFC-S who are Fellows of the IEEE.

Congratulations – Floyd Dunn

Congratulations to Floyd Dunn, Professor Emeritus of Electrical and Computer Engineering, University of Illinois who received the prestigious IEEE Edison Medal. The medal is sponsored by Hitachi Ltd., Mitsubishi Corporation, and Toshiba Corporation of Japan. In answer to the question: "Who or what inspired you to take the career path you have chosen", this was Professor Dunns response. "The inspiration, guidance, and preparation for my career on bioacoustics (bioultrasonics) was that of Professor William J. Fry of the University of Illinois - my thesis advisor, faculty mentor and personal friend. The support and stimulation of my colleagues in our small, close-knit field encouraged investigation of significant questions."

IEEE Fellows in the UFFC Society

John D. Adam	G. W. Farnell	R. S. Mackay	Bikash K. Sinha
E. L. Adler	Francis J. Fry	Albert Macovski	Leland P. Solie
Robert Adler	Satoru Fujishima	Charles Maerfeld	Ikuo Tanaka
Akihiro Aketani	Fred E. Gardiol	T. Makimoto	Roger Tancrell
John Andrews	R. Gerhard-Multhaupt	Donald C. Malocha	William J. Tanski
Bert Auld	James F. Greenleaf	Bruce McAvoy	S. W. Tehon
A. Ballato	Thomas W. Grudkowski	A. H. Meitzler	Donald O. Thompson
L. L. Beranek	Gene H. Haertling	Nobuo Mikoshiba	R. E. Thompson
D. A. Berlincourt	E. Hafner	Shota Miyairi	Harry F. Tiersten
Henry L. Bertoni	Gerald R. Harris	Gary K. Montress	Bernhard R. Tittmann
Lief Bjorno	Helmut W. Hellwig	R. A. Moore	Chen S. Tsai
J. V. Bouyoucos	Eric Herz	Arye Nehorai	A. Uhler, Jr.
Mack A. Breazeale	F. S. Hickernell	V. L. Newhouse	Sotirics J. Varaviolos
C. B. Burckhardt	Bill J. Hunsinger	Tatsuji Nomura	Herman van de Vaart
Charles A. Cain	Masaru Ieuka	William D. O'Brien, Jr.	Jacques Vanier
C. K. Cambell	F. H. Ingerslev	Matthew ODonnell	John R. Vig
Paul H. Carr	Robert A. Johnson	A. A. Oliner	Robert C. Waag
S. D. Chatterjee	Yukio Kagawa	John M. Owens	G. Wade
N. Chodorow	Reynold S. Kagiwada	Emmanuel P. Papadakis	Robert S. Wagers
H. W. Cooper	Peter Kartaschoff	Kevin J. Parker	Kikuo Wakino
James A. Cronvich	Irving Kaufman	Thomas E. Parker	Stephen Wanuga
Leslie E. Cross	Buturus T. Khuri-Yakub	Bernard Picinbono	Kiyotaka Wasa
Joseph M. Crowley	R. La Rosa	John M. Reid	W. Welkowitz
C. C. Cutler	C. E. Land	Paul Rosenberg	R. M. White
Louis J. Cutrona	Pua Lee	Peter H. Russer	H. K. Wickramasinghe
Eugene J. Dieulesaint	Moisés Levy	W. J. Sarjeant	Werner Wiesbeck
Michael M. Driscoll	Peter A. Lewin	O. P. Schmitt	R. C. Williamson
Floyd Dunn	H. C. Lin	G. M. Sessler	Kazuhiko Yamanouchi
Lawrence N.	M. S. F. Lucas	Gustave Shapiro	L. T. Zitelli
E. P. Eernisse	L. C. Lynnworth	Yasutaka Shimizu	
Irving Engelson	J-A-M Lyon	K. Kirk Shung	

PRINTING and PROPOSED REVISION of ANSI/IEEE STANDARD 176 - 1987

“ANSI/IEEE STANDARD on PIEZOELECTRICITY”

The IEEE Standards Board has established a policy to have every IEEE Standard reviewed by the appropriate committee and technical community every five years. The result of this review is a request to reaffirm (renew unchanged), to revise (to make minor or major changes), or to withdraw (remove support and recognition). Since more than five years have elapsed since the last revision in 1987, we have had to obtain extensions from the IEEE Standards Board. The appropriate committee for the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society is the Standards Activities Standing Committee of the Society Administrative Committee. This committee is currently chaired by Arthur Ballato. IEEE Standards are advisory in nature and are never requirements. This wholly voluntary use of IEEE Standards is described in the second page of ANSI/IEEE Standard 176-1987 and in the second page of ANSI/IEEE Standard 180-1986, which was printed in the IEEE TRANSACTIONS on ULTRASONICS, FERROELECTRICS, and FREQUENCY CONTROL, Vol. 38, No. 6, November, 1991, pages 534-555.

The technical upkeep of ANSI/IEEE Standard 176 is the responsibility of the Committee on Piezoelectric Crystals, which is a subcommittee of Arthur Ballato's Standing Committee. This committee is currently chaired by Thrygve R. Meeker. An IEEE Standards Project Authorization Request (PAR) for a modest revision in four main areas was approved by the IEEE Standards Board in December 1994. These areas are:

1. Correct errors;
2. Include the usage of the former [1949] system of giving signs to certain elasto-piezo-dielectric material constants of quartz;
3. Change the crystallographic nomenclature and conventions for some optically active biaxial crystals; and
4. Change the section on the use of resonator measurements to determine values for material constants to include the use of recent improvements in the theory of piezoelectric resonators.

Some details on the four areas of revision are discussed in the article that introduces the standard in the September UFFC Transactions.

Some members and friends of the Committee have been reviewing ANSI/IEEE Standard 176-1987, and some suggestions and comments have already been received. In order to have the broadest possible base of suggestions and comments included in the preparation of the revision, the IEEE Standards

Board has approved the printing of ANSI/IEEE Standard 176-1987 in the UFFC Transactions. The printing of Standard 176 has the sole purpose of facilitating and improving the revision process.

The committee values comments and suggestions from anyone with an interest in improving the usefulness of this standard. Some suggestions, such as a proposal to include complex material constants to describe dissipative processes, will have to wait for the next revision cycle.

With the comments in the Transactions as a starting point, please send suggestions and comments as soon as possible to:

Thrygve R. Meeker
2956 Lindberg Avenue
Allentown, Pennsylvania 18103-5508 USA
Voice Telephone: 610-437-3310
Facsimile Telephone: 610-437-0933

The revision process is already underway and your input is really needed. Drafts of suggested paragraphs and specific literature references are especially helpful. Any help on reviewing and editing manuscript drafts is especially appreciated. If you would like to help or if you need more information, please contact Thrygve R. Meeker.

The preparation and revision of standards is important to the maturing development of any field of professional activity. Those who serve on standards committees greatly appreciate the cooperation of people with strong interests in piezoelectric resonators.

If you have recent addresses, telephone numbers, and facsimile numbers for any of the following people, please send them to me so that I can update my committee mailing list:

S. F. Adam, Charles Adams, W. Albert, D. C. Bradley,
A. A. Comparini, Lawrence N. Dworsky, Paul Fenton,
J. Fiedziszka, S. Fujishima, Jean-Jacques Gagnepain,
D. Hall, W. H. Horton, C. K. Hruska, Alfred Kahan,
J. C. King, C. E. Land, J. E. May, Wallace A. Smith,
Daniel Stevens, S. Velska, S. Wanuga, Jr., Thomas Young
Please inform T. R. Meeker if you would like to serve on the IEEE Subcommittee on Piezoelectric Crystals.

Thank you.

Thrygve R. Meeker
Chair

IEEE UFFC Subcommittee on Piezoelectric Crystals
July 24, 1996

Standards Activities Report

1. Our society is currently responsible for eleven items, eight standards and three projects.

2. *Piezoelectric Crystals* — T.R. Meeker (176-1987 and 177-1978)

The present version of Standard 176 is to be published in our Transactions along with proposed revisions; it will then be revised based on comments received as a result of the publication. Revision was due at the Standards Office by May 1996, but an extension has been requested. The revision of Standard 177 will then follow.

3. *Ultrasonics in Medicine* — P.D. Edmonds (790-1989)
No activity.

4. *Time and Frequency* — J.R. Vig (1139-1988 and 1193-1994)

SCC27 on Time and Frequency is in the midst of a major revision of Standard 1138-1988, "IEEE Standard Definitions of Physical Quantities for Fundamental Frequency and Time Metrology." The revision is about 50% done; its completion is expected by the end of 1996.

5. *Sensors* — J. Schoenwald (P1182)

"IEEE Guide to Terms and Definitions of Ferroelectric, Frequency Control, and Ultrasonic Sensors" is in limbo until after the San Antonio meeting, 11/96.

6. *Ferroelectrics* — A.H. Meitzler (180-1986);
G.H. Haertling (P1211)

Standard 180-1986 has been administratively withdrawn by the IEEE Standards Board. The collaboration to revise 180 will involve members of Penn State University, under the lead of Eric Cross, who heads up the Ferroelectrics Committee.

PAR 1211 — "Standard Definitions, Symbols and Characterization of Ferroelectric Thin Films, Memory Cells and Device Structures" has also been administratively withdrawn by the IEEE Standards Board.

7. *Surface Acoustic Wave Devices* — E.L. Adler
(1037-1992)

Subcommittee is being reconstituted; the issue of revising the SAW standard will be addressed during the coming year.

8. *Actuators and Transducers* — J.G. Smits
Subcommittee is in process of formation. (no change)

9. *Piezomagnetic Technology* — S.L. Ehrlich (319-1990)
Standard is in process of being reaffirmed. Kathy Doty (IEEE Standard Dept.) is sending out ballots to subcommittee members; the next step is a vote by the entire UFFC Standards Committee.

10. *Acousto-Optics* — D.L. Hecht (P1022)

PAR 1022 was administratively withdrawn by the IEEE Standards Board on 9/21/95.

Arthur Ballato
Chairman, Standards Activities



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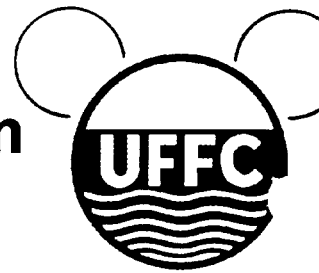
 **IEEE** The Institute of Electrical and Electronics Engineers, Inc. 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331 USA



1997 IEEE International Frequency Control Symposium

May 28 to 30, 1997

Hilton Hotel, Disney World, Orlando, Florida, U.S.A.



Sponsored by The IEEE Ultrasonics, Ferroelectrics, & Frequency Control Society

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NIST

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Local Arrangements Chair

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Tutorial Chair

Lute Maleki
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lmaleki@voyager.jpl.nasa.gov

CALL FOR PAPERS

Deadline for Submission: January 6, 1997

The 51st consecutive meeting of the Frequency Control Symposium will be held at Walt Disney World in Orlando, Florida, USA. This Symposium is the leading international technical forum for research and development directed towards frequency control and precision timekeeping.

Authors are invited to submit papers dealing with recent and original work of interest to the frequency control community in the following subject categories:

Group 1

- A. Fundamental Properties of Materials**
- B. Theory and Design of Resonators and Filters**
- C. Sensors and Transducers**

Group 2

- A. Oscillators - BAW and SAW**
- B. Oscillators - Microwave to Optical**
- C. Synthesizers and Other Circuitry**
- D. Noise Phenomena and Aging**

Group 3

- A. Atomic and Molecular Frequency Standards**
- B. Frequency and Time Coordination**
- C. Measurements and Specifications**
- D. Applications of Frequency Control**

The following topics are of special current interest:

- Experimentally determined constants of new piezoelectric materials
- Device design and production performance of devices using new piezoelectric materials
- Drive level dependence and frequency jumps in BAW resonators
- Microwave to optical frequency synthesis

One copy of a summary (EMail preferred) in sufficient detail for evaluation of the proposed paper (at least 300 words, two pages maximum) should be sent to **Wendy Ortega Henderson, NIST, Time and Frequency Div., 325 Broadway, Boulder, CO 80303, USA; EMail: ortegaw@boulder.nist.gov** Each summary **MUST** include the responsible author's name, address, telephone and FAX numbers, and EMail address, if available. On the first page of the summary, indicate one of the subject categories listed above, and the type of presentation preferred, i.e., oral or poster session, or no preference. Authors will be notified the Program Committee's decision by 18 March, 1997. Camera ready manuscripts for publication in the Proceedings are required by 23 June.

1997 IEEE International Frequency Control Symposium at Disney World in Orlando, Florida, USA

Award Nominations

Formal nominations for the Cady, Rabi and Sawyer Awards should be sent to the Program Chairman, Gary Johnson. Informal suggestions of deserving nominees should be sent to the Awards Chairman, Roger Ward.

Exhibits

For information on arranging for exhibit space, or for general conference information please contact:

Mr. Michael R. Mirarchi
Synergistic Management, Inc.
3100 Route 138
Wall Township, NJ 07719, U.S.A.
Tel: 908-280-2024, Fax: 908-681-9315

The deadline for arrangements is 3 March, 1997.

Travel Support

Presenters from outside the United States — Limited funds are available to help with the travel expenses of presenters from outside the United States who might not otherwise be able to attend. Requests for support, including the name of the presenter and the amount requested (in U.S. dollars) must be included with the paper summary. The Symposium will provide reimbursement up to an amount to be specified. Airline tickets and travel arrangements will no longer be provided.

Student authors/co-authors — Limited funds are available to support the travel of student authors (from anywhere). Requests must be included with the summary.

Second International Conference on Optical Information Processing

The Second International Conference on Optical Information Processing was held in Pushkin (a suburb of St.Petersburg) from 17-20 June, 1996. The Conference Cochairmen were Zhores Alferov, A.F.Ioffe Physical Technical Institute, Russian Academy of Sciences (Russia), Yuri Gulyaev, Institute of Radio Engineering and Electronics, Russian Academy of Sciences (Russia) and Dennis R.Pape, Photonic Systems, Inc., (USA)

Conference Organizers:

- St.Petersburg State Academy of Aerospace Instrumentation
- A.F.Ioffe Physical Technical Institute, Russian Academy of Sciences
- Institute of Radio Engineering and Electronics, Russian Academy of Sciences.

Conference Sponsors:

- St.Petersburg State Academy of Aerospace Instrumentation
- St.Petersburg Higher Fire Technical School
- State Committee of Russian Federation for Higher Education
- Ministry of Science and Technical Policy of Russia
- Russian Foundation for Basic Research
- Municipality of St.Petersburg
- SPIE-The International Society for Optical Engineering
- SPIE Russian Chapter.

The Conference's topics included:

Optical Computing (Digital and analog optical computing, Optical Interconnections, Matrix algebraic processing, Neural networks, Optical memory), Optical Signal Processing (Adaptive and matched filtering, Correlators and converters, Ambiguity function generation, Spectrum analysis, Frequency excision, Radar processing, Multisensor processing), Optical Image Processing (Correlation filter algorithms, Matched filtering architectures, Optical correlates, Pattern recognition), Optical Processing Components (Light sources, Spatial light modulators, nonlinear optical and photorefractive materials and devices, Smart pixels, Photodetector arrays).

207 participants represented Russia (156), the independent republics of the former Soviet Union (6 from Belarus, Ukraine, Lithuania, Moldova), other countries (45 from USA, Germany, Japan, France, Italy, Belgium, Sweden, Finland, Mexico, Denmark, Poland). They presented 59 oral lectures and 109 posters. They will be published in the Proceedings of the Conference.

The Conference took place in the Khochubey Palace situated very close to the famous Pushkin Palace. The cultural program included visits to Pushkin Palace, Peterhof Palace and the Hermitage.

The next, Third International Conference on Optical Information Processing, is to be organized in 1999.

Vladimir Kulakov

FUTURE UFFC-S SPONSORED SYMPOSIA

ULTRASONICS SYMPOSIA

1997 IEEE International Ultrasonics Symposium

Toronto, Ontario, Canada - 5 - 8 October 1997

For information contact:

F. Stuart Foster, *General Chair*
University of Toronto
Sunnybrook Health Science Center
Department of Medical Physics
Reichmann Research Building
2075 Bay View Avenue
Toronto, Ontario
CANADA M4N 3M5
(416) 480-5716 (Phone); (416) 480-5714 (FAX)

Katherine W. Ferrara, *Technical Program Chair*
University of Virginia
Department of Electrical Engineering
1105 West Main Street
Stacey Hall
Room 1421
Charlottesville, Virginia 22903
(804) 243-6321 (Phone); (804) 982-3870 (FAX)

FREQUENCY CONTROL SYMPOSIA

1997 IEEE International Frequency Control Symposium

Orlando, Florida — 28 - 31 May 1997

For information contact:

Thomas E. Parker, *General Chair*
National Institute of Standards & Technology
Time & Frequency Division
Division 847
325 Broadway
Boulder, Colorado 80303
(303) 497-7881 (Phone); (303) 497-6461 (FAX)

Gary R. Johnson, *Technical Program Chair*
Sawyer Research Products Inc.
35400 Lakeland Boulevard
Eastlake, Ohio 44095
(216) 951-8770 (Phone); (216) 951-1480 (FAX)

1998 IEEE International Frequency Control Symposium

Los Angeles, California

For information contact:

Thomas E. Parker, *General Chair*
National Institute of Standards & Technology
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325 Broadway
Boulder, Colorado 80303
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Gary R. Johnson, *Technical Program Chair*
Sawyer Research Products Inc.
35400 Lakeland Boulevard
Eastlake, Ohio 44095
(216) 951-8770 (Phone); (216) 951-1480 (FAX)

1999 IEEE International Frequency Control Symposium

Besancon, France

For information contact:

Donald B. Sullivan, *General Co-Chair*
National Institute of Standards & Technology
Time & Frequency Division
Division 847
325 Broadway
Boulder, Colorado 80303
(303) 497-3772 (Phone); (303) 497-6461 (FAX)

or

Raymond J. Besson, *General Co-Chair*
LCEP-ENSMM
la Bouloie - route de Gray
25030 Besancon Cedex
FRANCE
(31) 81-666632 (Phone); (31) 81-885714 (FAX)

Frederick L. Walls, *Technical Program Chair*
National Institute of Standards & Technology
Time & Frequency Division
Division 847
325 Broadway
Boulder, Colorado 80303
(303) 497-3207 (Phone); (303) 497-6461 (FAX)

1998 IEEE International Symposium on Applications of Ferroelectrics

Montreaux, Switzerland

Medical Imaging 1997

Feb. 27-28, 1997: Penn State Ultrasonic Transducer Engineering Workshop will be held as part of the SPIE Medical Imaging Symposium in 1997 at Newport Beach, CA. [For more information, please contact Donna Rode at SPIE P.O. Box 10, Bellingham, WA 98227-0010. Tel: 360-676-3290, E-mail: donnar@mom.spie.org or K. Kirk Shung, 342 Hallowell Bldg., Penn State University, University Park, PA 16802. Tel: 814-865-1407, E-mail: kksbio@engr.psu.edu]

Corrections

There are a few corrections to be noted from the spring newsletter. Apologies to Narendra Batra who was identified at Gatra in the middle photograph of page 12. On page 19 regarding the Constitution Revision, in section 5.1.1, second line after President there should be inserted "President-Elect". Also one of our new members, Zurong Cai, did not appear on the new members list. The editor apologizes for the omission.

EXPRESS YOUR VIEWS.

Your ideas are valuable!

Nominations for UFFC-S ACHIEVEMENT AWARD

The Achievement Award is the highest Society-wide award presented to a member in special recognition of outstanding contributions. You are encouraged to identify members you feel deserve to be honored. The award is granted for significant technical publications in the field of ultrasonics, ferroelectrics, or frequency control; for presentation of lectures; and/or for service to the Society.

The award embraces all technical fields in the society, and includes both technical and organizational achievements. Each nomination receives serious consideration by the Officers and the Awards Committee. Participate by filling out the attached form.

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

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

Nominee's Name & Main Contributions: _____

Your Name/Address: _____

Send at anytime to: Roger H. Tancrell
Chair, UFFC-S Awards Committee
225 Walden Street, Suite 5C
Cambridge, MA 02140
Tel/FAX: (617) 547-6639
e-mail: r. tancrell@ieee.org

Nominations for DISTINGUISHED LECTURER AND/OR TOPIC

The UFFC-S Distinguished Lecturer is welcomed by organizations around the world to present an up-to-date review of new developments in ultrasonics, ferroelectrics, or frequency control. The Distinguished Lecturer represents the Society to the larger technical community and stimulates interest in the Society's professional areas. Recent lecturers have spoken to local chapters, universities and companies throughout North America, Japan, Europe, China, and South America.

Which topics would you like to hear? Which member would give a stimulating lecture? Fresh ideas are always welcome. Be heard by filling out the attached form.

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

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

Your Name/Address: _____

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

Notes from the Editor

The first part of the fall issue of the newsletter is devoted to raising the memberships interest in the upcoming 1996 Ultrasonics Symposium in San Antonio. Jeff Scoenwald and his symposium team (very photogenic) together with Pierre Khuri-Yakub and the technical program committee have come up with an excellent meeting that you shouldn't miss. When you see Jeff tell him how much you appreciate his work and the work of his committee. San Antonio is a very special place to enjoy when not catching the latest technical ideas. Did you stay up-to-date on the Ultrasonics Symposium by tapping into the web page <http://macro.stanford.edu/groups/uffc/>?

In August the International Symposium on the Applications of Ferroelectrics was held near Rutgers University with Ahmed Safari as the General Chair. We heard it was a great meeting and hope to have a report on the symposium in the next newsletter.

The 50th anniversary meeting in Hawaii of the Frequency Control Symposium was an overwhelming success and we congratulate all the award winners. John Vig and Kazuhiko Yamanoichi did a great job as General Co-Chairs, even if it was necessary for John to cut off a tie to emphasize the importance of a relaxed conference atmosphere. It certainly was the most colorful meeting (those flowered Hawaiian shirts) I have ever been to. Tom Parker is looking forward to our participation in the 1997 FCS meeting. There is a call for papers in this issue. Have you ever noticed that the Frequency Control Group picks locations near ocean beaches.

Our president, refreshed at the Fern Grotto in Kauai, brings us some important information. Biographies of the new Administrative Committee members; Katherine Ferrara, David Hutchins, Tom Shoup, and Jan Smits who were elected to three-year terms, effective January 1st, 1996 are included in this issue. Contact the president or any of the AdCom members to express any concerns or suggestions. Gary Montress reports on the minutes of the AdCom meeting. Welcome to our new members, which represent quite a cross-section of our world. Chapters' news is lacking, except for a good report from the Boston Chapter courtesy of Bill Ossmann. Other chapters take note.

There are four action items for members. The IEEE Fellow nomination process will soon be underway again. Please note where to get a nomination kit. Then there are the society nominations for the Achievement Award and for the Distinguished Lecturer. Take time to let Roger and Mack know who your choices are. A simple form is available to fill out and send in. Thrygve Meeker has alerted the membership to the proposed revision of ANSI/IEEE STANDARD 176-1987, "ANSI/IEEE STANDARD on PIEZOELECTRICITY," which will be printed in the September issue of the UFFC Transactions. He solicits your suggestions and comments.

We salute Floyd Dunn for his award of the IEEE Edison Medal and for his long and distinguished career. Your newsletter editor is anxious to publicize member activities and happenings, so don't hesitate to inform the newsletter editor.

Thanks to Vladimir Kulakov for the report on the Optical Information Processing meeting in Russia. Our best wishes to the Russian Chapter and its involvement in the Acoustoelectronics, Frequency Control, and Signal Generation Symposium held in September in Moscow.

Our Distinguished Lecturer for 1996-97 is Tom Parker. Be sure and schedule him for a presentation. His biography and abstract are near the front of the spring newsletter. His email address is tparker@bldrdoc.gov.

I trust you will enjoy this issue of the newsletter. Special thanks go to Ann Scrupski Goedkoop and her coworkers at IEEE Magazines/Newsletters for final assembly of this newsletter edition. It is their touch that makes this newsletter come alive. The invitation is always there to any of our members to submit articles, photographs, and information which will be of interest to our readership. The next deadline falls around March 15, 1997, for the spring newsletter. The easiest way to communicate is email if you have it available. My address is f.hickernell@ieee.org. I have a fax-(602) 441-7714, a phone-(602) 441-2923, and an address-Motorola SSTG, 8201 E. McDowell, Scottsdale, AZ 85252. I look forward to hearing from you.

Fred Hickernell
Newsletter Editor



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