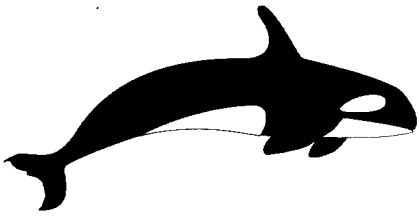
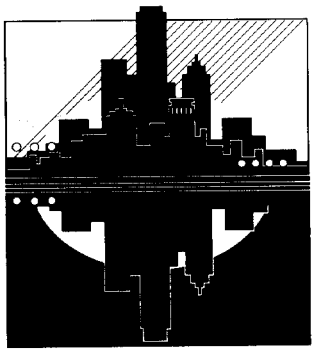
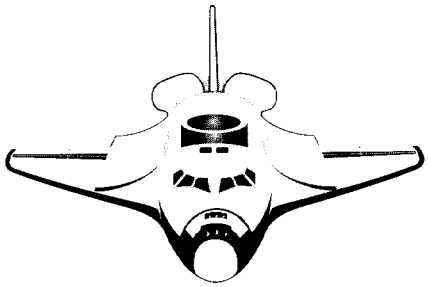
IEEE ULTRASONICS, FERROELECTRICS AND FREQUENCY CONTROL SOCIETY NEWSLETTER

Number 12: October 1991

Editor: Fred S. Hickernell



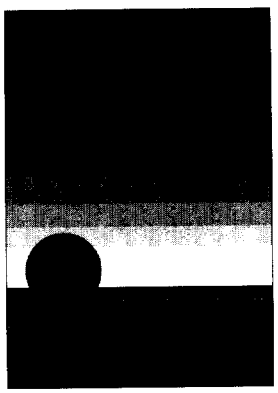




1991 IEEE ULTRASONICS SYMPOSIUM

December 8-11, 1991
Lake Buena Vista, Florida

Sponsored by The Ultrasonics, Ferroelectrics, & Frequency Control Society



1991 IEEE ULTRASONICS SYMPOSIUM

Sunday–Wednesday, December 8-11, 1991

Hilton Hotel
at
Walt Disney World Village
Lake Buena Vista, Florida

SHORT COURSE & SYMPOSIUM INFORMATION

The IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society presents:

- **Six Short Courses**, Sunday, December 8, 1991
- **1991 IEEE Ultrasonics Symposium**, from Monday, December 9, 1991, through Wednesday, December 11, 1991.

All symposium activities will be concentrated in the Grand Ballroom area of the Hilton Hotel, Lake Buena Vista, Florida. A block of rooms are reserved for attendees and guests at a special rate. The Hilton Hotel is located in the Disney Village area, centrally located to all Central Florida area attractions.

Special rates for the hotel and many Central Florida attractions have been extended from the Saturday before the Symposium through the Sunday afterwards to encourage attendees to bring their families and enjoy the world's number one family vacation destination.

Reduced airfares for international travelers have been negotiated for the first time to afford the maximum opportunity for all to share Florida's allure.

IMPORTANT DEADLINES

Hotel Reservations . . . . . November 8, 1991
Advance Registration . . . . . November 8, 1991
Symposium
Short Courses
Guest Social Program
Evening Social Events
Advance Attraction Tickets
Special Audio-Video Requirements . November 8, 1991

CENTRAL FLORIDA AREA

In December we should have nearly ideal weather with 8°F (27°C) highs and 60°F (16°C) lows. There is abundant sunshine with the slight possibility of some late afternoon thunder storms. Swimsuits and light clothing are recommended for the daytime, and a light jacket or sweater may be appropriate for the evening.

Nicknamed "The City Beautiful," Orlando is located in the heart of Central Florida. Currently one of the most rapidly growing metropolitan centers in the United States, the Orlando area serves as home to an ever increasing number of high-tech companies in addition to attracting a substantial amount of tourism. As the number one vacation destination in the world today, Orlando is uniquely equipped to provide its visitors with an unforgettable and thoroughly enjoyable experience.

One of the most popular features of the Central Florida area is the wide variety of theme parks and amusement parks available for entertainment. The largest of these is Disney World, which is located near our hotel and includes several separate theme parks. The Magic Kingdom allows parents and youngsters alike to experience anew the magic of Disney animation and includes many fun shows and rides such as "Space Mountain." EPCOT Center takes its visitors on a trip into the future, examining various technologies, how they developed, and where the current trends may lead. In addition, you are able to visit and experience the cultures of several countries from around the world. This park also has several exciting rides and shows, the most well known of which may be "Illuminations." The third Disney theme park is Disney-MGM Studios, where movies and television shows are currently in production. This park gives visitors an inside look at various Disney productions, past and present. Despite the size and diversity of Disney World itself, it is by no means the only theme park in the Orlando area. Universal Studios Florida, also in Orlando, gives its visitors a look at some of the behind-the-scenes workings of a movie studio, along with many exciting rides such as "Back to the Future." For those Orlando visitors who prefer nature-oriented attractions, Sea World exposes visitors to a variety of marine creatures and habitats, from killer whales such as "Shamu" to sharks, dolphins, and more. Cypress Gardens, located approximately thirty minutes from Orlando also allows visitors to see more of what the natural Florida is like, from beautiful plants and gardens to alligators and tropical birds. Busch Gardens, in Tampa, is roughly one and one-half hours from Orlando and includes such attractions as an African safari, roller coaster and other rides, plus a variety of shows, and concerts.

Located near the center of the Florida peninsula, Orlando is a short drive from the Space Coast. Here Kennedy Space Center provides many fascinating and educational activities for visitors. In addition to all of the organized attractions mentioned above, Central Florida has lovely beaches on both coastlines, with enviable fishing for the avid angler. There are a large number of beautiful, championship golf courses in the area, and the weather should be perfect.

Our conference will be held at the Walt Disney World Hilton Hotel, located ideally to serve as a base of operations for seeing much of what Central Florida has to offer. A wide variety of dining and evening entertainment options are available nearby, including Disney's Pleasure Island, a group of nightclubs based on different themes and located only minutes from the Hilton. Options to visit many of the previously mentioned attractions are offered as part of our guest program.

However, so that those of you who are attending the technical portions of the symposium do not miss out on all of the fun, we suggest that you consider extending your stay in the Orlando area for a few days before and/or after the symposium to take advantage of the area's attractions. For those of you considering bringing children along — by all means do so — it will most certainly be an exciting and truly memorable experience for your whole family.

SYMPOSIUM REGISTRATION & FEES

All Symposium participants and guests must register and receive badges. The Symposium fee includes admittance to all technical sessions, the Monday evening reception, and the cost of one soft-cover copy (except for full-time students, retirees or guests) of the 1991 IEEE Ultrasonics Symposium Proceedings.

The guest fee includes continental breakfast each morning for the guest and the Monday evening reception. A social program and tours have been arranged for guests. The daytime activities provide non-symposium participants an opportunity to experience some of Central Florida's attractions. Details and fees are in the Guest Social Program section.

Registration fees are as follows:

	Advance Registration	On-Site Registration
IEEE Members	$265.00	$295.00
Non-IEEE Members	$325.00	$355.00
Full-time Students or Retirees	$25.00	$40.00
Guests		
Adult	$25.00	$35.00
Child (12 and under)	$10.00	$15.00

The reduced rate for advance registration is available only by completing the form located at the center of the Advance Program book, enclosing proper payment, and mailing to:

1991 IEEE Ultrasonics Symposium
c/o LRW Associates
1218 Balfour Drive
Arnold, MD 21012-2150
USA

The Advance Registration Form must be received at LRW Associates by 8 November 1991. **Postmarks do not apply**.

Please note: **Advance Registration Forms and remittance must be received at LRW Associates by November 8, 1991. Each registrant must complete a separate Advance Registration Form. The remittance is payable in US Dollars only, personal or company checks drawn on a US bank, money orders, VISA, or MasterCard. 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 preregistered 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 November 30, 1991.

SHORT COURSE REGISTRATION & FEES

The following six short courses are scheduled for Sunday, December 8, 1991. The short courses will be held at the Hilton Hotel in the rooms indicated.

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

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

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

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

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

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

Please see a later section of the newsletter for complete Short Course descriptions

Registration for the short courses is on a first-received, first-processed basis. Registrations will be accepted with the appropriate fee until the time of the short courses. However, available space for each course is limited, and registration for individual courses may be closed prior to the 8 November 1991 Advance Registration Deadline. We reserve the right to cancel any course due to insufficient preregistration. Short course fees for **each** short course are as follows:

	Advance Registration	On-Site Registration
IEEE Members	$110	$120
Non-IEEE Members	$140	$150
Student or Retiree	$40	$50

Advance registration for the short courses by mail is strongly encouraged. For advance Short Course registration, complete and mail the Advance Registration Form located in the center of the Advance Program book to:

1991 IEEE Ultrasonics Symposium
c/o LRW Associates
1218 Balfour Drive
Arnold, MD 21012-2150
USA

The Advance Registration Form must be received at LRW Associates by 8 November 1991. **Postmarks do not apply**.

Please note: **Advance Registration Forms and remittance must be received at LRW Associates by November 8, 1991. Each registrant must complete a separate Advance Registration Form. The remittance is payable in US Dollars only, personal or company checks drawn on a US bank, money orders, VISA, or MasterCard. 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**.

TECHNICAL PROGRAM OVERVIEW

The Symposium's technical program will be held from Monday, December 9, through Wednesday, December 11, 1991. The technical program will commence with a Plenary Session on Monday morning at 8:00 am. Paper presentations have been separated into four parallel oral sessions and a single poster session. Individual contributed oral presentations have each been allocated fifteen minute time slots, with approximately twelve minutes recommended for the presentation and three minutes reserved at the end of each talk to respond to questions from the audience. Invited oral presentations have each been allocated thirty minute time slots, with twenty-five minutes suggested for the presentation and five minutes devoted to handling questions from the audience.

Poster sessions have been used for the last sixteen years at the IEEE Ultrasonics Symposium. They afford a unique and stimulating forum for technical exchanges and interactions between author and audience. For the poster session each author is assigned a space with a 4′ x 8′(1.2 m x 2.4 m) bulletin board provided by the Symposium on which the author may place graphs, diagrams, data, and a small amount of text to illustrate the main points of the presentation. For each Invited Poster Paper, the author is assigned a space with two (2) 4′x 8′ (1.2 m x 2.4 m) bulletin boards. Authors should remain with their poster paper displays during the entire poster session time period. Symposium participants may wander through the Poster Session area or else go directly to those poster papers which most interest them. This year, the poster session will be held in the Hilton Hotel on Monday, December 9, 1991, from 3:30 pm until 5:30 pm. The setup period for the poster session is 1:30 pm to 3:00 pm. No oral sessions will be held in parallel with the poster session. The break-down period for the poster session is 5:30 pm until 6:30 pm.

This year's poster session topics include:

Session PA:	Medical Imaging
Session PB:	Medical Imaging with Coded Waveforms
Session PC:	Medical Signal Processing
Session PD:	Large Aperture Hydrophones & Specialized Arrays
Session PE:	NDE
Session PF:	Ultrasonic Processes
Session PG:	Ultrasonic Signal Processing
Session PH:	Sensors
Session PI:	Physical Acoustics I
Session PJ:	Acousto-Optic Applications
Session PK:	Photo-Acoustic Spectroscopy
Session PL:	Theory of Bulk Wave Resonators
Session PM:	Materials Characterization
Session PN:	SAW Materials & Propagation I
Session PO:	SAW Filters

INVITED PAPERS

The 1991 IEEE Ultrasonics Symposium Technical Program Committee has invited the following individuals to highlight new, emerging, and outstanding aspects of the ultrasonics field:

A-1 "**Ultrasonic Properties of Miscible Epoxy Blends and their influence on Piezoelectric Composite Performance**" - W. Huebner, *Materials Research Laboratory, The Pennsylvania State University*, and K. Liang, C. Oakley, and H. Kunkel, *ECHO Ultrasound*

I-3 "**High Frequency Ultrasound Backscatter Imaging**" - F.S. Foster, C.J. Palvin, G.R. Lockwood, L.K. Ryan, K. Harasiewicz, L. Berube, and A.M. Routh, *Sunnybrook Health Science Centre & Department of Medical Biophysics, University of Toronto*

M-1 "**The Necessity of and Specifications for Two-Dimensional Phased Arrays for Phase Aberration Correction**" - G.E. Trahey, P.D. Freiburger, and D. Zhao, *Biomedical Engineering Department, Duke University*

Y-1 "**Ultrasound - A Potential Approach to Cancer Therapy?**" - P. Peschke, J. Debus, E.W. Hahn, W. Folberth, G. van Kaick, and W.J. Lorenz, *German Cancer Research Center, Institute of Radiology & Pathophysiology, Heidelberg*

HH-1 "**Piezoelectric Thin Film Devices**" - M. Sayer, *Department of Physics, Queen's University, Kingston, Ontario*

F-3 "**Ultrasonic Plate Wave Evaluation of Composite Laminates**" - D.E. Chimenti, *Johns Hopkins University*

J-1 "**Acoustic Emission for the 1990s**" - M.R. Gorman, *Naval Postgraduate School, Monterey, California*

V-3 "**Applications of SAW Devices to Chemical Analysis**" - H. Wohltjen, *Microsensor Systems, Inc.*

Z-5 **"Application of Time-Frequency Analysis to NDE"** - M.E. Zakharia, *I.C.P.I. Lyon, L.A.S.S.SO., Lyon, France, and J.P. Sessarego, CNRS, LMA, Labo US, Marseille, France*

DD-1 **"Intelligent Processing of Ultrasonic Signals for Quantitative Materials Testing"** - W. Sachse, *Department of Theoretical & Applied Mechanics, Cornell University*

II-3 **"Recent Advances in Acoustic Microscopy"** - A. Atalar, *Bilkent University, Ankara, Turkey*

C-3 **"Recent Developments in Multiple Quantum Well Acousto-Optic and Electro-Optic Modulator Structures"** - F.C. Jain and K.K. Bhattacharjee, *The University of Connecticut, Storrs*, and T.W. Grudkowski, *United Technologies Research Center*

G-1 **"Integrated Acoustically-Tuned Optical Filters for Filtering and Switching Applications"** - D.A. Smith, J.J. Johnson, J.E. Baran, and K.-W. Cheung, *Bellcore*

PL-1 **"Visualization Techniques for Bulk Wave Resonators"** - D. Silver, *Department of Electrical & Computer Engineering, and CAIP, Rutgers University*, and J. Stewart and Y.-K. Yong, *Department of Civil & Environmental Engineering, Rutgers University*

K-5 **"A Dual Mode Thickness-Shear Quartz Pressure Transducer"** - R.J. Besson and J.J. Boy, *ENSMM, Besancon, France*, and Y. Jinzaki, B.K. Sinha, B. Glotin, and M. Valdois, *Schlumberger (Japan, USA, and France)*

S-1 **"Thermoacoustic Engines"** - W.P. Arnott, *National Center for Physical Acoustics, University of Mississippi*

EE-3 **"Estimating a Shear Modulus of a Transversely Isotropic Rock"** - K.J. Ellefsen, *Mobil Research & Development Corporation*, and M.N. Toksoz, K.M. Tubman, and C.H. Cheng, *Earth Resources Laboratory, MIT*

D-5 **"A Comparison of Band Pass Filter Technologies for Communication System Applications"** - L.N. Dworsky, *Motorola, Inc.*

PO-1 **"SAW Technology in Eastern Europe"** - W. Buff, *Ilmenau Institute of Technology, Ilmenau, Germany*

PO-2 **"Investigations of Fundamentals, Current Status, and Trends of SAW in Siberia"** - I.B. Yakovkin, *Department of Acousto-Electronics & Acousto-Optics, Semiconductor Physics Institute, Siberian Branch of the USSR Academy of Sciences, Novosibirsk, Siberia, USSR*

P-3 **"Green's Function Applications for SAW Device Modelling"** - A.R. Baghai-Wadji, *Technische Universitaet Wien, Vienna*

X-1 **"A Review of Optimization Algorithms for the Design of SAW Transducers"** - C.C.W. Ruppel, *Siemens AG, Corporate Research & Development, Munich*, A. Sachs, *Ludwig-Maximilian-Universitaet, Munich*, and F. Seifert, *Technische Universitaet Wien, Vienna*

BB-3 **"Synthesis and Performance of Precision Wideband Slanted Array Compressors"** - S. Jen, *Texas Instruments, Inc.*

FF-5 **"SAWs for Secure Remote Electronic Identification Using Phase Encoding"** - P.A. Nysen, *X-Cyte, Inc.*

HOTEL RESERVATIONS

The Hilton Hotel at Walt Disney World Village is set on twenty-three acres (9.3 hectares), offering 813 rooms and featuring four restaurants and two lounges. The Hilton is located directly across the street from the Walt Disney World Village Marketplace and is just a short walk from Pleasure Island, one of Disney World's newest attractions with six nightclubs, several restaurants, a variety of shops, and a cinema complex. The Hilton is designated as an "official" Walt Disney World Hotel and is actually located within the boundaries of Walt Disney World. As a result, registered guests at the Hilton enjoy certain privileges usually available only to guests staying at Walt Disney World-owned properties, such as free shuttle bus service to and from the Magic Kingdom, the Transportation and Ticket Center, EPCOT Center, and the Disney-MGM Studios Theme Park, as well as the opportunity to make reservations for dinner shows before bookings are accepted from the general public. Guests at the Hilton can also use the tennis and golf facilities at the Walt Disney World Village Clubhouse. The Hilton's recreational facilities include two tennis courts, two swimming pools, and a health club.

The Hilton Hotel at Lake Buena Vista has reserved a block of rooms at a special rate for symposium attendees. Please reserve early to ensure availability of your room preference. A one-night deposit by check or credit card is required. Rooms at the Hilton for conference attendees are available at the following special rate:

1 King or 2 Double Beds $110/night
(same rate for family up to four people)

Hotel reservations must be made by November 8, 1991.

Telephone reservations can be made by calling **(407) 827-4000** or **(800) 782-4414**. You must specify IEEE Ultrasonics Symposium to obtain the special room rates. For those who wish to spend a few extra days in the Orlando area, the special rates will apply through the weekends directly before and after the 1991 IEEE Ultrasonics Symposium.

Please note that the Hilton Hotel will bill you for the one night reservation charge on the following month's credit card billing. However, you do have the option to cancel your reservation up to five days before scheduled check-in and your credit card account will be credited.

AIR TRANSPORTATION

Delta Airlines has been selected as the official airline for the 1991 IEEE Ultrasonics Symposium. The airline provides service throughout the United States to Orlando and is also the designated Walt Disney Airline. We have also arranged for Walt Disney Travel to be our official travel agency. They are

extremely knowledgeable and helpful and have a toll-free number for your convenience.

The following airfare discounts are available:

US Domestic Flights

- 5% discount off most published fares
- 40% discount off the unrestricted coach fare (7 day advance ticketing)

Canadian Flights

- 40% discount off unrestricted coach fare (7 day advance ticketing)

Call Walt Disney Travel (800) 344-4342 or Delta Airlines using reservation number F0292.

International Flights

A special arrangement has been made which is only available through Walt Disney Travel.

Save: 10% on Economy Class Fares
20% on Business Class Fares
30% on First Class Fares

These savings can be realized by booking your flights on Delta through Walt Disney Travel (800) 344-4342, and you must identify the IEEE Ultrasonics Symposium.

CAR RENTAL

National Car Rental has been appointed the official rental car agency for the 1991 IEEE Ultrasonics Symposium. Special group rates have been negotiated for this event to help economize on your travel costs. The following rates will apply for the symposium meeting:

Car Class	Daily Rate	Weekly Rate	Mileage Allowance
Economy	$22.95	$147.95	unlimited
Mid-size	$24.95	$159.95	unlimited
Full-size	$27.95	$178.95	unlimited
Mini-Van		$184.95	unlimited

Special Weekend Rates

Noon Thursday through Midnight Sunday
(Rates quoted are per day.)

Economy	$19.75	Convertible	$35.95
Mid-size	$22.75	Full-size	$25.75

The toll-free reservation office can be reached at (800) CAR-RENT for these published rates. The above rates will be offered at two Orlando offices: The Orlando International Airport (open 24 hours) and the Hilton at Lake Buena Vista (open 7:30 am to 5:30 pm). **Note that the car can be obtained at the Hilton**. Be sure to reference your association with the IEEE Ultrasonics Symposium.

LOCAL TRANSPORTATION

Upon arrival at the airport, there are several ways to proceed to the Hilton Hotel. Cabs as well as several airport shuttle services are available. Your trip to the Hilton Hotel should take approximately twenty minutes. Airport shuttle service provides transportation every ten to fifteen minutes to the Disney hotel complex. The price is $12.50 for adults ($22.00 for a round trip), children 4-11 are $9.50 ($16.00 for a round trip), and children under 4 are free. Please note that these prices are subject to change.

While staying at the Hilton, there is free transportation to and from all Walt Disney World attractions. Also, shuttle buses, some of which are free, can be taken to off-site attractions.

GUEST SOCIAL PROGRAM

We encourage guests to attend a continental breakfast which will be provided for registered guests of the symposium (8 am - 10 am, M,T,W). Your guest badge will help us to become acquainted and is necessary to attend the continental breakfast in the American Vineyard Restaurant. A wide variety of tours have been arranged for the enjoyment of guests and attendees. Advance registration for the Guest Social Program should be made on the advance registration form. Registration at the Conference will be accepted on a space available basis. In addition, at the end of this section, we have listed shuttle schedules for certain attractions.

Monday, December 9, 1991
Sea World, 10:00 am to 4:00 pm (times are flexible)
Adult: $36.00 Child (3-9): $31.00

The Sea World Animal Lover's Tour includes a behind-the-scenes view of special areas and an up-close, in-depth look at the animals and their care. As a guest you will see the Breeding and Research Facilities for Sea World's seals and sea lions, the Beach Animal Recovery Pools which house the endangered manatee, and the Aquarium Quarantine Facility that is home for newly arrived fish and turtles. In addition, you will tour the Avian Propagation Center and the Penguin Research Facility. Finally, you will get a backstage view of the largest marine mammal habitat in the world and reserved seats for the show at the Shamu Stadium. The scheduled group shuttle for Sea World will depart the Hilton at 10:00 am. A short trip (15 minutes) will take us to Sea World. We will meet at the main gate and be conducted to the tour area. The tour will last ninety minutes and conclude with a twenty minute show at the Shamu Stadium. You are free to eat lunch at the various concessions within the park. In addition, you may take advantage of the other shows and exhibits within the park. The scheduled shuttle for the group will leave Sea World at 3:00 pm. Additional Hilton shuttles leave Sea World daily at 4:00 pm and 7:00 pm.

Tuesday, December 10, 1991
Cypress Gardens, 9:00 am to 4:00 pm
Adult: $31.00 Child (3-9): $25.00

Cypress Gardens (since 1936) is Central Florida's oldest attraction. Known as the water ski capital of the world, it is also world famous for its botanical gardens. Family entertainment includes animal exhibits, rides for the little ones, magic shows, a replica of an antebellum town with shopping and shows, and boat rides around and through the gardens. Daily shows include water skiers stacking into a human pyramid 6 stories high, synchronized swimmers, the breath-taking human torch, and the ice dancers.

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

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

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

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

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

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

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

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

Shuttle Schedules

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

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

EVENING SOCIAL EVENTS

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

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

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

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

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

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

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

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

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

tains. A fifteen minute bus ride from the Hilton will bring us to Sea World at 6:30 pm just as the public is leaving the park and the gates are closing.

We will be welcomed to Orlando and Sea World with a magical treat of music, lights, and water at Sea World Theater before we are escorted to the "Penguin Encounter." There, light hors d'oeuvres and snacks will be served, and cash bars will offer soft drinks, cocktails, wine, and beer while we leisurely enjoy more than 200 penguins swimming and playing in their polar habitat. "Terrors of the Deep" will then be opened for us to view nature's most perfect predator, the shark. You will enter a transparent tunnel within an 800,000 gallon aquarium where you will be surrounded by sharks and meet face-to-face the barracudas, moray eels, and venomous fish.

A "Caribbean Hurricane Dinner Party" for our group offer will offer many choices, served in an "all you can eat" buffet style. After conch chowder, green salads, fruit salads, pasta salads, and marinated melon balls, enjoy lemon pepper chicken, broiled catch of the day, and chef carved jerk pork. Green beans with mushrooms, glazed sweet potatoes with coconut, and long grain wild rice round out the selections before your traditional Florida dessert, key lime pie. Coffee and iced tea will be served and there will be cash bars for other preferences. A special children's menu may be provided if there is sufficient advance registration.

Our night at Sea World concludes with a private killer whale show featuring Shamu and her family at the largest marine mammal facility (6,000,000 gallons) ever built. These featured giants and their trainers provide an impressive and heartwarming program for all ages. We will arrive back at the Hilton about 10:30 pm.

Each of the events planned for you at Sea World is in a covered area, but once in the park we will have to walk between attractions. In early December, we usually enjoy some of the best weather, but please bring at least a sweater to Orlando and a rain cape or umbrella if possible for the very unlikely event of a shower or cool spell.

WEDNESDAY, DECEMBER 11: December Surprise
6:00 pm - ??:??

Since we expect that many attendees will bring their families for an extended visit and also that many will take advantage of the NASA tour on Thursday, a special Wednesday night event may be offered to you when you register for the conference. Since the theme parks close around 7:00 pm during the conference time, we felt that an adult night out might prove popular for many. (Children are also welcome.) Among our possibilities is a private social gathering at the Adventurers' Club for one or two hours. Each purchase of a Disney Value Added admission ticket includes one day admission to Pleasure Island, or the admission charge is $12.65. You can purchase drinks, food, or snacks as you choose. There is no additional charge for the Adventurers' Club or Pleasure Island if we have sufficient attendance. Afterwards, everyone would be free to enjoy Pleasure Island for as long as they wish until the closing street party. With classic rock and roll, contemporary music, country rhythms, comedy shows, numerous food varieties, other attractions and shops, Pleasure Island provides a change of pace for conference attendees and guests.

LOCAL ATTRACTIONS

As a service to our attendees, we have arranged for reduced admission price tickets to Walt Disney World and Sea World. These tickets will be valid from December 7, 1991, through December 15, 1991. Tickets can be obtained prior to the symposium by returning the preregistration form and proper remittance. Tickets will be sold at the symposium, based on availability.

Walt Disney World

The major attractions include the Magic Kingdom, EPCOT, and Disney/MGM Studios.

1 Day Value Added tickets allow a single day access to one attraction plus a single day at Pleasure Island or River Country.

4 Day Value Added tickets allow four-day access to all attractions plus a single day at Pleasure Island or River Country.

These special symposium tickets are only valid December 7-15, 1991.

1 Day Value Added Ticket	Adult (reg. $47.50)	$38.75	Child (2-10 yrs)	$27.45 (reg. $40.10)
4 Day Value Added Ticket	Adult (reg. $129.85)	$111.00	Child (2-10 yrs)	$92.90 (reg. $105.55)

Sea World

This is a wonderful attraction for adults and children. You are able to see Shamu, the killer whale, dolphin and sea lion performances, water skiers, and other live shows. In addition, there are several exhibits and a beautiful park setting. Sea World is approximately 10-15 minutes from the Hilton Hotel. The attraction provides a full day's enjoyment.

Adult (reg. $28.55)	$24.30	Child (3-9 yrs)	$20.65 (reg. $24.30)

1991 IEEE ULTRASONICS SYMPOSIUM SHORT COURSES Sunday, 8 December 1991

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Thomas E. Parker (M'79-SM'86) was born in Natrona Heights, PA, on September 17, 1945. He received his B.S. in Physics from Allegheny College in 1967. He received his M.S. in 1969 and his Ph.D. in 1973, both in Physics, from Purdue University. His doctoral thesis was a Brillouin scattering study of acoustoelectric domains in GaAs. In August 1973, Dr. Parker joined the Professional Staff of the Raytheon Research Division, Lexington, Massachusetts, working with the Generalized Filters and Microwave Acoustics (now Stable Sources) Group. Initially, his work was primarily related to the development of improved temperature stable surface acoustic wave materials. More recently, Dr. Parker has been responsible for several surface acoustic wave oscillator programs at the Research Division. His primary interest has been oscillator frequency stability, with emphasis on 1/f noise, vibration sensitivity, and aging. Dr. Parker is a member of IEEE, Sigma Pi Sigma, and Sigma Xi. He served as an elected member of the Administrative Committee of the *IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society* (1988-1990). He has served on the Technical Program Committees for both the Ultrasonics Symposium and the Annual Symposium on Frequency Control. He was Finance Chairman for the 1980 Ultrasonics Symposium and is the current Finance Chairman for the Annual Symposium on Frequency Control. Dr. Parker served as Technical Program Chairman for the 44th and 45th Annual Symposia on Frequency Control (1990, 1991).

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

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

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

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

1991 IEEE Ultrasonics Symposium

December 8-11, 1991 Lake Buena Vista, Florida

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1991 IEEE Ultrasonics Symposium Organizing Committee

General Chair

DONALD C. MALOCHA

Don Malocha earned his B.S. Degree in Electrical Engineering/Computer Science and his M.S. and Ph.D. degrees in Electrical Engineering from the University of Illinois, Urbana in 1972, 1974 and 1977, respectively. Presently, Don is a Professor in the Electrical Engineering department and group leader of the Solid State Devices and Systems Laboratory at the University of Central Florida, Orlando. His research group is currently working on single-phase surface acoustic wave (SAW) transducers, diffraction analysis, CAD techniques, SAW based systems, quartz resonator measurement techniques and ACT devices.

From 1977 to 1978, Don was a research associate in the Coordinated Sciences Laboratory at the University of Illinois working on SAW technology. From 1978 to 1980 he was a member of the Corporate Research Laboratories at Texas Instruments, Dallas, working on SAW based modulator and convolver systems. From 1980 to 1982 he was the Manager of Advanced Produce Development for Sawtek, Orlando, developing low loss transducer technology, data acquisition techniques and bidirectional filters. In 1989-1990, he was a visiting member of the Technical Staff at Motorola's Advanced Components Technology Group, Phoenix, working on SAW and acoustic charge transport (ACT) technology.

Don is an Associate Editor of the *IEEE UFFC Transactions*, is the UFFC society Membership chair and an elected member of the UFFC society Administrative Committee. Don is past chair of the IEEE Orlando Section and the Orlando UFFC chapter. He has received the IEEE Orlando Sections' Engineer of the Year, Educator of the Year and Outstanding Service Award in 1984, 1988, and 1989, respectively. He was awarded the UCF College of Engineering Excellence in Research award in 1986 and 1991 and received the Florida Governor's Award for Outstanding Contributions to Science and Technology in 1989. Don is a Senior Member of the IEEE, a member of the American Vacuum Society, Eta Kappa Nu and Tau Beta Pi. He is a professional engineer, State of Florida, and holds three patents, several copyrights on computer software and has over 40 publications.

Technical Chair

GARY MONTRESS

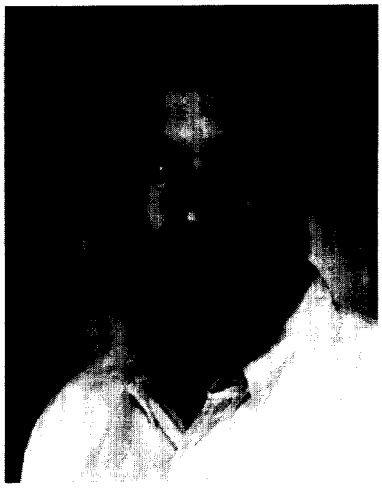
Gary K. Montress (S'66-SM'87) was born in East Orange, NJ, on April 10, 1947. He received the B.S.E.E., M.S.E.E., Electrical Engineer, and Ph.D. degrees from MIT, Cambridge, MA, in 1969, 1971, and 1976, respectively. From 1969 to 1972, while at MIT, he was a Teaching Assistant in the EE Department, teaching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

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

Resonators and Oscillators: Design and Performance".

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

Finance



MADJID A. BELKERDID

Madjid A. Belkerdid received his B.S.E., M.S.E., and Ph.D degrees in Electrical Engineering from the University of Central Florida in 1978, 1980 and 1984 respectively.

Currently, he is an associate professor in the Electrical Engineering department at the University of Central Florida, where he is the chair of the communications committee. His current research interests include Direct Sequence Spread Spectrum communication systems, coding theory, and Meteor Burst Channels.

He is a member of the Solid State Devices and Systems Laboratory where he is working on Quadrature Modulation Techniques using SAW technology and has authored and co-authored several papers in the area. He also investigated bulk acoustic wave (BAW) resonator parameter extraction.

Madjid was the Electrical Engineering Department teacher of the year for 1988, and 1991. He was the recipient of engineer of the year award for the COM/T chapter of the IEEE Orlando section is 1990.

Madjid is a senior member of IEEE, he was treasurer, Vice-Chairman, and Chairman of the IEEE Orlando Section. Madjid enjoys sunny Florida with his wife Siiri and their two boys Danny and Jacob.

Publicity

JACQUELINE H. HINES

Jacqueline earned a B.S. Degree in Applied and Engineering Physics from the Cornell University College of Engineering in 1984 and an M.S. in Electrical Engineering from the University of Central Florida in 1988.

Ms. Hines joined Sawtek Inc. in August 1988 as a Research and Development Engineer. Her research activities presently include analysis of diffraction effects in SAW devices, high frequency SAW device techniques, and studies being done in conjunction with the Condensed Matter and Radiation Sciences Division of the U.S. Naval Research Laboratory on the effects of radiation on SAW devices. Prior to joining Sawtek, Ms. Hines was a Lieutenant in the U.S. Navy, where her primary responsibility was technical instruction in the areas of physics and nuclear reactor theory at Naval Nuclear Power School in Orlando, Florida.

As a student, Ms. Hines was involved in several research efforts, including work as a research assistant at Bell Labs investigating the feasibility of using polyacrylamide gels in the fabrication of optical fibers and work in the Theoretical and Applied Mechanics Division of Cornell University's College of Engineering on creep crack propagation modelling. Her M.S. thesis involved the theoretical development of a new time domain approach to analyzing diffraction effects in SAW devices. Currently, Jacqueline is pursuing a Doctoral Degree in Electrical Engineering at the University of Central Florida where she works with the Solid State Devices and Systems Lab (SSDSL). Ms. Hines is also active in the Naval Reserves.

Ms. Hines is a member of Tau Beta Pi, Phi Kappa Phi, and is presently Treasurer of the Orlando Section of the Institute of Electrical and Electronics Engineers.

Publicity

YASUTAKA SHIMIZU

Yasutaka Shimizu graduated from Tokyo Institute of Technology in 1964, and received his Master and Doctor degrees of Engineering both from Tokyo Institute of Technology in 1966 and 1971 respectively. From 1966 to 1969, he worked with Seiko Company to develop the atomic frequency standard. Since 1969 he has been with Tokyo Institute of Technology and is currently Professor of the Center for Research and Development of Education Technology (CRADLE). From 1972 to 1973 he was a Post Doctoral Fellow at the Polytechnic Institute of New York

where his research was on surface acoustic waves. He has been working on microwave propagation theory and techniques especially on the development of microwave absorbers for anechoic chambers and the surfaces of tall buildings or huge bridges to prevent TV ghost or marine radar ghost image. He was the former Vice Chairman of UFFC Tokyo Chapter.

Local Arrangements

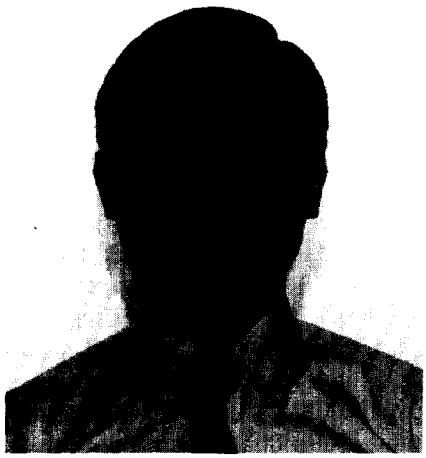
RONALD M. HAYS

Ron Hays received a B.A. degree in Mathematics in 1966 and B.S.E.E. degree in 1967 from Rice University, an M.S.E.E. degree from Stanford University in 1968, and an M.B.A. from Southern Methodist University in 1976. He is a member of Tau Beta Pi, Sigma Nu, Beta Gamma Sigma, the American Management Association (AMA), and the Institute of Electrical and Electronic Engineers (IEEE).

Ron is one of the founders and a director of Sawtek, Inc., in Orlando, Florida, where he was Vice-president of Sales and Marketing from 1979 through 1986 and Vice-president of Engineering from 1987 until 1991. Prior to Sawtek, he worked eleven years at Texas Instruments in the Government Products Group (1968 - 1972), the Corporate Research Laboratory (1972 - 1976), and the Semiconductor Division (1976 - 1979). He began work in Surface Acoustic Wave (SAW) technology in 1969 and has extensive experience in the integration of SAW components into radar, communication, navigation, and other military and commercial systems; in research and development of SAW component technologies including optimization and synthesis techniques for SAW bandpass filters, delay lines, and pulse compression devices; and in the design of SAW-based subsystems. He has authored a number of papers in these areas with subjects that include bandpass filters, transform processors, SAW applications, and subsystems.

Recently, he has chosen to enjoy more of the rewards of successful entrepreneurship and especially traveling, hiking, camping, and scuba diving with Terry, his friend and wife, and with Niki and Stacie, their brilliant, beautiful daughters. Ron currently provides consulting and management services to Sawtek in such areas as SAW applications, R&D, and Sales and Marketing while enjoying his family, friends and a relaxing Florida life-style.

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 Allied-Signal 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 presently a Senior Research Physicist in the Solid State Devices Program and works in the areas of material research and sensor development. He has authored or co-authored sixteen technical publications, and he is a co-inventor on one U.S patent. He has been a member of the Ultrasonics Symposium Technical Program Committee since 1987, and is a member of the American Society of Test Engineers.

Janpu, his wife Yumei and their sons Dennis and Raymond reside in Bridgewater, New Jersey. He is active in community programs and has been listed in American Leaders in Achievement for contributions to Asian American Community in U.S. by American Biographical Institute. He is the Vice President of the Chinese Institute of Engineers in USA, Greater New York Chapter.

CORRECTION

The April 1991 issue of the Newsletter, in the article "UFFC co-sponsors the Journal of Lightwave Technology," failed to mention that the IEEE Lasers and Electro-Optics Society and the IEEE Aerospace and Electronic Systems Society are also co-sponsors of the Journal.

1991 IEEE Ultrasonics Symposium
Technical Program Committee

Technical Program Chair

Gary K. Montress — Raytheon Research Division

GROUP 1: ***Medical Ultrasonics & Transducers***

Mark E. Schafer, *Vice-Chair*	Sonic Technologies
Paul J. Benkeser	Georgia Institute of Technology
Gary H. Brandenburger	Research & Development Management
L. Eric Cross	The Pennsylvania State University
Helmut Ermert	Ruhr Universität - Bochum
James F. Greenleaf	Mayo Clinic
Masao Ide	Musashi Institute of Technology
John R. Klepper	Institute of Applied Physiology & Medicine
John D. Larson	Hewlett-Packard Laboratories
Reinhard Lerch	Siemens AG
James G. Miller	Washington University, St. Louis
Vernon L. Newhouse	Drexel University
Mehrdad Nikoonahad	Acoustic Systems
William D. O'Brien, Jr.	University of Illinois
Kevin J. Parker	University of Rochester
Helen F. Routh	Advanced Technology Laboratories
K. Kirk Shung	The Pennsylvania State University
Wallace A. Smith	Office of Naval Research
Roger H. Tancrell	Raytheon Research Division

GROUP 2: ***NDE & Sensors***

Gerald V. Blessing, *Vice-Chair*	National Institute of Standards & Technology
Richard L. Baer	Hewlett-Packard Laboratories
Narendra K. Batra	Naval Research Laboratory
Karl F. Etzold	IBM Thomas J. Watson Research Center
Eric S. Furgason	Purdue University
Patrick H. Johnston	NASA Langley Research Center
Larry W. Kessler	Sonoscan, Inc.
Doron Kishoni	NASA Langley Research Center
Eric I. Madaras	NASA Langley Research Center
M. Edward Motamedi	Rockwell International Science Center
Emmanuel P. Papadakis	Iowa State University - Ames
Gerard J. Quentin	Universite Paris
Jalar Saniie	Illinois Institute of Technology
Jeffrey S. Schoenwald	Rockwell International Science Center
Bernhard R. Tittmann	The Pennsylvania State University
Ralph A. Treder	AT&T Bell Laboratories
Jiromaru Tsujino	Kanagawa University
H.K. Wickramasinghe	IBM Thomas J. Watson Research Center
Celia E. Yeack-Scranton	IBM Research Division
Donald E. Yuhas	Allied-Signal, Inc.

GROUP 3: ***Physical Acoustics***

Arthur Ballato, *Vice-Chair*	US Army LABCOM
John D. Adam	Westinghouse Electric Corporation
Mack A. Breazeale	University of Mississippi
Jan Brown	Fisher Controls International, Inc.
Gerald W. Farnell	McGill University
Brage Golding	Michigan State University
David L. Hecht	Xerox Corporation
John N. Lee	Naval Research Laboratory
Moises Levy	University of Wisconsin-Milwaukee
Bruce R. McAvoy	Westinghouse Electric Corporation
Robert A. Moore	Westinghouse Electric Corporation
John M. Owens	Auburn University
Harry L. Salvo, Jr.	Westinghouse Electric Corporation
Susan C. Schneider	Marquette University
Bikash K. Sinha	Schlumberger-Doll Research
Joseph Trivisonno	John Carroll University
Chen S. Tsai	University of California-Irvine
John R. Vig	US Army LABCOM
Yook-Kong Yong	Rutgers University

GROUP 4: ***SAW***

Gary K. Montress, *Vice-Chair*	Raytheon Research Division
Eric L. Adler	McGlll University
Tim L. Bagwell	Hewlett-Packard Company
Lawrence J. Castelli	Crystal Technology, Inc.
Curt A. Flory	Hewlett-Packard Laboratories
Jean-Jaques Gagnepain	LPMO-CNRS
Edward M. Garber	TRW Electronics & Technology Division
Thomas W. Grudkowski	United Technologies Research Center
Brent Horine	SAWTEK, Inc.
Janpu Hou	Allied-Signal, Inc.
Shen Jen	Texas Instruments, Inc.
Theodore J. Lukaszek	US Army LABCOM
Donald C. Malocha	University of Central Florida
Carl M. Panasik	Texas Instruments, Inc.
David Penunuri	Motorola, Inc.
Bob R. Potter	RF Monolithics, Inc.
Clemens C.W. Ruppel	Siemens AG
Adrian Venema	Delft University of Technology
Peter V. Wright	RF Monolithics, Inc.
Kazuhiko Yamanouchi	Tohoku University

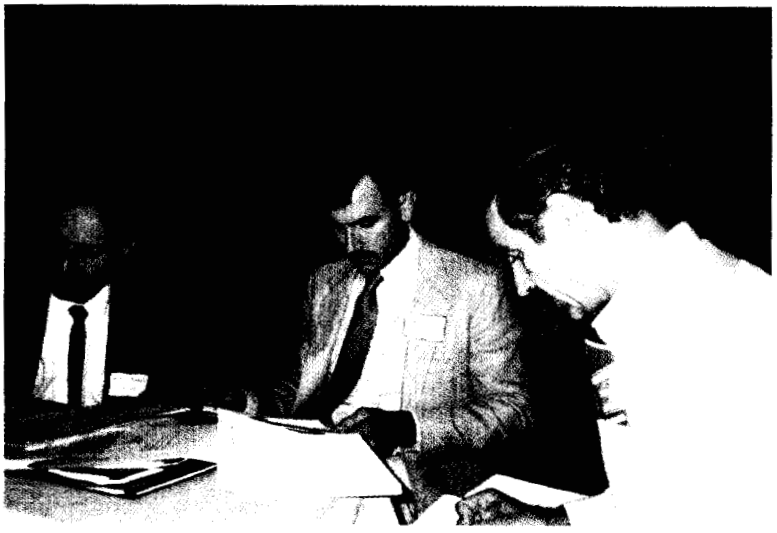
Seen and Overheard at the 1991 Ultrasonics Symposium Technical Program Meeting

"Is this a good working pose?"

"Then there was the time this alligator chased me . . ."

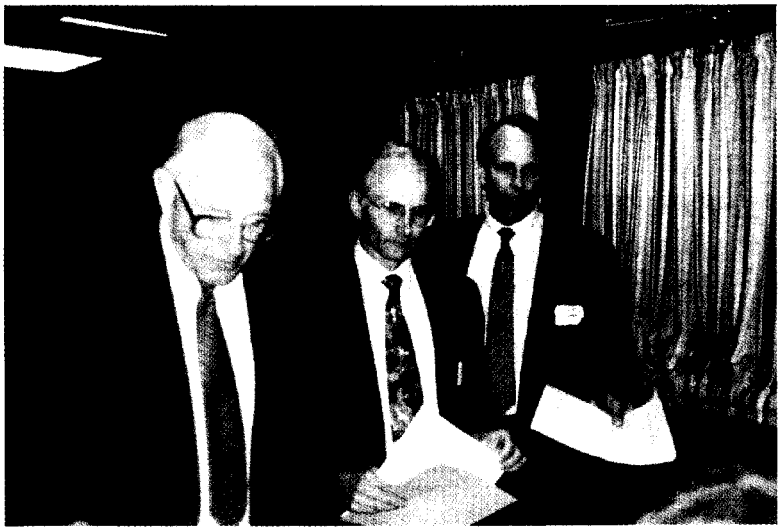
"Harry, I found this error in your dissertation"

"You took the words right out of my mouth"



Well, at least some groups were working

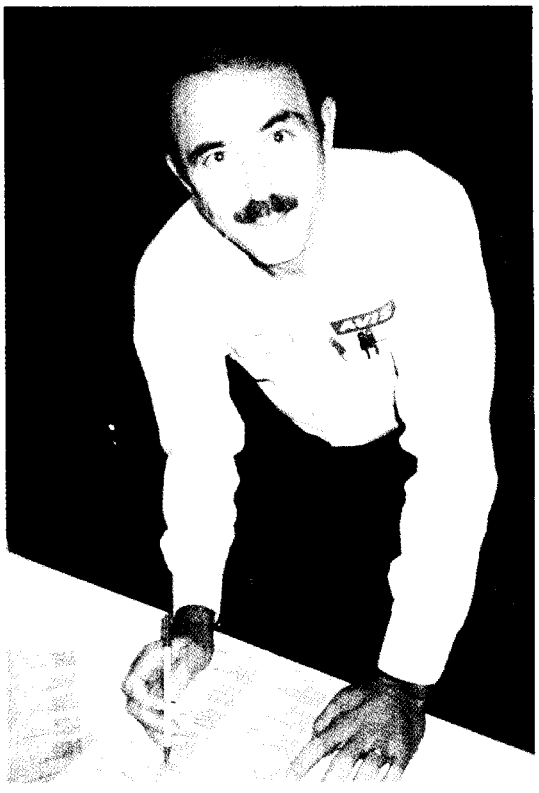
"Your vacation snapshots look great."



"We wish to resign from the Communist Party"

"My bound symposia volumes better be on time next year!"

"Are you really taking Nina with you to Japan?"



"The Avis people are meeting in the next room!!"

Bolef Symposium on Physical Acoustics

In honor of the 70th birthday of Professor Dan I. Bolef, a symposium on physical acoustics has been planned by a group of his former students and colleagues from Washington University in St. Louis, in conjunction with the Ultrasonics, Ferroelectrics, and Frequency Control Society's 1991 IEEE Ultrasonics Symposium.

In the forty years since Dr. Bolef received his Ph.D. at Columbia University he has contributed to the fundamental understanding of molecular beams, solid state masers, elastic properties of solids, and acoustic paramagnetic resonance. In addition, he discovered the acoustic Mössbauer effect with S.L. Rudy and discovered direct nuclear acoustic resonance with M. Menes.

Perhaps more important to Dan than pioneering in physics was the productive and congenial atmosphere he created which allowed his students to work independently and become collaborators. His students have gone on to contribute in a wide range of fields both inside and outside of physics.

From his first ten years spent at Westinghouse Research Laboratories in Pittsburgh to his twenty-two years at Washington University, Dan has inspired his students and colleagues to think independently and to voice their opinions. Dan is now living in rural western Pennsylvania where he is maintaining his political activism by working with local groups on environmental issues.

The Bolef Symposium will take place on Saturday, December 7, 1991, at the Hilton Hotel at Walt Disney World Village in Lake Buena Vista, Florida. **Registration for this Symposium is entirely separate from the 1991 IEEE Ultrasonics Symposium.** The registration fee for the Bolef Symposium alone will be $100.00 and for the Symposium and Dinner/Roast will be $150.00. Checks or money orders and further inquiries should be directed to:

Ronald K. Sundfors/Bolef Symposium
Physics Department
Campus Box 1105
Washington University
One Brookings Drive
St. Louis, MO 63130
Phone: (314) 889-6220 - FAX: (314) 889-6219

Please mail your registration by December 1, 1991. Registration may also be made on the day of the Bolef Symposium.

As can be seen from the following program, the Symposium promises to be very stimulating and the evening Roast a lot of fun, renewing acquaintances and taking the opportunity to pay tribute to Dan Bolef for the role he has played in our lives as scientists and as people. On behalf of the organizing committee it is our pleasure to invite you to attend the:

BOLEF SYMPOSIUM ON PHYSICAL ACOUSTICS

Ronald K. Sundfors Jan Brown

BOLEF SYMPOSIUM PROGRAM - SALON II

In Honor of the 70th Birthday of Dan I. Bolef

December 7, 1991 Lake Buena Vista, Florida

PROGRAM

9:00	Registration & Refreshments	
9:40	Welcome	
	Session I, Robert Melcher, Chair	
9:50	**Dan Bolef**, Washington University	Acoustic Magnetic Resonance and other High Frequency CW Ultrasonic Techniques: A Personal Memoir
10:30	**Charles Elbaum**, Brown University	Ultrasonic Studies of Flux Line Properties In High T_c Superconductors
11:00	**Brage Golding**, Michigan State University	Coherent Acoustic Resonance in Disordered Systems
11:30	Lunch Break	
	Session II, Jan Brown, Chair	
1:00	**Robert Leisure**, Colorado State University	Resonant Ultrasound Spectroscopy of High T_c Superconductors and Metal-Hydride Systems
1:30	**Moises Levy**, University of Wisconsin, Milwaukee	Acoustoelectric and Phonon Interaction in Superconducting Films
2:00	**Harry Ringermacher**, United Technologies	Thermoacoustic Super-Resolution Effects in Thermal Wave Imaging
2:30	Tea and Coffee	
	Session III, Robert Leisure, Chair	
3:00	**George Mozurkewich**, Ford Research	Interaction between Acoustic Waves and Charge Density Waves
3:30	**Jim Stokes**, Exxon Research	Interface Oscillation and Harmonic Generation as a Probe of Dissipation of a Moving Contact Line
4:00	**Jay Maynard**, Pennsylvania State University	Tuning-Up a Quasicrystal
6:00	Cocktails	
7:00	Banquet/Roast	

45TH ANNUAL SYMPOSIUM ON FREQUENCY CONTROL

1991 Frequency Control Symposium Awardees.
Rabi Award, Andrea DeMarchi; Cady Award, Robert C. Smythe; and
Sawyer Award, John G. Gualtieri.

The Annual Symposium on Frequency Control for 1991 was held May 29-31 at the Los Angeles Airport Marriott Hotel. The symposium was preceded by an outstanding 1-day Tutorial Program.

Attendance at both the Tutorials and the Symposium was higher than in recent years (especially by West Coast residents). The poster session was very lively and provided a good forum for extended discussions.

The evening program included a welcoming buffet and a tour of the Jet Propulsion Laboratory (JPL). The JPL tour was booked to capacity and provided an entertaining as well as intellectual discussion.

The Symposium Awards for 1991 were presented at the Plenary Session.

The I.I. Rabi Award was presented to Andrea DeMarchi, Politechnio di Torino, "for contributions to significant improvements in the accuracy and stability of cesium beam frequency standards." David Allan from the National Institute of Science and Technology, made the presentation.

The W.G. Cady Award was presented to Robert C. Symthe, Piezo Technology, Inc., "for contributions to the development of single and dual mode quartz resonators for filter applications." Harry Tiersten, from Rensselaer Polytechnic Institute, made the presentation.

Also presented was the C.B. Sawyer Memorial Award to John G. Gualtieri, U.S. Army Electronics Technology and Devices Laboratory, "for significant contributions in further understanding alpha-quartz as regards to sweeping, etch-channels, irradiation, and developing high yields in photolithographic processing." Joel Martin, from Oklahoma State University, made the presentation.

Jan Brown, Fisher Controls, President of the UFFC Society, presented an IEEE Fellow certificate to Michael Driscoll, Westinghouse.

The 46th Annual Symposium will be held May 27-29, 1992 at the Hershey Lodge and Convention Center, Hershey, PA. The General Chairman is Ray Filler (908-544-2467) and the Technical Program Chairman is Jack Kusters (408-553-2041). Information about future symposia is in the following table.

Forthcoming Annual Symposia on Frequency Control
(as of August 1991)

Year	Dates	Location	Hotel	General Chairman	Technical Program Chairman	Local Arrangements Chairman
1992	May 27 - 29	Hershey, PA	Hershey Lodge and Convention Center	R. Filler	J. Kusters	C. Jensik
1993	June 2 - 4	Salt Lake City, UT	Salt Lake City Marriott	J. Vig	J. Kusters	E. EerNisse
1994	June?	Orlando, FL		J. Vig	L. Maleki	
1995	June?	San Francisco, CA			L. Maleki	

46TH ANNUAL SYMPOSIUM ON FREQUENCY CONTROL

The 46th Annual Symposium on Frequency Control is sponsored with the participation of personnel of the U.S. Army Electronics Technology & Devices Laboratory, Fort Monmouth, NJ. The symposium will be held on May 27, 28, 29, 1992 at the Hershey Lodge and Convention Center, Hershey, Pennsylvania. The symposium committee consists of:

General Chairman:
Dr. Raymond L. Filler
U.S Army LABCOM
Technical Program Chairman:
Mr. Jack Kusters
Hewlett-Packard Company
Finance Chairman:
Dr. Thomas E. Parker
Raytheon Research Division

The Annual Symposium on Frequency Control has served as the leading technical conference addressing all aspects of frequency control and precision timekeeping. Authors are invited to submit papers dealing with recent progress in research, development and applications in areas represented by the following topics:

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

Authors are requested to submit two copies of a summary in sufficient detail for evaluation of the proposed paper (at least 500 words), together with the author's name, address and telephone number. The summary should be sent to:

Mr. Jack Kusters, 52U/07
Hewlett-Packard Company
5301 Stevens Creek Blvd.
P.O. Box 58059
Santa Clara, CA 95052-8059
Tel: 408-553-2041

On the first page of the summary, in the upper right hand corner, please indicate the topic from the list of "Symposium Topics" that best characterizes the paper. There may be a poster session again at this year's symposium. Please indicate at the bottom of the first page of your summary whether you prefer to present your paper at an oral or poster session. Deadline for submission of summaries is January 10, 1992. Authors will be notified of acceptance of papers by March 23, 1992. Accepted papers will be published in the Proceedings of the 46th Annual Symposium on Frequency Control. Complete manuscripts are required by June 15, 1992.

A centralized products, equipment and information exhibit area will be featured at the Symposium. For information on how to arrange for your exhibit please contact:

Michael R. Mirarchi
Synergistic Management Inc.
3100 Route 138
Wall Township, NJ 07719
Telephone: 908-280-2024

Exhibit booths cost $625.00 per booth. The deadline for exhibit arrangements is March 2, 1992.

The Symposium annually honors outstanding contributors to the frequency control area. Nominations for the Cady and Rabi Awards should be sent to:

Mr. Jack Kusters, 52U/07
Hewlett-Packard Company
5301 Stevens Creek Blvd.
P.O. Box 58059
Santa Clara, CA 95052-8059
Tel: 408-553-2041

by January 10, 1992. Information about these awards and about the nominating procedure can be found on page 2 of the 1985 Proceedings.

For any additional information on the 46th Annual Symposium on Frequency Control contact Mr. Michael Mirarchi or Ms. Barbara McGivney, Synergistic Management Inc., 3100 Route 138, Wall Township, NJ 07719 (908) 280-2024.

Tucson Site of 1992 IEEE Ultrasonics Symposium

The 1992 IEEE Ultrasonics Symposium will be held in Tucson, Arizona, October 20-23rd. Tucson and Southern Arizona offer a great variety of attractions ranging from the old west to the cutting edge of science — from a desert museum to an airplane museum—from a cave to a canyon.

The internationally acclaimed Biosphere 2 just 35 miles from downtown is the newest wonder — a human experiment of epic proportion — an enclosed, self-contained ecosystem is which eight Biospherians will live for two years and practice ways to live in the future.

Just west of the city is Old Tucson Studios, the famous movie location and western-themed attraction where visitors can watch the filming of movies (and often see famous movie stars), ride a stagecoach or mine train and witness a gunfight.

Up the road from Old Tucson Studios is the world-famous Arizona-Sonora Desert Museum, which has been heralded as one of the top 10 zoos in the country by *The New York Times*. This "living" museum features plants and animals unique to the Sonoran Desert.

Nine miles southeast of Tucson is The San Xavier del Bac Mission, one of the best examples of Spanish mission architecture, located on the Tohono O'ohdam Indian Reservation. Known as the "White Dove of the Desert," the mission is the site of several community celebrations throughout the year.

The Titan Missile Museum is a deactivated Titan missile complex and silo near Green Valley, Arizona, about 20 miles southwest of Tucson. Guided tours of the museum and a memorial to the Air Force personnel who maintained peace and freedom with the Titan weapon system are available for the public.

Twenty-two miles southeast of Tucson is Colossal Cave, thought to be the largest dry cavern in the world. Guided tours of the cave reveal fascinating crystal formations and stories of bandit hide-always. The Rincon Mountain Unit of the Saguaro National Monument is located in the range of mountains forming the eastern boundary of the Tucson valley.

Sabino Canyon, on Tucson's northeast side, is situated in the Catalina National Forest and has creeks, waterfalls, birds, coyote, deer and colorful desert vegetation. It is a popular place for picnicking, hiking and swimming. Guided tram rides are available.

The beautifully landscaped campus of the University of Arizona is in the heart of Tucson. Campus attractions include the Grace H. Flandrau Planetarium, the Arizona State Museum, the Center for Creative Photography, the Museum of Art and the Mineral Museum.

Plan to come early and stay late so that you can enjoy some of these attractions as a supplement to your symposium activities. See you in Tucson in '92! For further information on the 1992 symposium contact Fred Hickernell, Motorola Inc. P.O. Box 1417, Scottsdale, AZ 85252-1417 U.S.A. Telephone 602-441-2923, FAX 602-441-7097.

Cannes Site of 1994 IEEE Ultrasonics Symposium

The location and the date of the 1994 Ultrasonics Symposium has been established. It will take place in the Hotel Martinez in Cannes on the French Riviera on November 1st, 2nd and 3rd. Cannes is famous for its Film Festival and is one of the most beautiful French resorts along the Mediterranean. It is the symbol of the "European Luxury Way of Life".

The Hotel Martinez overlooks the Mediterranean and the romantic montain called "Esterel" is in the background. This palace has been recently entirely refurbished in the original 1930 style and offers all the amenities required for our symposium. At this time of the year, even if the latitude of Cannes is the one of Boston, it will be possible to swim in the blue and quiet sea from the private beach of the Hotel just across "La Croisette," the avenue known by all movie aficonados. Finally, one of the hotel restaurants, "La Palme d'Or," has become one the ten best tables in France.

C. Maerfeld
Thomson - CSF

FUTURE ULTRASONICS SYMPOSIA

1992 IEEE Ultrasonics Symposium
Tucson, AZ — 20-23 October 1992
For information contact:

Fred S. Hickernell, *General Chair*
Motorola, Inc.
Government Electronics Group
MD H-1019
8201 East McDowell Road
Scottsdale, AZ 85252
(602) 441-2923

Gary K. Montress, *Technical Program Chair*
Raytheon Company
Research Division
131 Spring Street
Lexington, MA 02173
(617) 860-3053

1993 IEEE Ultrasonics Symposium
Baltimore, MD — 8-10 November 1993
For information contact:

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

Ralph Treder, *Technical Program Chair*
AT&T
Bell Laboratories
Engineering Research Center
P.O. Box 900
Princeton, NJ 08540
(609) 639-3020

1994 IEEE Ultrasonics Symposium
Cannes, FRANCE — 1-4 November 1994
For information contact:

Gerard J. Quentin, *General Co-Chair*
G.P.S. Tour 23
Universite Paris 7
2 Place Jussieu
75251 Paris CEDEX 05
FRANCE
(33) 1-43-29-51-22

or

Herman van de Vaart, *General Co-Chair*
Allied-Signal, Inc.
Research & Technology
P.O. Box 1021
Morristown, NJ 07962
(201) 455-2482

Bernhard R. Tittmann, *Technical Program Chair*
The Pennsylvania State University
Department of Engineering Science & Mechanics
227 Hammond Building
University Park, PA 16802-1484
(814) 865-7827

1995 IEEE Ultrasonics Symposium
Seattle, WA — October 1995
For information contact:

Gerald V. Blessing, *General Chair*
National Institute of Standards & Technology
Building 233, Room A-147
Gaithersburg, MD 20899
(301) 975-6627

OTHER UFFC-S SPONSORED SYMPOSIA

46th Annual Symposium on Frequency Control
Hershey, PA — 27-29 May 1992
For information contact:

Raymond L. Filler, *General Chair*
U.S. Army LABCOM
Electronics Technology & Devices Laboratory
SLCET-EQ
Fort Monmouth, NJ 07703-5000
(908) 544-2467

Jack A. Kusters, *Technical Program Chair*
Hewlett-Packard Company
5301 Stevens Creek Boulevard
Santa Clara, CA 95052
(408) 553-2041

47th Annual Symposium on Frequency Control
Salt Lake City, UT — 1-4 June 1993
For information contact:

John R. Vig, *General Chair*
U.S. Army LABCOM
Electronics Technology & Devices Laboratory
SLCET-EQ
Fort Monmouth, NJ 07703-5000
(908) 544-4275

Jack A. Kusters
Hewlett-Packard Company
5301 Stevens Creek Boulevard
Santa Clara, CA 95052
(408) 553-2041

1992 IEEE International Symposium on Applications of Ferroelectrics
Clemson University, Clemson, SC — 31 August - 2 September 1992 For information contact:

Gene H. Haertling, *General Chair*
Clemson University
Department of Ceramic Engineering
Olin Hall
Clemson, SC 29634
(803) 656-0180

Angus I. Kingon, *Technical Program Chair*
North Carolina State University
Department of Materials Science & Engineering
Materials Research Laboratory
P.O. Box 7907
Raleigh, NC 27695-7907
(919) 737-2867

UFFC-S ADCOM BRIEFS

The Administrative Committee (ADCOM) Meeting of the Ultrasonics, Ferroelectrics, and Frequency Control Society (UFFC-S) was called to order at 9:00 a.m., July 1, 1991 by J. Brown.

President Brown introduced the new members of the ADCOM; Errol P. EerNisse, Helmut Helwig, and Gary K. Montress. She also welcomed Gene H. Haertling the General Chair of the 1992 International Symposium on Applications of Ferroelectrics.

J. Brown reported that TAB is considering returning their entitlement funds to help the IEEE general fund. This opens the question of whether TAB should be self supporting. ADCOM directed the President to vote against TAB becoming self funded.

TAB is considering a minimum member-nonmember registration fee differential of $20.00 for all conferences, workshops, etc. but that the $20.00 go directly to TAB or the Institute. President Brown will vote against this motion.

Also under discussion in TAB; Should all IEEE members be members of a technical society. ADCOM also directed the president to vote against a TAB motion to require IEEE members to belong to a Technical Society.

The next item President Brown discussed is the idea that chapters report to the technical societies instead of the sections. The consensus of the ADCOM is that the President should not support such a motion.

J. Brown reported that the TAB vice-president is appointed by the IEEE Board of Directors of which less than 50% represent technical societies. The question before TAB is whether TAB should elect its own vice-president. ADCOM directed the President to vote for the election of the TAB vice-president by TAB itself.

J. Brown reported on the new formula for the Book Broker program. For 1991 we will be reimbursed the greater of the old formula or the new schedule. In addition, the IEEE is now set up to be competitive with outside printers for publishing the Proceedings.

J. Brown mentioned that every year two or three Societies have their reserves wiped away because they publish more pages in their Transactions than they budgeted. On the other hand, if you under publish, the Society makes money. There is a question of whether this is ethical. In order to encourage Societies to budget pages more realistically or at least not profit from under publishing, she is recommending that the money which normally would go to the under publishing Society would go to the TAB general fund. After much discussion on this issue, the ADCOM recommended that there be no reward for under publishing and no penalty for over publishing up to some limit, i.e. 10%.

ADCOM passed the following resolution.

"It is the will of the UFFC-S ADCOM that proceedings and digests of all symposia and conferences sponsored by the society be published in as timely a manner as possible.

To this end, it is UFFC-S policy that the proceedings and digest technical papers associated with all UFFC-S sponsored symposia and conferences not be subjected to the peer-review process used for IEEE Transactions articles.

Initial selection of papers, based on abstracts or summaries, shall be the sole review mechanism.

The technical paper manuscripts shall be submitted in standard IEEE two-column, camera ready format, and shall not be subject to further *technical* review. Review for compliance with editorial instructions, pagination, etc., shall be the only review, and publication shall be targeted to take place within three months of the date that the manuscripts are due to the editor."

ADCOM approved changes to the Bylaws. Bylaws are published in full elsewhere in this Newsletter.

President Brown appointed a committee chaired by G. Farnell to look into the issue of ADCOM Travel Expense. This committee will bring a proposal to the next ADCOM meeting.

President Brown appointed a committee chaired by T. Parker to formulate a Symposium Procedures Manual.

President Brown appointed a committee chaired by W. O'Brien to develop a business plan and job description for a Society Administrator.

President Brown appointed a committee chaired by B. Tittmann to develop a manual for new ADCOM members.

ADCOM approved the slate of nominees for election to ADCOM brought from the Nominations Committee.

F. Hickernell reported that the Spring newsletter was done using electronic publishing. The deadline for the Fall Newsletter will be August 15, 1991.

W. O'Brien gave the Transactions report. 605 pages were published in 1990. There are two special issues scheduled for 1991: Thin Film Ferroelectrics containing 8 or 9 papers and Ferroelectrics with 10 papers. He also reported that the Transactions will go electronic starting with the January 1992 issue.

R. Tancrell reported that the 1991 Cady Award was presented to Dr. Robert C. Smythe and the 1991 Rabi Award was presented to Dr. Andrea DeMarchi.

Both Awards were presented during the 45th Annual Symposium on Frequency Control.

The Distinguished Lecture for 1991-1992 is Dr. Moises Levy. His topic is "Ultrasonics of High Tc and Other Unconventional Superconductors."

A. Ballato presented the report on Standards activities. He has appointed Dr. Peter Edmonds as Chair of the Ultrasonics in Medicine subcommittee. Dr. Edmonds replaces Fred Kremkau who resigned after ten years of service. He reported that Standard 319-1990 "Magnetostrictive Materials: Piezomagnetic Nomenclature" has been published.

ADCOM approved a new Society Logo and a set of Guidelines on the Use of the UFFC Logo and "UFFC".

H. van de Vaart reported that the Society's surplus at the end of 1990 was $141.1K with reserves of $345.2K. So far in 1991, as of 4/30/91, our surplus is $103.5K and our reserves are $448.7K.

ADCOM approved the 1992 UFFC-S budget. The budget calls for a Transactions page budget of 896 pages. The budgeted surplus is $103.7K.

G. Haertling presented the report on the 1992 ISAF. The Symposium will be held on August 31 to September 2, 1992 at the Hyatt Regency Hotel in Greenville, South Carolina. ADCOM approved the 1992 ISAF budget. ADCOM also recommended that the ISAF be held yearly.

T. Parker presented the report on the 1991 Frequency Control Symposium. The attendance was 362 which is up from last year. He also reported that a nominations committee has been established for the Rabi and Cady awards. J. Vig is chairing this committee. He also reported that the Frequency Control Committee has been approached by Sawyer Research Products to take responsibility for selecting the winner of the Sawyer Award.

ADCOM approved the site selection of the "1994 Frequency Control Symposium in Orlando, FL and the 1995 Frequency Control Symposium in San Francisco, CA."

D.C. Malocha gave a short presentation on the 1991 Ultrasonics Symposium to be held in Orlando, FL. The hotel rate is $110.00 per night. National Car Rental is the Symposium rental car carrier. They have an office in the hotel. Delta will be the official airline. He is trying to negotiate international flights with Delta.

F. Hickernell gave a report on the 1992 Ultrasonics Symposium in Tucson. The Symposium budget will be ready for approval at the next ADCOM meeting.

H. Salvo reported on the 1993 Ultrasonics Symposium. The Symposium will be held at the Hyatt Regency Hotel in Baltimore on November 8 to 10, 1993.

G. Farnell reported that the 1994 Ultrasonics Symposium will be held on November 2 to 5, 1994 in Cannes, France. H. van de Vaart has agreed to be the Co-chair for this meeting. B. Tittmann will be the technical chair.

J. Greenleaf suggested that we consider having all three of our conferences held together in 1996 and then every four years. In particular he mentioned the year 2000 for a large meeting. This discussion will be an agenda item for the next ADCOM meeting.

The next ADCOM meeting of 1991 will be Sunday, December 8, 1991 at 9:00 a.m. in Orlando.

The UFFC-S ADCOM adjourned at 5:22 p.m.

Harry Salvo
Secretary, UFFC-S

1991 UFFC-S ADMINISTRATIVE COMMITTEE

IEEE HEADQUARTERS

Director, Div IX:	H.W. Coooer
Secretary, TAB:	I. Engleson

SOCIETY OFFICERS

President:	J. Brown	Fisher Controls International
Vice President:	J.F. Greenleaf	Mayo Clinic
Secretary/ Treasurer:	H.L. Salvo, Jr.	Westinghouse ESG

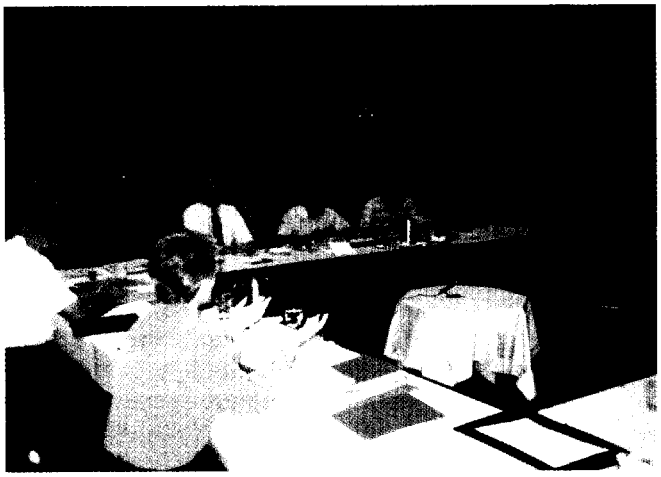
ELECTED COMMITTEE MEMBERS

1989-1991	J.F. Greenleaf	Mayo Clinic
1989-1991	H. Ermert	Ruhr Universität–Bochum
1989-1991	D.C. Malocha	University of Central Florida
1989-1991	C.E. Yeack-Scranton	IBM Research Division
1990-1992	H.L. Bertoni	Polytechnic University
1990-1992	M. Levy	University of Wisconsin–Milwaukee
1990-1992	C. Maerfeld	Thomson Sintra DTAS
1990-1992	C.S. Tsai	University of California–Irvine
1990-1992	G.W. Farnell	McGill University
1991-1993	E.P. EerNisse	Quartex, Inc. & Quartztronics, Inc.
1991-1993	H. Hellwig	Air Force Office of Scientific Research
1991-1993	G.K. Montress	Raytheon Research Division
1991-1993	H. Takeuchi	Hitachi, Ltd.

EX-OFFICIO

Awards	R.H. Tancrell	Raytheon Research Division
Fellows	R.M. White	University of California–Berkeley
Ferroelectrics	L.E. Cross	The Pennsylvania State Univ.
Finance	H. van de Vaart	Allied-Signal, Inc.
Frequency Control	T.E. Parker	Raytheon Research Division
Membership	D.C. Malocha	University of Central Florida
Newsletter	F.S. Hickernell	Motorola, Inc.
Nominations	B.R. Tittmann	The Pennsylvania State Univ.
Standards	A. Ballato	US Army LABCOM
Transactions	W.D. O'Brien, Jr.	University of Illinois - Urbana
Ultrasonics	G.W. Farnell	McGill University

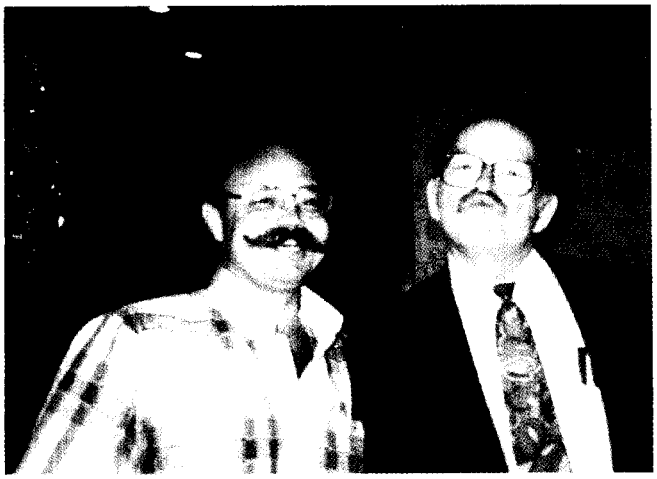
AdCom – June '91



Let's all rise and sing the UFFC anthem.

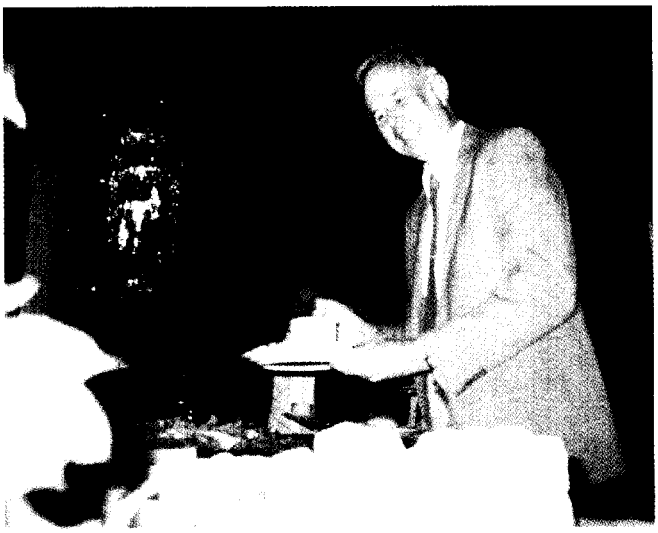
There is an idea in there someplace.

Chen and Gerry are all smiles.



The transactions editor and vice president hamming it up.

Fred, no remarks about the tie.



Art, I wore mine too.

A Note From The President

THANK YOU to all you! Members and especially volunteering members are the backbone of the Society without which there would be no Society. You are all to be congratulated for your technical and personal contributions to the Society.

As I mentioned in my last note to you, membership in the IEEE comes in four main categories: Student, Member, Senior Member and Fellow. You all owe it to yourselves professionally to seek the highest level of membership for which you are qualified. You may nominate yourself to become a Senior Member. You must be nominated by a professional colleague to become a Fellow. I encourage all of you to become familiar with the criteria to file for membership upgrade. You may obtain information and nomination packets by calling: William Hunter (908) 562-5522 for Senior Member and Delores Wright (212) 705-7750 for Fellow.

In addition, I would like to encourage all of you to reflect upon what benefits have accrued to you by membership in the IEEE. For those of you who attend the Symposia and tutorials and who publish in the Transactions, these benefits are obvious. Copies of Institute and Society publications are also an obvious benefit. In the words of members from other societies there are a number of not so obvious benefits of which you should be aware. The opportunity to get together with peers to expand technical knowledge in Chapter, Section, Region, and Society meetings. This access to peers and technical developments allows you to expand business and technical contacts, network, and keep abreast of the latest technical developments and standards.

In addition, it provides a forum where you can achieve international exposure and recognition. While this may appear to you that I am preaching to the choir, I urge all of you to consider this information and encourage a colleague to join the IEEE and a society or societies of his/her choice.

Before I leave the topic of membership, I would like to remind you that we have instituted an Ambassador Program to provide memberships to our colleagues in those regions of the world where income and currency restrictions make membership difficult to impossible. Should any of you be traveling to Regions 8 through 10 (anywhere outside North America), please contact our Membership Chair, Don Malocha (407) 823-2414, for Ambassador information so that you may present memberships on behalf of the UFFC.

Jan Brown
UFFC-S President

On the Institute front: Cash Flow continues to be a major issue. While the Institute has plenty of assets, they are not liquid assets. A tremendous effort has been put forth by staff and volunteers to remedy the situation. A long term plan has been put in place to return the Institute to a healthy cash position.

This plan has not been without pain. All major boards of the Institute have been asked to do their share in contributing to the General Fund and reserve by cutting their costs and returning a portion of their entitlement.

In TAB, the Technical Activities Board comprised of all the Societies and Councils, we sought to find ways to cut our costs without eliminating services and find new revenue streams to share with the General Fund. In all cases, we have tried to institute measures which make good business sense and do not constitute an ongoing "TAX" on the societies.

Thank You all for your work on behalf of the Society. If any of you are inspired to become more active, please give me a call (512) 834-7230 or FAX (512) 834-7200. I look forward to hearing from you!

Jan Brown
President, UFFC-S

CHAPTER ACTIVITIES

Tokyo Chapter

1. Technical Meeting

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

1)	February 19, 1991	6 papers	Tokyo
2)	March 19, 1991	7 papers	Tokyo
3)	April 18, 1991	6 papers	Tokyo
4)	May 17, 1991	6 papers	Tokyo
5)	June 22, 1991	6 papers	Tokyo
6)	July 16, 1991	8 papers	Tokyo

2. USE 91 and UFFC-S 1991-1992 Distinguished Lecturer

The Tokyo Chapter is going to sponsor the USE 91 (the 12th Symposium on Ultrasonic Electronics) which will be held in Tokyo on December 2-4 this year. More than 100 papers are expected to be presented including some invited talks. Professor Yamanouchi, Chairman of the Tokyo Chapter, is now arranging to invite Japan UFFC-S 1991-1992 Distinguished Lecturer, Professor Levy at the end of this year.

3. Errata

The following errors appeared in the printed text in the Spring Issue of 1991. First name of the Chairman, Kazuhiki should be Kazuhiko. Address and telephone number of the secretary (Professor Kojima) should be: 6-1-1 Tamagawa-gakuen, Machida-shi 194, Japan Tel 0427-28-3463.

Masatsune Yamaguchi
Vice Chairman

Results of the Administrative Committee Election Ballot

The following candidates have been elected for a three-year term to the IEEE Ultrasonics Ferroelectrics and Frequency Control Society Administrative Committee beginning January 1, 1992:

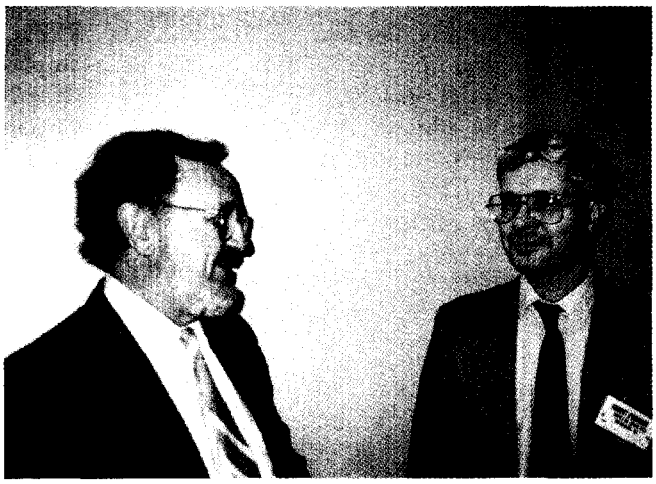
Eric L. Adler
Helge E. Engan*
James G. Miller
Susan C. Schneider

*Regions 8-10 Representative

We wish the newly elected members of the Administrative Committee success and thank all nominees for their willingness to serve and for permitting their names to be included on the ballot.

Ferroelectric Committee

These short stand-up meetings are great.



See you at Clemson in September 1992.

IEEE TRANSACTION ON ULTRASONICS, FERROELECTRICS, AND FREQUENCY CONTROL

Electronic Publishing Guidelines

Effective immediately, the *UFFC Transactions* will be electronic publishing manuscripts. It is our hope that electronic publishing will mean savings (1) in time from submission of original manuscript to publication, and (2) in costs associated with the production of the *UFFC Transactions*.

Simply stated, upon final acceptance of the manuscript, the author is requested to submit the final version of the manuscript in electronic form, i.e., prepared using one of many software word processors and sent to the Associate Editor on floppy disk. This includes text, equations, references, tables and biosketches. Figures will be processed as they have been in the past, i.e., we will continue to request original copies of figures, photos, etc. **An identical paper copy will also be required.**

- Make sure that **both** the paper version and the floppy disk version are **identical**.
- Do not try to be overly fancy. Leave the format to the publisher.
- Adher to the accepted style of the *UFFC Transactions*. Of particular importance is the reference list --- consult a recent issue of the *UFFC Transactions*.
- Package your floppy disk to minimize possible shipping damage.
- **Write on floppy disk label**: (1) paper title, (2) authors, (3) exact type of computer used and (4) type of word processor used, including version number.
- Also, include an **ASCII** version of the manuscript on the disk, if possible.

The IEEE can accept:

- Any IBM-PC disk format: 5.25"/360k/1.2Mb - 3.5"/720k/1.44Mb (DS/DD, DS/HD, DS/QD, etc.)
- Macintosh disk format.
- 0.25" magnetic tape cartridges (Unix: tar, dump).
- 3.5" floppy disk (UNIX workstations).
- Any of the following:

Microsoft Word (incl non-default type styles)	Multimate	Wordstar 2000
Sprint	Wang IWP	Volkswriter 3
ASCII	DIF	Officewriter 6.0
Writing Assistant	First Choice	XyWrite
Wordstar (all versions)	RTF	WordPerfect (all versions)
WordMarc	Displaywrite	Samna
ProWrite 1.0/2.0	DCA/FFT	DX
SmartWare II	CEOwrite	PFS: Write A, B, C
DCA/RFT	Mass-11	TROFF/NROFF
	Nota Bene	

- Interleaf, TEX and LaTEX, but if you have written macros that are required to produce the hard-copy, then IEEE requires them to be available on your submitted electronic media.

William D. O'Brien, Jr.
Editor-in-Chief

Revised UFFC Bylaws

About a year ago AdCom decided that several changes in the Society Bylaws were in order. The last major revision to the Bylaws occurred in 1985 when our name was changed from Sonics and Ultrasonics Group to Ultrasonics, Ferroelectrics, and Frequency Control Society, followed by some minor revisions in 1986. Since that time, several changes in the way our Society operates have occurred that were not reflected in the Bylaws. For example, the responsibilities of the Finance and Operations Committee (formerly the Finance Committee) have been expanded to include acting as the sole interface between the Society and IEEE in all financial matters, establishing audit committees to audit the financial records of each Symposium, and updating the Bylaws. The duties of the Awards Committee were updated to include selection of the Distinguished Lecturer. With the rescission of the Memorandum of Understanding between the US Army and UFFC regarding the Annual Symposium on Frequency Control, the duties of the Frequency Control Committee were modified so that they are now identical to those of the Ultrasonics Committee and the Ferroelectrics Committee. Regarding the Transactions, terms of office for the Editor-in-Chief and the Associate Editors have been instituted by AdCom and are now included in the Bylaws. Finally, all references to gender have been deleted, i.e. "Chairman" has been changed to "Chair," "Chairmen" has been changed to "Chairs," and all sentences that contained "he" or "his" have been modified. The revised Bylaws were approved by AdCom at its meeting on June 1, 1991 and are printed below.

H. van de Vaart,
Chair UFFC Finance and Operations Committee.

Approved by UFFC-AdCom: 6-1-91

BYLAWS
IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society

1. Nature of the Bylaws. These Bylaws are intended to provide general, and in some cases explicit, instructions for the supervision and management of the affairs of the Society, in accordance with the Society Constitution and the IEEE Technical Activities Manual which includes the Constitution and Bylaws of the IEEE. Amendments to these Bylaws may be made by means of the procedures described in Article 9, Section 9.2 of the Constitution. Decisions on procedures made and voted by the AdCom as reported in its Minutes are binding as written and approved. Only the most important and time independent procedures shall be incorporated in the Bylaws.

2. Membership.

2.1 Regular Members. There shall be only one grade of Society membership available to all IEEE members, based on the payment of the annual fee prescribed in Section 4.1 of these Bylaws.

2.2 Honorary Life Members. Such membership, exempt of the payment of the annual fee, shall be based on the recommendation of the Awards Committee and the approval of AdCom.

2.3 Affiliates. No Societies are recognized for affiliate purposes. However, Affiliates may join in accordance with any other provision that may be incorporated in the IEEE rules and regulations.

2.4 Students. An exception to the annual fee shall be made for students, as prescribed by IEEE rules and regulations.

2.5 Voting Membership. The voting membership shall be constituted of Regular Members, Honorary Life Members and Affiliates.

3. Administrative Committee (AdCom).

3.1 AdCom Makeup. Article 5, Section 5.1 of the Constitution provides that AdCom shall consist of a President, a Vice-President, not more than 15 ex-officio members, and 12 elected members. Of the elected members, at least three must be from regions 8 through 10. Article 7, Section 7.2 of the Constitution provides that a quorum shall be nine members, without distinction between elected members and ex-officio members, and that all members shall have an equal vote. Unless otherwise provided, a majority vote of the members attending an AdCom meeting shall be sufficient for the conduct of its business.

3.2 Ex-Officio Members. The following shall be ex-officio members with vote if they are not already elected members (in any case, each shall have only one vote):

a. The retiring AdCom President for a period of three years.
b. Chairs of the standing committees as listed in Section 5.1 of these Bylaws.
c. Secretary-Treasurer
d. Transactions Editor-in-Chief
e. Newsletter Editor-in-Chief

3.3 Absences and vacancies. In order to create a continuously active AdCom, elected and ex-officio members who miss three consecutive meetings will be dropped from mem-

bership in AdCom in the absence of extenuating circumstances. A vacancy in the elected membership thus or otherwise created will be filled by appointments for the unexpired term by the President as prescribed in Article 6, Section 6.1 of the Constitution.

3.4 Nomination of Members. A slate of nominees for vacancies on AdCom shall be prepared by the Nominations Committee for approval by AdCom at its first scheduled meeting of the year. The number of nominees shall be at least six from regions 1 through 7 and at least two from regions 8 through 10, and proper consideration shall be given to technical interest. Nominees may also be presented by Society members. A Nominating Petition, carrying at least 25 names of Society members, places that nominee automatically on the slate. Nominees may also be presented from the floor by members of AdCom. A simple majority vote will place the nominee on the ballot. All nominees must be voting members of the Society in good standing at the time of nomination.

3.5 Election of Members. The election to fill forthcoming vacancies on AdCom shall be by mail ballot to the entire Society voting membership. To ensure representation from regions 8 through 10, each member shall vote for three nominees from regions 1 through 7, and for one nominee from regions 8 through 10. The deadline for the return of the ballots shall be not less than 30 days after the actual date of mailing of the ballots. Distribution, collection, and counting of ballots shall be done by IEEE Headquarters. Election shall be based on the highest number of votes, taken in descending order for the candidates from regions 1 through 7, and in descending order for the candidates from regions 8 through 10. Ties shall be broken by AdCom. The Chair of the Nominations Committee shall insure an orderly progression and completion of the election procedure prior to the last scheduled AdCom meeting of the year.

3.6 Nomination and Election of Officers. At its last scheduled meeting of the year, AdCom shall elect a President and a Vice-President for the following year. Nominations will be invited from the floor and election shall be by secret ballot. A majority of the ballots shall determine the election. In case there are more than two nominees, and nobody receives a majority, the nominee with the lowest number of votes shall be dropped from the slate, and the voting repeated until a majority is obtained. The election for President shall be conducted by the incumbent President, unless the incumbent President is nominated for reelection, in which case the Vice-President shall conduct the election. The election for Vice-President shall be conducted by the incumbent President.

3.7 Term of Office. As provided in Article 5, Section 5.1 of the Constitution, the term of both the President and the Vice-President shall be for one year, commencing January 1, and either may be reelected for a second term of one year. Whether the President serves for one or two years, the retiring President shall not be eligible for election to the same office until a lapse of three years. Eligibility for the Vice-President is restored after a lapse of one year.

3.8 Duties of Officers and Members of AdCom. It is intended to retain as much flexibility in the operation of AdCom as possible. Therefore, with the exception of a few minimum requirements, the provisions of this section are intended to serve as general guidelines without being binding in detail. It is the responsibility of all officers and standing committee chairs to continue in service until their successors have had the opportunity to be briefed, receive the files appropriate to their offices, and in other respects take the reins of office. Transfer of Society records and files should always be confirmed in writing, with copies of the letter of transmittal sent to the Secretary-Treasurer. At the discretion of the President, archive files may be transferred to the Ultrasonics, Ferroelectrics, and Frequency Control Society section of the IEEE Archives.

3.8.1 President. The President shall supervise the affairs of the Society, as defined in Article 5, Section 5.2 of the Constitution, and shall speak for the Society on all matters not specifically delegated to others. The President is automatically a member of certain IEEE committees, and in these positions is expected to promote the interest of the Society, and to influence for the better the conduct of IEEE affairs. The President shall also serve as the Society representative on the IEEE Division IX Nominating Committee. The Society may provide funds to enable the President or designated alternate to attend the IEEE TAB Meetings and to chair the first scheduled AdCom meeting of the year, provided that all possibilities of employer reimbursement have been exhausted.

3.8.2 Vice-President. The Vice-President shall fulfill the Presidential duties in the President's absence or incapacity, and shall fulfill such other functions as directed by the President or AdCom.

3.8.3 Secretary-Treasurer. The Secretary-Treasurer shall be appointed by the President as prescribed in Article 5, Section 5.1.3 of the Constitution and shall be responsible for keeping the records of AdCom. These responsibilities include preparing and distributing meeting notices and minutes in sufficient detail so that they constitute a satisfactory record of decisions made by AdCom and other Society affairs, maintaining a complete file of minutes, financial records and other correspondence which will become the permanent record of the Society, endorsing and transmitting to IEEE all bills for payment, and monitor rates of receipts and expenditures in order to insure conformance to the Society's budget and guidelines as imposed by AdCom.

3.9 Meetings. The basic conduct of AdCom meetings is covered in Article 7, Section 7.2 of the Constitution. No AdCom meetings shall be held for the purpose of transacting business unless each member has been notified of the place and time of such meeting at least ten days prior to the scheduled date of the meeting. In case less than a quorum attend a duly called meeting, tentative actions may be taken which will become effective upon ratification at a subsequent meeting or by mail by a sufficient number of members as to constitute a majority. Minutes of each meeting shall be mailed

to all AdCom members at least ten days before the next scheduled meeting.

4. Society Funds.

4.1 Annual Fee and General Expenditures. The Society may raise funds as specified in Article 4 of the Constitution and in the IEEE Bylaws and rules and regulations. The Society may spend funds within the same restrictions. Expenditures must fall within budget projections, as approved by AdCom. It is the responsibility of the Secretary-Treasurer to monitor the expenditures, and in case of gross deviations from the budget consult with the Finance and Operations Committee and obtain AdCom approval for those expenditures. The annual Society fee shall be set by AdCom subject to approval by the IEEE Executive Committee. The Affiliate fee shall be equal to the Society fee plus an IEEE support surcharge set by the IEEE Executive Committee. Actual Society fees are to be found in the current IEEE fee schedule. IEEE Headquarters shall act as a bursar for all Society funds except as specified hereunder. Billings and receipt of the annual fee shall be via the IEEE Membership and Fiscal Departments. All other fiscal affairs shall be handled through the office of the TAB Secretary.

4.2 Symposia Funds. Financial arrangements of conferences or symposia sponsored or co-sponsored by the Society shall be covered by a separate budget with adequate safeguards against undue risk. The general committee for such a conference or symposium may authorize the Conference Treasurer or Finance Officer to open an account to be used for the deposit and disbursement of funds related to the symposium and may request from the Society's general fund a loan to cover expenses in advance of the symposium. The Symposium General Chair is required to submit a formal budget to AdCom for approval at least ten months before the symposium, and to present a final account of symposium income and expenses at the first scheduled meeting after the symposium. The symposium budget shall also be submitted to the IEEE General Manager for approval, and a financial report to IEEE is required no more than six months after the symposium. Final transfer of funds from the Symposium account to the Society's general fund, including return of the loan, must be completed within a year after the symposium.

4.3 Other. In other activities involving the Society or any of its subgroups, financial commitments shall be approved by AdCom, and prudent arrangements shall be made to safeguard the Society funds that may be involved.

5. Committees.

5.1 Standing Committees. Standing Committees may be added or deleted by AdCom as the need arises through amendment of the Bylaws, subject to the restrictions imposed by Article 5, Section 5.1 of the Constitution. Standing Committee Chairs shall be appointed by the President and ratified by a majority of the elected members of AdCom. It will be discretionary with the President to appoint part or all of any standing committee, or to appoint the Chair only and request the latter to appoint additional committee members. The Standing Committees shall be:

1. Awards
2. Membership Services
3. Fellows
4. Ultrasonics
5. Ferroelectrics
6. Frequency Control
7. Nominations
8. Standards
9. Finance and Operations

5.2 Term of Office. The terms of office of the chair and members of the standing committees shall be for one year. However, because it is recognized that the tasks in connection with Society activities are of perpetual nature and it takes some time to become familiar with these tasks and be effective, chairs of these committees are encouraged to serve more than the minimum term. Therefore, the number of terms of office is not limited by these bylaws.

5.3 Ad Hoc Committees. Special or Ad Hoc Committees may be created by AdCom as the need arises, as provided for by Article 5, Section 5.3 of the Constitution. For each such case, AdCom shall specify if the chairman is to be an ex-officio member of AdCom with or without vote, the number of members the committee shall have and how the members are to be selected, and the terms of office of the Chair and the members if other than for the life of the Committee. Unless otherwise specified, Special or Ad Hoc Committees shall be automatically dissolved after a period of two years.

6. Duties of Standing Committees.

6.1 General. As with the duties of AdCom officers as noted in Section 3.8 of these Bylaws, the duties of the Standing Committees as listed below are intended to be general guidelines, and serve as minimum requirements only. Each Standing Committee Chair is expected to gather information from IEEE documents, from other IEEE Societies, from non-IEEE groups where appropriate to establish a point of reference for the Society's operations, and in general remain aware of the status of the Society within its sphere of interest. The Chair shall take the initiative to inform AdCom of developments which may affect its operations and plans and shall prepare written and oral reports for presentation to AdCom at its meetings.

6.2 Awards Committee. The Awards Committee is charged with the following responsibilities:

a. Select candidates and prepare nominations for the various IEEE Awards listed in the IEEE Awards Manual.
b. Evaluate nominations for IEEE Awards if requested to do so by the IEEE Awards Board.
c. Recommend members for Honorary Life Membership.
d. Select candidates for Society Awards.

These Awards are:

1. The Ultrasonics, Ferroelectrics, and Frequency Control Society Achievement Award.

2. The Ultrasonics, Ferroelectrics, and Frequency Control Society Outstanding Paper Award.

3. The Distinguished Lecturer Award.

Nominations for Society Awards shall be considered annually by the Awards Committee, although awards need not be made annually. The Committee's decision is final and need not be ratified by AdCom, except for Honorary Life Membership and the Distinguished Lecturer Award. Additional Technical Awards may be awarded by the Ultrasonics, Ferroelectrics, and Frequency Control Standing Committees.

6.3 Membership Services Committee. The Membership Services Committee shall encourage membership in the IEEE and especially membership in the Society by all IEEE members who are interested in the fields of interest of the Society, support the local or regional Society Chapters and initiate or actively encourage the formation of new Chapters. It shall initiate membership drives, and prepare membership material for special mailings or distribution at Symposia sponsored by the Society. The Chair shall be the interface between Chapters and AdCom and report on Chapter activities at AdCom meetings. The Committee shall maintain a list of Chapter officers, and a mailing list of non-Society members who have attended meetings or conferences sponsored by the Society or in any other manner have indicated interest in the activities of the Society.

6.4 Fellows Committee. The Fellows Committee shall be responsible for receiving and evaluating nominations for Fellow grade candidates engaged in the fields of activity covered by the Society. The Committee shall make recommendations concerning these nominations on behalf of the Society. Its deliberations and conclusions are confidential and shall only be transmitted to the IEEE Fellow Committee. The Society's Fellows Committee shall consist of at least five members, all of whom must be Fellows.

6.5 Ultrasonics Committee. The Ultrasonics Committee shall encourage and assist the orderly development of technical activities related to Ultrasonics and promote the Society as the focal point of these activities. The Committee shall be responsible for selecting schedules, dates and locations for the Ultrasonics Symposium for approval by AdCom. It shall select a Symposium Chair for each Symposium and appoint a Proceedings Editor, and ascertain that all preparations for the Symposium are progressing satisfactorily. It shall support the Ultrasonics Symposium organizing committee where needed and insure that the Symposium plans are in accordance with Society policies and directives as described in the IEEE Conference Organization Manual. Its activities include the organization of workshops, tutorials, and the organization of topical sessions on Ultrasonics at other IEEE conferences. As part of the Finance and Operations Committee, the Ultrasonics Committee Chair shall review the Ultrasonics Symposium budget which is to be submitted by the Symposium Chair to AdCom for approval, and make sure the Symposium Budget and Financial Report are in accordance with IEEE rules and regulations.

6.6 Ferroelectrics Committee. The Ferroelectrics Committee shall encourage and assist the orderly development of technical activities related to Ferroelectrics and promote the Society as the focal point of these activities. The Committee shall be responsible for selecting schedules, dates and locations for the International Symposium on the Applications of Ferroelectrics for approval by AdCom. It shall select a Symposium Chair for each Symposium and appoint a Proceedings Editor, and ascertain that all preparations for the Symposium are progressing satisfactorily. It shall support the organizing committee of the International Symposium on the Applications of Ferroelectrics where needed and insure that the Symposium plans are in accordance with Society policies and IEEE directives as described in the IEEE Conference Organization Manual. Its activities include the organization of workshops, tutorials, and the organization of topical sessions on Ferroelectrics at other IEEE conferences. As part of the Finance and Operations Committee, the Ferroelectrics Committee Chair shall review the Budget of the International Symposium on the Applications of Ferroelectrics which is to be submitted by the Symposium Chair to AdCom for approval and make sure the Symposium Budget and Financial Report are in accordance with IEEE rules and regulations.

6.7 Frequency Control Committee. The Frequency Control Committee shall encourage and assist the orderly development of technical activities related to Frequency Control and promote the Society as the focal point of these activities. The Committee shall be responsible for selecting schedules, dates and locations for the Frequency Control Symposium for approval by AdCom. It shall select a Symposium Chair for each Symposium and appoint a Proceedings Editor, and ascertain that all preparations for the Symposium are progressing satisfactorily. It shall support the Frequency Control Symposium organizing committee where needed and insure that the Symposium plans are in accordance with Society policies and IEEE directives as described in the IEEE Conference Organization Manual. Its activities include the organization of workshops, tutorials, and the organization of topical sessions on Frequency Control at other IEEE conferences. As part of the Finance and Operations Committee, the Frequency Control Committee Chair shall review the Frequency Control Symposium budget which is to be submitted by the Symposium Chair to AdCom for approval and make sure the Symposium Budget and Financial Report are in accordance with IEEE rules and regulations.

6.8 Nominations Committee. The Nominations Committee shall each year prepare a slate of nominees for vacancies on AdCom for presentation to AdCom at its first scheduled meeting of the year, as prescribed in Section 3.4 of these Bylaws. It shall prepare biographies of candidates for inclusion with the ballots, and interact with IEEE Headquarters in the conduct of the election. The Nominations Committee shall consist of a Chair, and at least four members not more than half of whom may be present members of AdCom.

6.9 Standards Committee. The Standards Committee shall be responsible for establishing and reviewing IEEE Standards within the scope of interest in the Society. The Committee shall periodically upgrade existing standards and shall initiate standards in new areas when they have become sufficiently established. The Chair of the Standards Committee shall appoint subcommittees to deal with specific areas and shall be an ex-officio member of all such UFFC standards subcommittees.

6.10 Finance and Operations Committee. The duties of the Finance and Operations Committee are to establish long range financial policy and plans of the Society, monitor and analyze financial data and make appropriate recommendations on expenses such as publication costs and meeting expenses. It shall prepare the annual budget for AdCom approval and submission to IEEE and report the financial status of the Society to AdCom. The Committee shall act as the sole interface between the Society and IEEE on all financial matters. In that capacity, the Committee shall review each Symposium Budget and Financial Report before it is submitted for approval by AdCom and be responsible for submitting these documents to IEEE. It will establish Audit Committees to audit the financial records of each Symposium as specified by IEEE rules and regulations. The Committee shall also periodically examine AdCom decisions and submit those deemed of sufficient general importance to AdCom for consideration to be included in the Bylaws, as prescribed in Article 9, Section 9.2 of the Constitution. The members of the Committee shall include the Secretary-Treasurer, the Transactions Editor-in-Chief, and the Chairs of the Ultrasonics Committee, the Ferroelectrics Committee and the Frequency Control Committee.

7. Publications.

7.1 General. The Society shall publish a Transactions, a Newsletter, and a Proceedings for each Symposium sponsored or co-sponsored by the Society. The President shall appoint the Editors-in-Chief for the Transactions and Newsletter, subject to the approval of the elected members of AdCom. They shall each have the status of chair of a standing committee. The Transactions Editor-in-Chief shall act as a liaison with the IEEE Publications Board. The editors for the Symposia Proceedings will be appointed by the chair of the relevant technical committee; Ultrasonics, Ferroelectrics, or Frequency Control.

7.2 Transactions. The Transactions on Ultrasonics, Ferroelectrics, and Frequency Control shall be the primary publication of the Society. It shall contain the technical papers and review material which constitute the primary output of the Society. Its format, publication schedule, and contents are matters which shall be decided by AdCom, and executed by the Editor-in-Chief. The normal term of office of the Editor-in-Chief shall be five years with the opportunity for reappointment. The Transactions Editor-in-Chief may appoint Associate Editors to receive and handle review of manuscripts in various technical areas. The terms of office for the Associate Editors shall be five years with the possibility for reappointment for only one additional term. Paper review procedures shall be administered in accordance with IEEE and Society policies. Rules for manuscript preparation shall be available to those who request them, and shall be published at least once a year in the Transactions. The Editor-in-Chief may appoint guest editors for special issues, and may delegate corresponding responsibility for assembling the body of technical papers to be included. Other aspects of publication and content of special issues shall remain the responsibility of the Transactions Editor-in-Chief.

7.3 Newsletter. The Newsletter shall be published at least twice a year, and shall contain items of interest to members of the Society, such as announcements and results of elections and the biographies of elected AdCom members, the minutes of AdCom meetings, and reports of officers and committee chairs of AdCom. The Newsletter Editor-in-Chief shall have the responsibility of assembling the material and publishing the Newsletter in accordance with Society policy.

7.4 Symposium Proceedings. A Proceedings shall be published for each Symposium sponsored or co-sponsored by the Society which will contain papers presented at that Symposium. The Proceedings Budget, based on projected printing cost and the cost of the Proceedings to Symposium attendees and members of the Society, shall be set by the Proceedings Editor and the Chair of the relevant technical committee and be integrated with the Symposium Budget for approval by AdCom. Similarly, the Proceedings Financial Report shall be integrated with and be part of the Symposium Financial Report. The Proceedings Editor shall be a member of the relevant Symposium organizing committee. In all aspects, the Proceedings Editor shall follow the guidelines as set forth in the IEEE Policy and Procedures Manual and any AdCom guidelines.

Call for Associate Editors of the *UFFC Transactions*

UFFC Transactions Associate Editors serve for a 5-year term with the possibility for reappointment for one more 5-year term Nominations are being solicited for individuals to serve a 5-year term as Associate Editor, effective January 1, 1992, for the following areas:

- Measurement and Control Applications
- Optical Interactions

Individuals technically qualified in these research areas and interested in applying should send a letter, including biography, to the Editor-in-Chief:

Professor William D. O'Brien, Jr.
Department of Electrical and Computer Engineering
University of Illinois
1406 West Green Street
Urbana, IL 61801
217/333-2407
FAX: 217/244-0105
email: obrien@uieea.ece.uiuc.edu

Nomination deadline is November 15, 1991.

EDITOR'S NOTE

A high word count and information content to this issue of the newsletter. Thanks to those who submitted their news items and articles. The editor (and his secretary) especially appreciate the disks that were sent with the longer articles. The Orlando symposium information was compiled by Jackie Hines and Gary Montress. We ought to have a great attendance. Herman van de Vaart submitted the Bylaws. Please keep them as a reference on how your society operates. Harry Salvo nicely compacted seven hours worth of AdCom meeting discussion into the few pages of key information and action items. Your president, Jan Brown, gave us some good perspective on the IEEE and our society. She also was the photo contributor but disclaims any fore-knowledge of what the captions were going to be. Our Tokyo Chapter is very active; Are there any other Chapters doing something out there? Our Frequency Control Symposium had a good attendance and we congratulate this years award winners. We also congratulate our newly elected AdCom members. Look for their faces in the next issue. Bill O'Brien is looking for a few good editors and will probably extend the deadline a little since this issue may not reach you till October. He goes into the electronic publishing arena in January similar to the way your newsletter is now processed.

In June your newsletter editor had a marvelous meeting with the IEEE Publishing services staff. They are a very conscientious and hard working group. Ann Scrupski has been especially helpful to this newsletter editor as we have marched into electronic publishing. She has sensed the format that our newsletter has traditionally used and is improving on it. Your newsletter editor's scissors have rusted shut and his rubber cement has hardened. Thank you Ann.

Thank you to Kathy Nolan who assembled most of the articles on a single disk. Remember to have your next news items to me by March 15, 1992.

We'll see you in Orlando in December.

Fred S. Hickernell
Newsletter Editor

HANDBOOK ON ULTRASONICS

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

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

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

Handbook on Ultrasonics, Questionnaire

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

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

For the following, please use a separate page.

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

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

5. What types of formula should be included?

6. What procedures would be useful in dynamic form?

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

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

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

Optional Information

NAME _____

FIELD OF ACTIVITY _____

ADDRESS _____

_____

_____

TELEPHONE _____ FAX _____

Please send questionnaire to: Professor G.W. Farnell
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McGill University
3480 University Street
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CANADA H3A 2A7

IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY

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Published Quarterly
Inaugural issue, March 1991

The IEEE TRANSACTIONS on APPLIED SUPERCONDUCTIVITY is published by the IEEE Superconductivity Committee on behalf of the following societies: Communications; Components, Hybrids and Manufacturing Technology; Dielectrics and Electrical Insulation; Electron Devices; Instrumentation and Measurements; Magnetics; Microwave Theory and Techniques; Power Electronics; Power Engineering; and Ultrasonics, Ferroelectrics and Frequency Control.

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Publication Announcement

IEEE GUIDE FOR MEDICAL ULTRASOUND FIELD PARAMETER MEASUREMENTS

Sponsor

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

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

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

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