IEEE ULTRASONICS, FERROELECTRICS, AND FREQUENCY CONTROL SOCIETY NEWSLETTER

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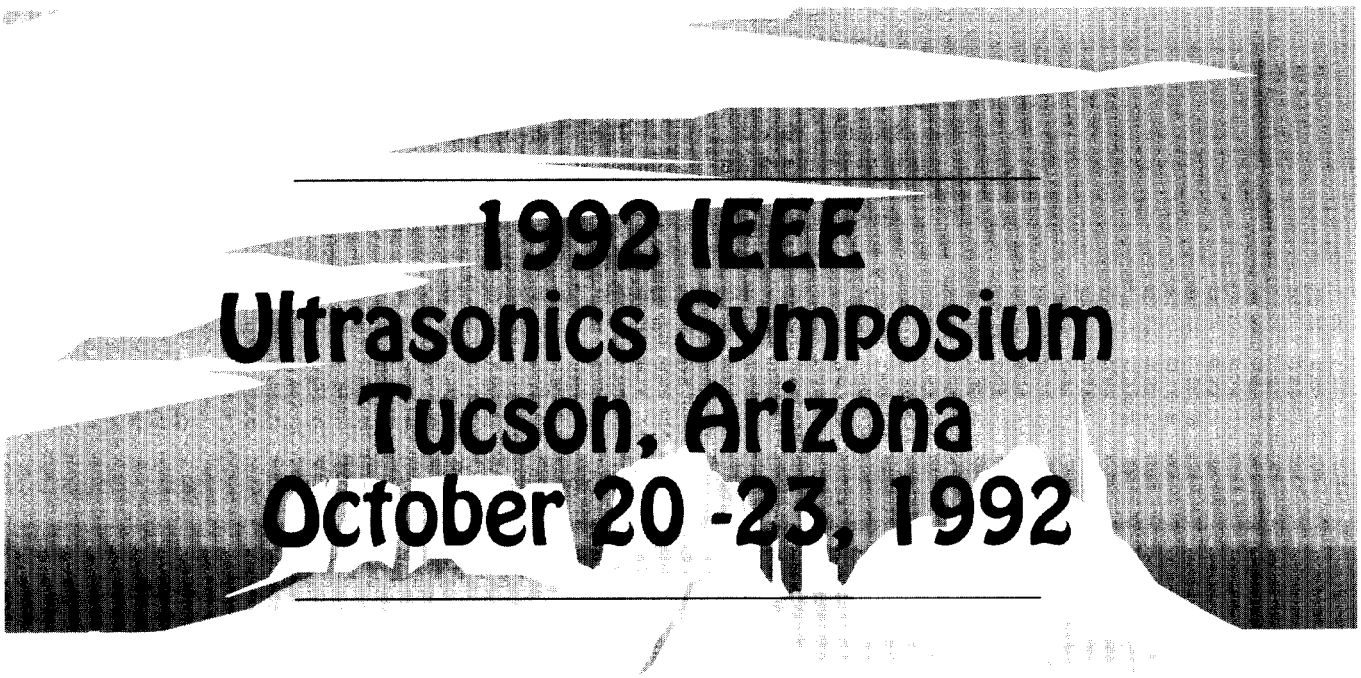


1992 IEEE ULTRASONICS SYMPOSIUM

Tuesday - Friday, October 20-23, 1992

Holiday Inn Broadway
Tucson, Arizona

SYMPOSIUM INFORMATION

The IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society presents the 1992 IEEE Ultrasonics Symposium:

- Six Short Courses, Tuesday, October 20, 1992
- The Symposium Technical Program, from Wednesday, October 21, 1992 through Friday, October 23, 1992.

All symposium activities will be concentrated in the Holiday Inn Broadway in the heart of downtown Tucson, Arizona. Two nearby hotels, the Park Inn Santa Rita and the Ramada Inn Downtown will also be used for accommodations. Restaurants, cultural centers, recreational activities, and a historic district are conveniently located near the hotels.

IMPORTANT DEADLINES

☐ Hotel Reservations	September 21, 1992
☐ Advance Registration	September 21, 1992
Symposium	
Short Courses	
Guest Social Program	
Evening Social Events	
☐ Special Audio-Video Requirements	September 21, 1992

TUCSON AREA

Tucson is a fast-growing sunbelt city of more than 600,000 people that blends modern, metropolitan life with scenic beauty and rich cultural diversity. Indian, Spanish, Mexican, and Pioneer influences have created a study in contrasts between old and new, traditional and modern, rural and metropolitan. Historic adobe buildings have been preserved among downtown high rises, and cowboys who ranch for a living walk the streets, shoulder to shoulder with business executives. Just a walk through downtown Tucson is a lesson in the history of this remarkable city.

Breathtaking scenic beauty can be seen from any point in Tucson. Five mountain ranges rise above the desert valley floor, itself covered by cacti, scrub brush, and trees unique to the Sonoran environs. Desert blooms burst in the spring, while dramatic lightning displays accompany the summer rainy season. In October at symposium time, the days will be sunny with a high temperature in the upper 70's and the cool dry nights drop the temperature into the 40's.

Tucson and Southern Arizona offer a great variety of attractions. 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-Sonoran Desert Museum, which has been heralded as one of the top ten zoos in the country by *The New York Times*. This "living" museum features plants and animals unique to the Sonoran Desert. Further down the road is Saguaro National Monument a forest of the famous saguaro cactus and other desert plants.

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 memorial to the Air Force personnel who maintained peace and freedom with the Titan weapon system are available for the public. Located 11 miles southeast of Tucson is the Pima Air Museum. More than 180 aircraft depict America's aviation history.

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

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.

If you wish to venture further beyond the immediate Tucson area there is Nogales, Mexico, to the south, Kitt Peak National Observatory to the west, Tombstone, the town too tough to die, to the east and old mining towns to the north. No matter what your interests, you'll find some place or people to capture your interest while visiting the Tucson area. Be sure to pick up a visitor's guide from the registration area shortly after your arrival.

SYMPOSIUM REGISTRATION & FEES

All symposium participants and guests must register and receive badges. The symposium fee includes admittance to all technical sessions, the Wednesday evening reception, and the cost of one soft-cover copy (except for full-time students, retirees, one day registrees or guests) of the 1992 IEEE Ultrasonics Symposium Proceedings. The guest fee includes a continental breakfast each morning for the registered guests and the Wednesday 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 the Tucson area attractions. Details and fees are in the Guest Social Program section.

Registration fees are as follows:

	Advance Registration	On-Site Registration
IEEE Members	$275.00	$305.00
Non-IEEE Members	$350.00	$385.00
Full-time Students or Retirees	$ 25.00	$ 40.00
Guests		
Adult	$ 25.00	$ 35.00
Child (12 and under)	$ 10.00	$ 15.00
One-Day registration		$150.00

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:

1992 IEEE Ultrasonics Symposium
c/o LRW Associates
1218 Balfour Drive
Arnold, MD 21012-2150
U.S.A.

The Advance Registration Form must be received at LRW Associates by September 21, 1992. **POSTMARKS DO NOT APPLY.**

Please note: **Advance Registration Form and remittance must be received at LRW Associates by September 21, 1992. Each registrant must complete a separate Advanced Registration Form. The remittance is payable in U.S. dollars only, personal or company checks drawn on a U.S. 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 pre-registered but who are unable, for whatever reason, to attend the symposium. A letter requesting the refund should state the registrant's name and to whom the refund check should be made payable. No refunds will be given for requests received after October 12, 1992

SHORT COURSE REGISTRATION & FEES

The following six short courses are scheduled for Tuesday, October 20, 1992. The short courses will be held at the Holiday Inn Broadway in the Forum and Plaza rooms.

Course 1: Piezoelectric Materials for Ultrasonic Transducers: Piezocomposites and Beyond
Instructor: Wallace A. Smith, *Office of Naval Research*
Time: Tuesday Morning, October 20, 1992
8:00 a.m. - 12:00 noon

Course 2: Basic Ultrasound Principles and Their Connection to Medical Ultrasound
Instructors: William D. O'Brien, Jr., and Ilmar A. Hein, *University of Illinois, Urbana-Champaign*
Time: Tuesday Afternoon, October 20, 1992
1:00 p.m. - 5:00 p.m.

Course 3: Medical Imaging
Instructor: Tom Shoup, *Hewlett-Packard Company, Imaging Systems Division*
Time: Tuesday Evening, October 20, 1992
6:00 p.m. - 10:00 p.m.

Course 4: Bulk Wave Resonators and Transducers
Instructor: Arthur Ballato, *ET&D Laboratory, Fort Monmouth*
Time: Tuesday Morning, October 20, 1992
6:00 p.m. - 12:00 noon

Course 5: High Stability SAW Oscillators: Design and Performance
Instructors: Gary K. Montress and Thomas E. Parker, *Raytheon Company, Research Division*
Time: Tuesday Afternoon, October 20, 1992
1:00 p.m. - 5:00 p.m.

Course 6: Fundamentals of Ultrasonic Sensors
Instructors: Stephen J. Martin and Antonio J. Ricco, *Sandia National Laboratories*; Richard M. White, *University of California, Berkeley*
Time: Tuesday Evening, October 20, 1992
6:00 p.m. - 10:00 p.m.

Registration for the short courses is on a first-received, first-processed basis. Registrations will be accepted with the

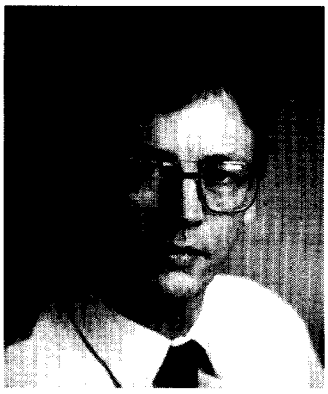
appropriate fee until the time of the short courses. However, available space for each course is limited, and registration for individual courses may be closed prior to the September 21st Advance Registration Deadline. We reserve the right to cancel any course due to insufficient preregistration. Short 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

The Advance Registration Form must be received at LRW Associates by September 21, 1992. **POSTMARKS DO NOT APPLY.**

Please note: **Advance Registration Forms and remittance must be received at LRW Associates by September 21, 1992. Each registrant must complete a separate Advance Registration Form. The remittance is payable in U.S. Dollars only, personal or company checks drawn on a U.S. 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.***

President's Speaker



Dr. Kullervo Hynynen

The speaker for the Plenary Session at the 1992 IEEE Ultrasonics Symposium will be Dr. Kullervo Hynynen from the University of Arizona. His talk is entitled "The Expanding Role of High Power Ultrasound Devices in the Treatment of Cancer". His presentation will review the present status of ultrasound therapy devices and summarize some of the early clinical experience.

Dr. Hynynen was born in Pyhanta, Finland in 1954. He received the M.S. degree from the University of Kuopio, Finland in 1977 and Ph.D. degree from the University of Aberdeen, Scotland in 1982. From 1982 to 1983 he was a postdoctoral research assistant in the University of Aberdeen, developing a focussed ultrasound system for the treatment of tumors. In 1984 he joined the faculty of the University of Arizona, where now he is an Associate Professor of Radiation Oncology. His main research interests include development of high power ultrasound devices for therapy, and interaction of ultrasound with tissue.

TECHNICAL PROGRAM OVERVIEW

The Symposium's technical program will be held from Wednesday, October 21st, through Friday, October 23rd, 1992. The technical program will commence with a Plenary Session on Wednesday morning, beginning at 8:00 am. Paper presentations have been separated into four parallel oral sessions and a single poster session. Individual contributed oral presentations and special invited presentations have each been allocated fifteen minute time slots, with approximately twelve minutes recommended for the presentation, and with 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 with the last five minutes devoted to handling questions from the audience.

Poster sessions have been used for the last seventeen 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 of a contributed poster paper or special invited poster paper presentation is assigned a space with one 4 foot by 8 foot (1.2 meter x 2.4 meter) 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 foot by 8 foot (1.2 meter x 2.4 meter) bulletin boards. Authors should remain with their poster paper displays during the entire poster session time period. Symposium participants may wander through the entire area, or else go directly to those poster papers which most interest them. This year, the poster session will be held in the Holiday Inn Broadway, on Wednesday, October 21st, 1992, from 3:30 pm until 5:30 pm. The set-up 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 breakdown period for the poster session is 5:30 pm until 6:30 pm.

This year's poster session topics include:

Session PA: Image Processing
Session PB: Transducer Materials & Technology
Session PC: Medical Ultrasound Topics
Session PD: NDE & Industrial Ultrasonics
Session PE: Sensors & Sonic Processing
Session PF: Ultrasonic Signal Processing
Session PG: Physical Acoustics I
Session PH: Photoacoustics & Acousto-Optics
Session PI: Physical Acoustics II
Session PJ: SAW Filters
Session PK: SAW Resonators & Oscillators and HACT Devices
Session PL: SAW Materials & Propagation

INVITED PAPERS

The 1992 IEEE Ultrasonics Symposium's Technical Program Committee has invited the following individuals to highlight new, emerging, and outstanding aspects of the Ultrasonics field:

A-1 **"Sonodynamic Approach to Tumor Treatment"** - S. Umemura and K. Kawabata, *Advanced Research Laboratory, Hitachi, Ltd., Hatoyama, Saitama, Japan,* and N. Yumita, R. Nishigaki, and K. Umemura, *Faculty of Pharmaceutical Science, Toho University, Funabashi, Chiba, Japan*

I-3 **"Real-Time Automatic Boundary Detection in Echocardiography"** - H. E. Melton, Jr., *Hewlett-Packard Laboratories, Palo Alto, CA,* and D. J. Skorton, *University of Iowa, Iowa City, IA*

M-1 **"Contrast Agents for Diagnostic Ultrasound: Their Potential and Limitations"** - P. N. Burns, *University of Toronto, Department of Medical Biophysics, Sunnybrook Health Science Centre, Toronto, Ontario, Canada*

U-3 **"Multidimensional Ultrasonic Visualization in Cardiology"** - M. Belohlavek, D. A. Foley, T. C. Gerber, J. B. Seward, and J. F. Greenleaf, *Mayo Clinic, Rochester, MN*

Y-5 **"Ferroelectric Polymers: Current and Future Ultrasound Applications"** - L. F. Brown, *South Dakota State University, Electrical Engineering Department, Brookings, SD*

PB-1 **"Application of Microelectronics and Microfabrication Technology to Ultrasound Imaging Systems"** - A. L. Robinson and J.-H. Mo, *University of Michigan, Solid State Physics Laboratory, Ann Arbor, MI*

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B-3 **"Tunneling Acoustic Microscopy"** - K. Takata, *Advanced Research Laboratory, Hitachi, Ltd., Hatoyama, Saitama, Japan*

V-5 **"Chemically Selective Polymer Coatings for Acoustic Vapor Sensors and Arrays"** - J. W. Grate, *Naval Research Laboratory, Chemistry Division, Washington, DC*

Z-3 **"Breaking the Sensitivity Barrier: The Challenge for Laser Ultrasonics"** - J. W. Wagner, *The Johns Hopkins University, Center for Nondestructive Evaluation, Baltimore, MD*

HH-1 **"Smart Structures - Modeling and Applications"** - V. V. Varadan, *The Pennsylvania State University, Research Center for the Engineering of Electronic and Acoustic Materials, and Department of Engineering Science & Mechanics, University Park, PA*

II-3 **"Ultrasonic Measurements for the Quantitative NDE of Adhesive Joints - Potential and Challenges"** - P. Cawley, *Imperial College, Department of Mechanical Engineering, London, UK*

LL-1 **"The Effects of Fatigue on Acoustic Nonlinearity in Aluminum Alloys"** - W. T. Yost, *NASA, Langley Research Center, Hampton, VA,* and J. H. Cantrell, *University of Cambridge, Cavendish Laboratory, Cambridge, UK*

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C-5 **"One Component Surface Waves in Materials with Symmetry"** - A. N. Norris, *Rutgers University, Department of Mechanical & Aerospace Engineering, Piscataway, NJ*

G-3 **"Piezoelectric Energy Conversion in Windmills"** - V. H. Schmidt, *Montana State University, Physics Department, Bozeman, MT*

K-1 **"Acoustic Ink Printing"** - B. Hadimioglu, S. A. Elrod, D. L. Steinmetz, M. Lim, J. C. Zesch, and C. F. Quate, *Xerox, Palo Alto Research Center, Palo Alto, CA,* and B. T. Khuri-Yakub, *Stanford University, Edward L. Ginzton Laboratory, Stanford, CA*

K-4 **"Characterization of Fullerine Molecules using Scanning Tunneling Microscopy"** - D. Sarid, *University of Arizona, Optical Sciences Center, Tucson, AZ*

AA-1 **"Sound Propagation in Disordered Metals at Low Temperatures"** - S. N. Coppersmith, *AT&T, Bell Laboratories, Murray Hill, NJ*

EE-1 **"Acousto-Optic Signal Processing: Transition to System Applications"** - J. M. Pellegrino, *U. S. Army Harry Diamond Laboratories, Adelphi, MD*

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H-1 **"A Review of SAW Resonator Filter Technology"** - P. V. Wright, *RF Monolithics, Inc., Dallas, TX*

P-3 **"Effects of Thermoelastic and Nonlinear Coupling on the Propagation of Surface Acoustic Waves"** - A. P. Mayer, *Universitaet Regensburg, Institut fuer Theoretische Physik, Regensburg, Germany*

T-1 **"Wideband Low Loss Double Mode SAW Filters"** - T. Morita, Y. Watanabe, M. Tanaka, and Y. Nakazawa, *Toyo Communication Equipment Company, Ltd., Kanagawa, Japan*

X-1 **"Low Cost Surface Mount Packaging for SAWs"** - J. Gore, B. Horine, J. Phillips, R. Hoffman, and J. Dodge, *SAWTEK, Inc., Orlando, FL*

MM-3 **"Elastic Properties of MBE-Grown Crystalline Metallic Films and Multilayers"** - C. M. Falco and J. Kim, *University of Arizona, Department of Physics, Tucson, AZ,* J. R. Dutcher, *University of Guelph, The Netherlands,* and S. Lee and G. I. Stegeman, *University of Central Florida, Orlando, FL*

PL-1 **"Piezoelectric Materials for SAW Applications"** - A. Ballato, J. G. Gualtieri, and J. A. Kosinski, *U. S. Army Research Laboratory, Fort Monmouth, NJ*

SPECIAL INVITED PRESENTATIONS

The 1992 IEEE Ultrasonics Symposium's Technical Program Committee has invited the following individuals to present papers highlighting Ultrasonic activity in Eastern Europe and Russia:

FF-6 **"Investigation of Energetics of Molecular Processes in Liquids by High Precision Ultrasonic Measurements"** - A. Sarvazyan, *Institute of Theoretical and Experimental Biophysics of the Russian Academy of Sciences, Pushchino, Moscow, Russia*

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O-6 **"Guided-Wave Multichannel Acoustooptic Devices Based on Collinear Wave Propagation"** - V. V. Proklov and E. M. Korablev, *Institute of Radio Engineering and Electronics, Russian Academy of Sciences, Moscow, Russia*

W-6 **"Nonlinear Effects Limiting Maximum Values of Acoustic Fields"** - O. V. Rudenko and O. A. Sapozhnikov, *Moscow State University, Physics Department, Moscow, Russia*

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PJ-1 **"Acoustoelectronics in Bulgaria: Research and Production"** - L. Spassov, *Institute of Solid State Physics, Sofia, Bulgaria*

PK-1 **"Numerical Simulation of Charge Packet Transportation in Heterostructure Charge Transport Devices"** - I. L. Vasiliev, S. M. Kikkarin, D. V. Nomokonov, and I. B. Yakovkin, *Semiconductor Physics Institute, Novosibirsk, Russia*

HOTEL RESERVATIONS

There are three hotels in downtown Tucson which will be used for the symposium. The Holiday Inn Broadway, is the symposium hotel where the technical sessions will be held. The Park Inn Santa Rita and the Ramada Inn Downtown both within a short walking distance, will accommodate the anticipated overflow of symposium attendees. A block of rooms will be held for attendees and guests at a special rate until September 21st. Special rates for the hotels on a space available basis, extend from the Saturday before the symposium through the Sunday afterwards to encourage attendees to bring their families and enjoy the attractions of Tucson and surrounding areas.

A brief description of each hotel and the symposium rates follow. The rates are subject to a 9.5% sales tax and a $1.00 per room per night city surtax.

Holiday Inn Broadway

The Holiday Inn Broadway is a full service hotel situated in the center of the Historic and Arts Districts of Tucson. It features Lilies Restaurant and Lounge, heated outdoor pool and free parking garage. There is a spacious lobby and patio area and walkways adjacent to the Tucson Civic Center. The symposium rates are $75.00 for room occupancy - single or double. Also adjacent to the hotel is a health club which can be used at a nominal cost ($8.00 per guest). Phone (602) 624-8711 for reservations.

Park Inn Santa Rita

The Park Inn Santa Rita is an eight story historic hotel in downtown Tucson in the middle of the Historic and Arts Districts. The hotel offers free local phone calls, in-room coffee, a free A.M. continental breakfast and free P.M. beverages. It has a restaurant and lounge. Children under 18 are free. The symposium room rates are $55.00 for a single and $65.00 for a double. The Park-Inn is a five-minute walk from the symposium hotel. Phone (602) 622-4000 for reservations.

Ramada Inn Downtown

The Ramada Inn Downtown is a fifteen-minute walk through the Historic and Arts District sto the symposium hotel. El Centro Bar and Grill is available for breakfast, lunch and dinner. The hotel has in-room coffee service. The Ramada features an olympic-size heated swimming pool and airport transportation. The symposium room rates are $52.00 for a single and $58.00 for a double. There is a $10 charge for each additional person in a room. Phone (602) 622-3000 for reservations.

Hotel reservations must be made by September 21, 1992.

Telephone reservations can be made by calling the numbers listed for each hotel. You must specify IEEE Ultrasonics Symposium to obtain the special room rates. For those who wish to spend a few extra days in the Tucson area, the special rates will apply through the weekends directly before and after the 1992 IEEE Ultrasonics Symposium.

AIR TRANSPORTATION

There are several airlines which service the Tucson area; Alaska Airlines, Aeromexico, American Airlines, America West, Continental, Northwest, Delta, TWA, United, and U.S. Air.

Several of these airlines have direct flights into Tucson from major U.S. cities. All major airlines service the Phoenix area where connecting flights may be obtained. **There is no official airline designated for our symposium.** By making reservations early, low-cost fares can be obtained.

An attractive and possible cost-saving alternative is to fly into Phoenix and use a rental car to drive to Tucson. Travel time is just a little over two hours by freeway with easy access out of Phoenix and into Tucson. This also allows some sightseeing opportunities in the Sonoran desert area. If you plan to be in Arizona for some time preceding or after the symposium, Phoenix is a good central location to travel to other parts of Arizona.

AIRPORT TRANSPORTATION

Downtown Tucson is approximately a fifteen-minute drive from the airport. The recommended transportation to the hotels is with Arizona Stagecoach. This is a quality van service with a dispatchers desk located in the center concourse near the baggage claim area. After picking up your luggage, go to the Arizona Stagecoach desk and indicate that you are with the 1992 IEEE Ultrasonics Symposium. They will direct you to the van area. The one-way cost is $7.50, and round-trip is $13.00. When returning to the airport please reserve the van one-day in advance through the hotel desk.

LOCAL TRANSPORTATION

The location of the hotels is within convenient walking distance of several restaurants and shops. For travel in the city of Tucson there is a city bus service and also a free shuttle from the downtown hotel area to the Tucson Shopping Mall north of the city. To reach many of the scenic sites of the area, car rental is suggested. Arrangements can be made through the hotel desk for a rental car.

GUEST SOCIAL PROGRAM

We encourage registered guests of the symposium to attend a continental breakfast which will be provided from 8:00 to 9:00 am Wednesday and Thursday, and 7:00 to 8:00 am Friday. Your guest badge will help us to become acquainted and is necessary to attend the continental breakfast in the Manhattan Room at the Holiday Inn. A wide variety of tours has been arranged for the enjoyment of guests and attendees. Advanced 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. Comfortable walking shoes are suggested for all tours.

TUCSON, JEWEL OF THE SONORAN DESERT
Wednesday, October 21, 1992 - 9:00 AM TO 1:00 PM

We begin our introduction of "Tucson, America's Favorite Sun," with a talk and slide presentation by Audrey Davis, Convention Services Manager of the Tucson Convention Center, as she tells of Tucson's interesting mix of the old and the new. We will learn of its roots, experience its progress, and enjoy its artistic treasures. At ten o'clock we leave for a walking tour of historical downtown Tucson.

Become acquainted with one of the oldest cities in the American Southwest. This is an area rich in history and lore from the ancient Native Americans, who settled here hundreds of years ago, up through the coming of the Spaniards in the 1500's, and on to the sophistication of today.

Travel through the Barrio Historic — the finest collection of original adobe homes in the Southwest. Listen to the folklore and legends surrounding such sights as the El Tiradito Shrine and the once luxurious Silverlake Park. Then visit the El Presidio and the quaint La Casa Cordova, the oldest adobe home in the city, built in the 1830's. Right across the street is the Old Town Artisans, another historic treasure that now houses the work of native crafts people from around the world.

The coming of the railroad in 1880 changed the complexion and style of an already thriving city. A trip through the Snob Hollow neighborhood shows the vast changes of turn-of-the-century Tucson and the effects of having "exotic" building materials suddenly available.

After one o'clock you are free to enjoy one of the many downtown restaurants, shop, swim, and bask in the sunshine. Don't forget the evening social program beginning at 6:00 p.m. in the ballroom on the lower floor of the Holiday Inn.

JOURNEY TO NOGALES, MEXICO
Thursday, October 22, 1992 - 9:00 AM TO 4:00 PM
ADULT: $35 CHILD (3-9): $25

This morning our destination is sixty miles south of Tucson to Nogales, Mexico. Just a few miles down the road is the "White Dove of the Desert," San Xavier Del Bac Mission. Built by the Jesuits from 1783 to 1797, San Xavier stands majestically in the open desert, glowing bright and white against the purple-hued mountains. Established by the "Padre on Horseback," Father Kino, San Xavier is acclaimed as the finest example of mission architecture in the country. San Xavier Mission still serves as the parish church to the Tohono O'Odahm Indians, on whose reservation it stands.

Our day continues 'South of the Border' in Old Mexico. The twin towns of Nogales, Arizona, and Nogales, Sonora, Mexico, share the boundary between the U. S. and Mexico like sisters in a close family. A colorful piece of Mexico right out of the interior, Nogales, Sonora, has blocks of shops and alleys lined with booths where Mexican clothing, leather work, and silver jewelry are sold. Everybody speaks English — mixed with Spanish. There are good values on hand-carved furniture, hand-blown glassware, tooled leather goods, onyx chess sets, perfume, liquor, ceramics, embroidered dresses, hand-woven rugs, antiques, hand-carved doors, wrought iron crafts, and

Mexican clay pottery. Your tour guide will assist with your bargaining skills and show you the 'ropes' in the colorful world of Calle Obregon. We will have lunch in Nogales (included in the fee). We will return to Tucson in time to prepare for our visit to "Old Tucson." **For border crossing at Nogales, Foreign visitors will require a passport and U.S. citizens will need to carry proof of citizenship.**

EXPERIENCE THE DESERT
Friday, October 23, 1992 – 9:00 AM TO 2:00 PM
ADULT: $30 CHILD (3-9): $20

This morning we journey northeast of Tucson to visit Sabino Canyon. Nestled in the foothills of the Santa Catalina Mountains, this canyon offers views of sparkling mountain streams (seasonal) and majestic mountains. It is a sight not to be missed by nature lovers, or anyone who enjoys the great outdoors. You will enjoy this scenery from an open-air ground tram narrated by a knowledgeable driver-guide. Your 8.5 mile round trip takes you into the beauties of the majestic canyon walls carved by centuries of relentless flow of the creek.

Next we visit the studio of a famous southwestern artist. A landmark in Tucson, DeGrazia's Gallery in the Sun was designed by Ted DeGrazia to house his works. The gallery features adobe construction and beautiful decorative features as well as DeGrazia's art. It is a uniquely southwest place to explore, browse or shop. This famous Arizona artist is known for his colorful portrayals of Indian children, bull fights, and madonnas. The gallery exhibits his art work, spanning a lifetime of style changes evolving into an unmistakable 'signature' style known around the world.

We will have lunch (included in the price) at the Arizona Inn. The Arizona Inn is one of only thirty-four American Hotels Rene Lecier has included in *The 300 Best Hotels in the World.* Throughout its history the Inn has hosted such celebrities as Eleanor Roosevelt, Frank Lloyd Wright, Paul Newman, Johnny Carson, and many of America's top political figures.

EVENING SOCIAL EVENTS

SOCIAL GATHERING
Wednesday, October 21, 1992 – 6:00 PM TO 9:00 PM

Gather in the Starlight Ballroom and adjacent patio area of the Holiday Inn for a relaxing get-together. You will be serenaded by instrumentalists as you renew friendships and make new acquaintances. There will be ample hors d'oeuvres with a Spanish flavor. Each full registration will be accompanied by tickets for either two soft drinks or one cocktail, beer, or glass of wine. A cash bar will be available for additional drinks throughout the evening. Take advantage of this opportunity to socialize.

EXPERIENCE THE OLD WEST
OLD TUCSON STUDIOS
Thursday, October 22, 1992 – 5:30 PM TO 10:00 PM
ADULT: $35 CHILD (3-9): $30

Our major social event is an evening barbecue dinner at Old Tucson, the world famous recreation of an old west town. Old Tucson has been used as the location for some of the most famous western movies in history. Built in 1939 for the movie "Arizona", Old Tucson is still host to dozens of productions annually, including feature films, television series, and commercials. More than 250 productions have been shot at this historic studio. We board the buses at 5:30 p.m. at the Holiday Inn - Broadway and arrive at about 6:00 p.m., allowing you to tread the dusty streets that John Wayne strode. At 6:30 we gather in the Mexican Plaza for some chips with salsa and guacamole. At 7:30 we congregate in the High Chaparral area, where scenes from "Young Riders" were filmed, for an outdoor dinner of barbecue beef ribs and chicken with all the fixings. There will be entertainment and lots of fun for everyone. You will have extra time to look in shops, have entertaining rides, and view historic artifacts of the old west. As buses fill you can head back to the hotel.

SATURDAY EXCURSION

BIOSPHERE 2 AND ARIZONA-SONORAN DESERT MUSEUM
Saturday, October 24, 1992 – 8:30 AM TO 5:30 PM
ADULT: $40.00 CHILD (3-9): $25.00

In case you were so tied up in the technical and guest social program during the week and didn't have an opportunity to see the surrounding area, this excursion is especially for you. We leave at 8:30 a.m. for a bus trip to the Biosphere and the Arizona Sonoran Desert Museum.

Early this year eight people stepped into another world - a three-acre-miniature biosphere, Biosphere 2. For the next two years, their lives - the air they breathe, the water they drink and the food they eat - will be sustained by the seven ecological systems enclosed within Biosphere 2's airtight structure. What they discover may help advance our ability to live in harmony with the sphere of life - on Earth or among the stars. We will be able to tour the area surrounding the Biosphere and hear about its operation.

You experience the plants and animals of the desert at the world famous Sonora Desert Museum. The Arizona-Sonoran Desert Museum provides a unique opportunity to see a comprehensive collection of the plants, animals and geology of this area. More than 200 different living animals and 400 kinds of plants are on display in naturalistic settings. Reptiles and invertebrates of the Sonoran Desert, from centipedes, tarantulas and scorpions to endangered San Esteban Island chuckwallas, Gila monsters, snakes and lizards are on display. Cactus of the region abound at the Museum. In the Cactus Garden over 140 species of cacti and other Sonoran Desert plants flourish in a landscaped setting. Enjoy a relaxed couple of hours as you tour this area at your leisure or have an information filled guided tour. Between the two visits we will stop for a picnic in a park. We plan to be back to the hotel by 5:00 p.m.

1992 IEEE Ultrasonics Symposium
Short Courses
Tuesday, October 20, 1992

A series of six courses will be offered in conjunction with the 1992 IEEE Ultrasonics Symposium. These courses will be held in two parallel sessions beginning on Tuesday morning, 20 October 1992. The Advance Program Booklet (available in mid August 1992) for the 1992 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 21 September 1992.

SHORT COURSE ABSTRACTS

Course 1: Piezoelectric Materials for Ultrasonic Transducers: Piezocomposites and Beyond

Instructor: Wallace Arden Smith, *Office of Naval Research*

Time: Tuesday Morning, 20 October 1992
8:00 am - 12:00 noon

Piezoelectric materials lie at the heart of most ultrasonic transducers, performing the essential roles of converting an electric pulse into an acoustic wave and converting an incident acoustic wave into an electric signal. This tutorial begins with a brief summary of the properties of piezoelectric materials conventionally used in ultrasonic transducers: crystals, ceramics, and polymers. The core of the course focuses on delineating the range of properties achievable with composite piezoelectrics made by combining a passive polymer with a piezoceramic to form a new piezoelectric material. For 1-3 piezocomposites, which have found fruitful ultrasonic applications, a simple physical picture is presented which shows how certain piezocomposite properties - electromechanical coupling and acoustic impedance - can be superior to those of even its constituent ceramic. This perspective shows how to adjust the piezocomposite's properties by varying the piezoceramic and polymer constituents, their relative proportions, and the spatial scale of the structure. The analysis identifies the materials tradeoffs that must be made, as all advantages of piezocomposites cannot be achieved simultaneously, Device applications of 1-3 piezocomposites are illustrated with commercial product descriptions, as well as with research literature. The course concludes with a brief overview of recent piezoelectric materials research and its potential impact on ultrasonic transducers: piezocomposite fabrication methods; new electro-ceramics - piezoelectrics and electrostrictors; piezoceramic processing techniques - green forming, fiber fabrication, and multilayer structures; piezoelectric thin films - growth and patterning; and new piezopolymers. Useful background material can be found in the papers: "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, and "New Opportunities in Ultrasonic Transducers Emerging from Innovations in Piezoelectric Materials," by W. A. Smith, which will appear in the *Proceedings of the 1992 SPIE Symposium.* A pre-print of the later paper is available from the author upon request. (Dr. W. A. Smith, Office of Naval Research, Materials Division, Code 1131, Room 704, 800 North Quincy Street, Washington, DC 22217-5000.)

Wallace Arden 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 end optical materials for sonar transducers, adaptive control of structural acoustics, end electro-optics, as well as high-temperature superconducting ceramics. He received a B.A. degree in 1964 from Rutgers University, end both the M.A in 1966 end Ph.D. in 1970 from Princeton University, all in Physics. His research training involved experimental work in high energy particle physics, and nuclear and electron magnetic resonance, culminating in a theoretical thesis in the area of quantum statistical mechanics. He served on the faculties of New York University and the City University of New York, where he pursued theoretical research on quantum electrodynamics, laser physics, and hydrodynamic instabilities. For more than a decade he lead a research team at Philips Laboratories, Briarcliff Manor, NY, focusing on materials for pyroelectric infrared imaging and medical ultrasonic imaging, with excursions into tissue characterization. Dr. Smith has served as Chairman of the 1986 IEEE International Symposium on Applications of Ferroelectrics, as an elected member of the Administrative Committee of the *IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society* (1987-1989), and as an Associate Editor of the *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* (1986-1990). He is currently serving as Chairman of the 1993 International Meeting on Ferroelectricity. 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: Basic Ultrasound Principles and Their Connection to Medical Ultrasound

Instructors: William D. O'Brien, Jr. and Ilmar A. Hein
University of Illinois, Urbana-Champaign

Time: Tuesday Afternoon, 20 October 1992
1:00 pm - 5:00 pm

This short course is intended as an introduction to basic ultrasound principles for engineers or physicists who would like to improve their understanding of ultrasound wave propagation and ultrasound tissue interaction. From beginning principles, the acoustic wave equation will be developed and the sources of non-linear propagation phenomena will be described. Two-layer and three-layer transmission and reflection coefficients for both normal and oblique incidence will be derived from the solution to the wave equation. From this, the fundamental basis for ultrasonic specular scattering and transducer matching layers will be described. Also, from the wave equation solution, ultrasonic field patterns will be derived for spherical, piston, and array sources for both narrowband and broadband excitation. Finally, these basics will be

brought together to understand the fundamental trade-off between resolution and depth of penetration.

William D. O'Brien, Jr. (S'64-M'70-SM'79-F'89) was born in Chicago, IL, on July 19, 1942. He received the B.S., M.S., end Ph.D. degrees from the University of Illinois - Urbana in 1966, 1968, and 1970, respectively. From 1971 to 1976 he was with the Bureau of Radiological Health (currently the Center for Devices and Radiological Health) of the U.S. Food and Drug Administration. Since 1976 he has been at the University of Illinois where he is a Professor of Electrical and Computer Engineering, and of Bioengineering, College of Engineering, and Professor of Bioengineering, College of Medicine. His research interests involve the many areas of ultrasound-tissue interaction, including spectroscopy, risk assessment, biological effects, tissue characterization, dosimetry, blood flow measurements, and acoustic microscopy, for which he has published more then ninety papers. Dr. O'Brien is Editor-in-Chief of the *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control.* He is a Fellow of the IEEE, the Acoustic Society of America, and the American Institute of Ultrasound in Medicine (AIUM), and was the recipient of an IEEE Centennial Medal (1984) and the AIUM Presidential Recognition Award (1986). He served as President of the *IEEE Sonics and Ultrasonics Group* (1982-1983) (currently the *IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society*), Co-Chairman of the 1981 IEEE Ultrasonics Symposium, and General Chairman of the 1988 IEEE Ultrasonics Symposium. He was also President of the AIUM (1988-1991), and is currently Treasurer of the World Federation for Ultrasound in Medicine and Biology.

Ilmar A Hein was born in Woodstock, IL, in 1959. He received his B.S. and M.S. degrees in Electrical Engineering from the University of Illinois, Urbana-Champaign in 1981 and 1983, respectively. From 1983 to 1986 he worked as a microwave engineer for Hughes Aircraft Company in El Segundo, CA. He returned to the University of Illinois in 1986 and received his Ph.D. in Electrical Engineering in 1991. He is currently a postdoctoral research associate at the University of Illinois. His research interests include signal processing, ultrasound, and biomedical instrumentation. Dr. Hein was the 1989 recipient of the Terrence Matzuk Memorial Award for innovative research in the development of ultrasonic instrumentation from the American Institute of Ultrasound in Medicine, and is also a member of Eta Kappa Nu.

Course 3: Medical Imaging

Instructor: Tom Shoup, *Hewlett-Packard Company, Imaging Systems Division*

Time: Tuesday Evening, 20 October 1992
6:00 pm - 10:00 pm

This short course will introduce the principles used to create a real-time, 2D, ultrasonic image of the human body. It will also include a description of pulsed Doppler, color flow mapping, and phased array transducers, as well as more recent innovations. Videotape examples of these imaging modes will be included. Details of ultrasonic generation, detection, scan conversion, and signal processing for the various modes of operation will be presented. Applications of ferroelectric materials in transducers for medical imaging, which require low insertion loss, broad bandwidth and short pulses, will be covered. The utility of various image processing techniques and specialized signal processors as applied to medical ultrasound will also be considered.

Tom Shoup received the BA degree in Physics from Washington and Jefferson College, and the MA and Ph.D. degrees in Physics from Washington University in St. Louis. He has been employed at Hewlett-Packard for eleven years, initially in the Corporate Research Labs in Palo Alto, CA, and currently in the Imaging Systems Division in Andover, MA where he is an R&D section manager responsible for piezoelectric sensor design.

Course 4: Bulk Wave Resonators and Transducers

Instructor: Arthur Ballato, *U. S. Army Research Laboratory, Fort Monmouth*

Time: Tuesday Morning, 20 October 1992
8:00 am - 12:00 noon

This intermediate level course will describe the theory, design, fabrication, performance, and characterization of bulk wave resonators and transducers. Topics covered include piezoelectric crystals and cuts, modes of vibration, nature of piezoelectric transduction, distributed and lumped equivalent networks, and environmental effects.

Arthur Ballato received the S.B. degree in Electrical Engineering from the Massachusetts Institute of Technology, the M.S. degree in Electrical Engineering from Rutgers University, and the Ph.D. degree in Electrophysics from the Polytechnic Institute of New York. He has been employed at Fort Monmouth for the past thirty years in the areas of crystal controlled frequency sources, selection, and signal processing. He is an IEEE Fellow, twice received the U.S. Army R&D Achievement Award, and was recipient of the 1978 C. B. Sawyer Memorial Award for "contributions in the field of piezoelectric crystals".

Course 5: High Stability SAW Oscillators: Design and Performance

Instructors: Gary K. Montress and Thomas E. Parker
Raytheon Company, Research Division

Time: Tuesday Afternoon, 20 October 1992
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). Prom 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 control and signal processing components, and GaAs material and device technologies for SAW and electronic device applications. Since October 1984, Dr. 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 resonator 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 and the 1991 Ultrasonics Symposium in Orlando, and is currently serving as Technical Program Chairman for the 1992 Ultrasonics Symposium in Tucson. Dr. Montress was recently elected to serve a three year term on the *Ultrasonic,, 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 IEEE Frequency Control Symposium (formerly the Annual Symposium on Frequency Control). Dr. Parker served as Technical Program Chairman for the 44th and 45th Annual Symposia on Frequency Control in 1990 and 1991, respectively.

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: Fundamentals of Ultrasonic Sensors

Instructors: Stephen J. Martin and Antonio J. Ricco
Sandia National Laboratories
Richard M. White
University of California, Berkeley

Time: Tuesday Evening, 20 October 1992
6:00 pm - 10:00 pm

Principles of the operation of acoustic wave sensing devices will be reviewed, including surface acoustic wave (SAW) devices, quartz crystal microbalances (QCMs), Lamb wave devices, and acoustic plate mode (APM) devices. Topics to be discussed include device fabrication and instrumentation, wave transduction, propagation, sensitivity, stability, wave interaction mechanisms with thin films and the environment, and acoustic micro-actuators.

Applications of ultrasonic sensors will be discussed, including: chemical sensors - gas and solution species detection, selectivity, and sensitivity; physical sensors - measurement of acceleration, temperature, pressure, gas and liquid flow rates, and liquid viscosity and density; thin-film materials characterization - measurement of surface area and pore-size distribution; gas diffusivity; polymer viscoelastic properties; electrical conductivity; biological sensors; and immunoassay.

Stephen J. Martin received the B.S.E.E. degree from Rensselaer Polytechnic Institute in 1978. He received the M.S. and Ph.D. degrees in Electrical Engineering from Purdue University, the latter in 1983. He joined Sandia National Laboratories' Microsensor Research Division in 1983. His research involves the use of acoustic devices for physical and chemical sensing, as well as for materials characterization. These devices include surface acoustic wave (SAW), acoustic plate mode (APM), and quartz crystal microbalance (QCM) devices. He is particularly interested in interaction mechanisms between acoustic devices and the environment.

Antonio J. Ricco received the B.S. degree in Chemistry from the University of California, Berkeley in 1980 and the Ph.D. degree in Inorganic Chemistry from the Massachusetts Institute of Technology in 1984. He joined Sandia National Laboratories' Microsensor Research Division in 1984. His research currently focuses on chemical microsensors based upon acoustic wave devices, acoustic plate mode devices, optical fibers and waveguides, and silicon devices, with emphasis on new ways to utilize chemical and physical effects in combination with microelectronics technology to develop novel sensors having enhanced capabilities.

Richard M. White is Professor of Electrical Engineering and Computer Sciences, University of California, Berkeley. He received his Ph.D. degree in Applied Physics from Harvard University in 1956. Professor White is currently Co-Director of the Berkeley Sensor and Actuator Center, and has been Chair of the interdisciplinary graduate Group on Science and Mathematics Education at Berkeley. His publications and patented inventions concern sensors, ultrasonic phenomena and devices, and thermoelastic effects, as well as stroboscopic scanning-electron microscopy and microwave electronics.

1992 IEEE ULTRASONICS SYMPOSIUM COMMITTEE

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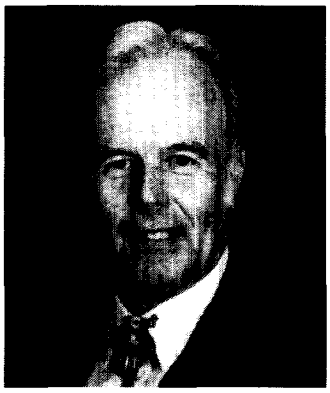
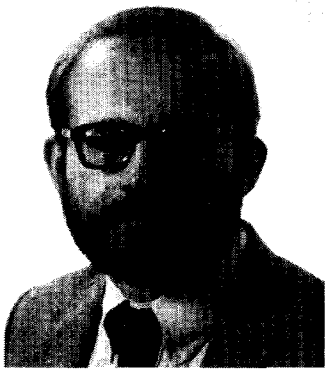


Fred Hickernell



Gary K. Montress

Susan Schneider

Vijay Nair

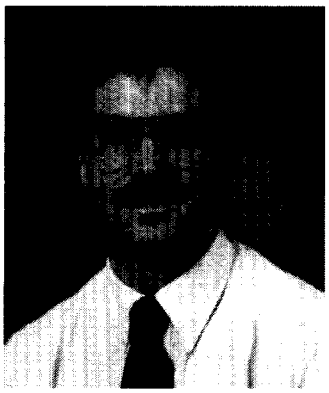
General Chair
Fred Hickernell

Fred Hickernell has spent the major part of his professional engineering career (32 years) with Motorola Inc. in the research and development of acoustical and optical microelectronic components for application to communication systems. Prior to joining Motorola in 1960 he was with Goodyear Aerospace for two years and had a four year tour of duty with the United States Air Force as a Weather Officer. Fred is a graduate of Arizona State University, Tempe, Arizona where he received his B.A in Education (1953), his M.S. in Physics (1959) and his Ph.D. in Physics (1966).

His major scientific and engineering contributions have been in the areas of SAW devices, thin-film dielectrics and piezoelectrics, and guided wave acoustooptics. He has over 80 published articles in scientific and engineering journals and is the holder of eight patents. Fred has been an invited speaker at scientific meetings in Canada, the United Kingdom, Russia, Bulgaria, India, Hong Kong, China, Japan, and the United States. He has been honored by NASA and Motorola for work on microwave acoustic components for communications equipment in space satellites including Voyager I and II.

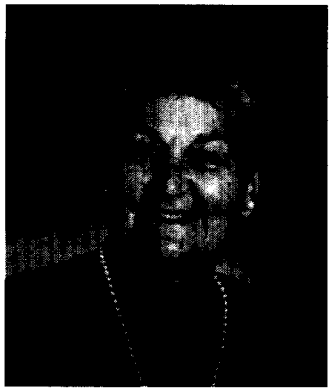
Fred is a Dan Noble Fellow of Motorola and an Adjunct Professor in the Optical Sciences Center of the University of Arizona. He is a member of several scientific societies and presently serves as Newsletter Editor and Administrative Committee Member for the Ultrasonics Ferroelectrics and Frequency Control Society of the IEEE and is on the Executive Council of American Scientific Affiliation (ASA). He has been elected to the grade of Fellow in both the IEEE and ASA.

Fred and his wife Thresa (a special education teacher) have four children (all married) and three grandchildren. The children work in scientific and teaching professions. Fred and Thresa enjoy tennis, cycling, hiking, and trav-

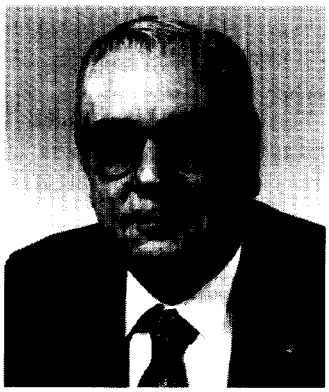


Hal S. Tharp

Janpu Hou



Thresa K. Hickernell



Bruce McAvoy

eling. They serve on church related boards and committees, teach church school, and are involved in a Respite Shelter ministry to homeless men at the First Baptist Church in Phoenix. They are long term residents of Arizona with a few years spent in Hawaii, Okinawa and Michigan while in the Air Force.

Technical Program
Gary K. Montress

Gary Montress (S'66-M'76-SM'87) was born in East Orange, New Jersey, 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, 1971, and 1976, respectively. From 1969 to 1972, while at MIT, he was a Teaching Assistant in the E.E. 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 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, 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 interests also encompass the development of custom electronic circuitry for application to low noise frequency sources. Dr. Montress is a member of Eta Kappa Nu, Sigma Xi, and Tau Beta Pi. IEEE activities include having served as an officer of the Boston Chapter of 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 and the 1991 Symposium in Orlando, and is currently serving 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 twelve year old daughter Rebecca enjoy vacationing on Cape Cod. Gary also enjoys reading (almost anything), golf, and softball.

Finance
Susan C. Schneider

Dr. Schneider received her B.S. in physics and mathematics from the University of Wisconsin-Stevens Point in 1972, followed with a Ph.D. in physics from the University of Wisconsin-Milwaukee in 1981. In 1981, she joined the Department of Electrical and Computer Engineering at Marquette University, and was promoted to Associate Professor in 1988. She has served as the Associate Chair of the department since 1988. Her teaching interests have been in electromagnetic fields and advanced analog and digital circuit design. Her research interests include theoretical studies of the SAW attenuation and velocity changes produced by electron-phonon, magneto-elastic and acousto-electric interaction in conducting, and superconducting thin films; experimental studies to characterize charge transport mechanisms across the interface formed by the union of dissimilar materials; and developing semiconductive glaze compositions for use as high power, high stress resistors. In addition, she has been involved in developing and implementing signal proc-

essing algorithms for "near real time" time differentiation. Dr. Schneider is an active member of the Ultrasonics, Ferroelectrics, and Frequency Control Society of IEEE, and she has just recently been elected to a 3 year term on the UFFCs Administrative Committee. In addition, she has served on the technical program committee for the 1988-1992 IEEE Ultrasonics Symposia, was publicity chairperson for the 1990 Ultrasonics Symposium, and is currently serving as the finance chairperson for the 1992 Ultrasonics Symposium.

On a personal note - six years ago, when her son Jacob was born, Dr. Schneider began to explore with her son the wonderful world of "boy toys". Starting with Matchbox Toys, the two kids moved into construction toys, and now they're confirmed Lego Maniacs. It's been reported that Lego stock has risen significantly since they started collecting sets. The two of them are now saving their (tooth fairy) money to buy the metroliner. Next stop will be LEGO/TC LOGO equipment, and then Mom will have to share her computer. Any free time remaining after work & Lego is devoted to devouring science fiction. (Dr. Schneider has a very messy house.)

Publicity
Vijay Nair

Vijay Nair received his M.S. degree in Physics and M.S. degree in Electrical Engineering from the University of Minnesota in 1979 and 1981 respectively. In 1981 he joined Bendix Advanced Technology Center (now Allied Signal) and conducted research activities in compound semiconductor material and device characterization, GaAs MESFET device design and fabrication, and Monolithic Microwave Integrated Circuit (MMIC) design. In 1984 he joined Semiconductor Research and Development Laboratories, Motorola Inc. to continue his research work in GaAs FETs and MMIC circuits. Currently, he is a Member of the Technical Staff at Phoenix Corporate Research Laboratories (PCRL), Motorola Inc. His research activities in PCRL include Heterojunction device design for microwave and millimeter wave applications, MMIC design, monolithic integration of frequency control devices and circuits to MMICs.

Mr. Nair is a Senior Member of IEEE. He was the chairman of the Waves & Devices Society of the Phoenix Section. Presently he is the Secretary of the Phoenix Section IEEE and the Chapter Officers' Meeting Coordinator of Microwave Theory and Techniques (MTT).

Local Arrangements
Hal S. Tharp

Hal S. Tharp received the B.S. degree from the University of Missouri-Rolla in 1981 and the M.S. and Ph.D. degrees from the University of Illinois at Champaign-Urbana in 1983 and 1986, respectively, all in electrical engineering. Since 1987 he has been an Assistant Professor in the Electrical and Computer Engineering Department at the University of Arizona, Tucson, Arizona.

Dr. Tharp's general research interests are in control, estimation, and optimization. Currently his research group is working on estimating the complete temperature field inside living tissue based on a limited number of temperature measurements, controlling the temperatures in living tissue by manipulating the power deposition, (e.g., the power deposition can be changed by electrically or mechanically scanning ultrasound transducers) and digital control of optical disk drives. The estimation problems are being attacked using multiple model based extended Kalman filtering and neural network techniques. The control problems are being investigated using multi-output techniques in the areas of robust control, adaptive control, and multi-rate sampling control.

Hal is a member of IEEE, the North American Hyperthermia Group (NAHG), Eta Kappa Nu, Tau Beta Pi, and Phi Kappa Phi. As a diversion from his professional activities, Hal enjoys spending time with his wife Barbara and their preschool sons Ryan and Ross.

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.

Guest Program
Thresa K. Hickernell

Thresa Hickernell is a graduate of Arizona State University, Tempe, Arizona, where she received her B.Ed. in 1953, and her M.Ed. in Special Education in 1984. Her professional career has included teaching first grade in Phoenix, kindergarten in Okinawa, and special education, grades four through eight, for the past sixteen years in the Scottsdale Unified School District in Arizona.

Thresa received the Arizona Childhood Education Student Award, the Arizona Council for Exceptional Children Special Education Teacher of the Year Award, and was elected to Who's Who in American Education. She has a membership in Pi Lambda Theta and

The Council for Exceptional Children. She has developed social studies curricula for grades six through twelve as a result of her travels to the United Kingdom, Russia, Bulgaria, India, China, and Japan.

Her main interests have been working with children, not only on a professional teaching level, but also in Christian education, and with her own four children, who are now grown. She has trained university education students and student teachers in the professional teacher preparation program. She is on the Board of Advisors for Rainbow Acres, a residential home for handicapped adults in Central Arizona.

Thresa and Fred are now enjoying being grandparents of two grandsons and a granddaughter. "If we had known that grandchildren were so much fun, we would have had them first."

Proceedings Editor
Bruce R. McAvoy

(SM'68-F'88) received the B.S. degree in physics from the University of Rochester in 1954, with further studies and teaching experience at Carnegie-Mellon University.

He has had extensive experience at the Westinghouse Science and Technology Center in developing microwave components for radar applications, starting in 1957 with solid-state research and continuing to microwave acoustic devices for signal processing and frequency control. More recently, he has been involved with the development of high-T_c microwave filters and resonators. He has published extensively in these fields and holds 11 patents.

In 1983, Mr. McAvoy was awarded the Westinghouse Engineering Achievement Award and in 1990 a Westinghouse Signature Award of Excellence. He his a member of MTT-18, Microwave Superconductor Applications, and chairman of MTT-2, Microwave Acoustics. He has served on the technical program committees for the International Microwave Symposium and the Ultrasonics Symposium and is on the Editorial Board of the IEEE Microwave and Guided Wave Letters. He was the recipient of an IEEE Centennial Medal.

1992 IEEE Ultrasonics Symposium Technical Program Committee Members

Technical Program Chairman

Gary K. Montress	*Raytheon Company, Research Division*

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Katherine W. Ferrara	*California State University, Sacramento*
James F. Greenleaf	*Mayo Clinic*
Masao Ide	*Musashi Institute of Technology, Japan*
John R. Klepper	*Institute of Applied Physiology & Medicine, Seattle*
John D. Larson	*Hewlett-Packard Laboratories*
Reinhard Lerch	*University of Linz, Austria*
James G. Miller	*Washington University, St. Louis*
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Bernhard R. Tittmann	*The Pennsylvania State University*
Ralph A. Treder	*AT&T Bell Laboratories*
Jiromaru Tsujino	*Kanagawa University, Japan*
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Celia E. Yeack-Scranton	*IBM Research Division, Almaden*
Donald E. Yuhas	*Allied-Signal, Inc.*

(continued on next page)

Technical Program Committee Members

(continued from previous page)

GROUP 3: Physical Acoustics

Arthur Ballato *Vice Chairman, Group 3*	*U.S. Army Research Laboratory*
John D. Adam	*Westinghouse Electric Corporation, Science & Technology Center*
Mack A. Breazeale	*National Center for Physical Acoustics, University of Mississippi*
Jan Brown	*Fisher Controls International, Inc.*
Gerald W. Farnell	*McGill University, Montreal*
Brage Golding	*Michigan State University*
David L. Hecht	*Xerox Palo Alto Research Center*
John N. Lee	*Naval Research Laboratory*
Moises Levy	*University of Wisconsin, Milwaukee*
Bruce R. McAvoy	*Westinghouse Electric Corporation, Science & Technology Center*
Robert A. Moore	*Westinghouse Electric Corporation, Electronic Systems Group*
John M. Owens	*Auburn University*
Dennis R. Pape	*Photonic Systems Incorporated*
Harry L. Salvo, Jr.	*Westinghouse Electric Corporation, Electronic Systems Group*
Susan C. Schneider	*Marquette University, Milwaukee*
Bikash K. Sinha	*Schlumberger-Doll Research Center*
Jan G. Smits	*Boston University*
Joseph Trivisonno	*John Carroll University, Cleveland*
Chen S. Tsai	*University of California, Irvine*
John R. Vig	*U. S. Army Research Laboratory*
Yook-Kong Yong	*Rutgers University*

GROUP 4: Surface Acoustic Wave (SAWs)

Gary K. Montress *Vice Chairman, Group 4*	*Raytheon Company, Research Division*
Eric L. Adler	*McGill University, Montreal*
Tim L. Bagwell	*Hewlett-Packard Company, MTD*
Larry J. Castelli	*Crystal Technology, Inc.*
Curt A. Flory	*Hewlett-Packard Laboratories*
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Janpu Hou	*Allied-Signal, Inc.*
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Adrian Venema	*Delft University of Technology, The Netherlands*
Peter V. Wright	*RF Monolithics, Inc.*
Kazuhiko Yamanouchi	*Tohoku University, Japan*

Symposium Echoes

The upcoming Ultrasonics Symposium in Tucson will be the 32nd such event since the first symposium held in 1959. What follows are some facts about the first three symposia representing the early beginnings of this event.

The first Ultrasonics Symposium was a one-day meeting held at Stanford University, August 17, 1959. Dr. Vincent Salmon of Stanford Research Institute was the General Chairman of this "National Ultrasonics Symposium" held the day before WESCON in San Francisco. Papers were presented covering the areas of delay lines, transducers, filters, acousto-optics and ultrasonic doppler. The meeting was attended by approximately fifty people. It almost faltered when only one paper was received by the deadline time for abstracts. By extending the deadline for one month and with some scrambling from the committee, fifteen high quality technical papers were presented. The registration fee was $3.00.

It wasn't until 1962 that the Second National Ultrasonics Symposium was held at Columbia University, New York City, November 28, 29, and 30th. The Columbia University School of Applied Science and Engineering served as the host. John May of BTL was the General Chairman. There were 292 registrants, with 121 from the local area, 166 from more distant points in the U.S. and five from outside the U.S. The program consisted of six technical sessions with 17 invited papers and 21 contributed papers. An early season blizzard did not seem to dampen the spirits of the attendees.

In December of 1963 the Ultrasonics Symposium was held at the Marriott Motor Hotel at the Twin Bridges just outside Washington D.C. The cost for attending had risen to seven dollars but speakers were free. There were over 300 registrants and a total of 56 papers presented (14 invited and 42 contributed). This was my first Ultrasonics Symposium. I remember the graciousness of the Technical Program Chairman Thrygve Meeker and the General Chairman Al Meitzler who were there at the regis-

IEEE '93
ULTRASONICS SYMPOSIUM
BALTIMORE, MD

Baltimore, Maryland will host the 1993 IEEE Ultrasonics Symposium. Baltimore, birthplace of the Star Spangled Banner, is one of the greatest cities of America. Founded in 1729, it is today our nation's eighth largest city with a population of over two million in the greater metropolitan area. It is a fantastic convention trade show marketplace by virtue of the fact that over 23 million people live within 200 miles. Baltimore is one of the world's most famous seaports and today it thrives with activity.

In the midst of downtown, spectacular rebirth has occurred with new office towers virtually jumping in every direction. The picturesque Inner Harbor has become the focal point of the revitalization. Sailing vessels and other pleasure craft leisurely move about in the shadows of the skyscrapers. The waters of the Chesapeake Bay gently lap against parks and promenades which lead to smart boutiques, outdoor cafes, theaters, and treelined plazas. Fountains spring forth amid steel and glass towers of prize winning new architecture which blends with the masterpieces of an earlier day.

Perhaps Baltimore's most unique characteristic is its community of more than one hundred neighborhoods, each with its own identity, revealing a strong pride in ethnic origins. From the great restaurants of Little Italy to the charming shops and bistros of the Mount Vernon Square area, all visitors will be intrigued with the neighborhoods that once housed the legendary Edgar Allan Poe, H.L. Menken, F. Scott Fitzgerald and Babe Ruth, just to mention a few.

The 1993 IEEE Ultrasonics Symposium will be held at the Hyatt Regency Baltimore October 31 to November 3, 1993. An integral part of the revitalized Inner Harbor area, The Hyatt Regency Baltimore, with its gleaming contemporary architecture, reflects the vibrancy and excitement of the city's downtown center of business and commerce. Over-the-street walkways connect the hotel to the Baltimore Convention Center and Harborplace, a glass- enclosed European-style marketplace.

For information on the Symposium contact:

Dr. Harry L Salvo, Jr.
Westinghouse Electric Corp.
Electronic Systems Group
P.O. Box 1521 - MS 3K13
Baltimore, MD 21203
(410) 765-4290

or

Dr. Susan C. Schneider
Marquette University
Department of Electrical &
Computer Engineering
1515 West Wisconsin Ave.
Milwaukee, WI 53233
(414) 288-7178

Baltimore

tration desk to welcome all attendees. The technical presentations filled my head with good ideas and expanded my knowledge of ultrasonics. It was a thrill to meet and talk with the people who had authored papers in my field of interest. It was the start of some long term friendships that have been maintained over the years.

Ultrasonic Symposia have been held every year since 1962. In this our 32nd year the number of papers and participants has grown to where the conference now attracts well over 500 people with a substantial representation from countries outside the United States. For some this will be their first year at an Ultrasonics Symposium and hopefully they will gleam some good technical ideas and make the acquaintance of several workers in their field. This will be my 30th consecutive symposium and I hope to be doing the same.

Fred S. Hickernell

1992 IEEE Frequency Control Symposium

Raymond J. Besson, Cady Award winner; James A. Barnes, Rabi Award winner; and Martin B. Bloch, Sawyer Award winner; after the award presentations.

Raymond Besson receiving the Cady Award from Errol EerNisse, with Ray Filler.

During the February 1992 meeting of the AdCom, the name of the 46th Annual Symposium on Frequency Control was changed to the 1992 IEEE Frequency Control Symposium. The name change reflects the fact that the Symposium is now sponsored by the Ultrasonics, Ferroelectrics, and Frequency Control Society of the IEEE (whereas previously, it was cosponsored by the UFFC-Soc and the U.S. Army Electronics Technology and Devices Laboratory).

The Symposium was successfully held on 27 - 29 May 1992 at the Hershey Lodge and Convention Center in Hershey, Pennsylvania. A day of tutorial short courses was held on 26 May. The course topics included: quartz crystal material basics, filter design, introduction to atomic frequency standards, frequency synthesis, contamination control methods for resonator fabrication, piezoelectric sensors, and clock synchronization using GPS.

The Symposium program included 116 papers. Of the 330 who registered, 73 were from outside the U.S.A. Twenty-one countries were represented, including a number of first-time attendees from Russia, Belarus, Bulgaria, Poland and Romania.

One of the highlights of the Symposium was the presentations of the three IEEE Frequency Control Symposium Awards: the Cady, Rabi and Sawyer Awards. The Cady Award was presented to Raymond J. Besson, ENSMM, Besançon, France, "for fundamental contributions to both quartz resonator fabrication technology and understanding of nonlinear effects leading to devices of superior performance." The award was presented by Errol P. EerNisse, Quartztronics, Inc.

The Rabi Award was presented to James A. Barnes, Austron, Inc., "for contributions and leadership in the development of the statistical theory, simulation and practical understanding of clock noise and the application of this understanding to the characterization of precision oscillators and

The award winners with UFFC-Soc. president Jim Greenleaf on the left, and General Chairman Ray Filler and Technical Program Chairman Jack Kusters on the right.

atomic clocks." The award was presented by David W. Allan, NIST.

The Sawyer Award was presented to Martin B. Bloch, Frequency Electronics, Inc., "for that rare combination of scientific and entrepreneurial excellence dedicated to the frequency control industry." The award was presented by John R. Vig, U.S. Army LABCOM.

This year, 15 scientists from the former East Bloc countries participated in the Symposium; 11 from Russia and one each from Belarus, Bulgaria, Poland, and Romania. A number of these scientists had a few days left on their visas after the Symposium was over and spent the time becoming acquainted with the U.S. A group of six such scientists, who had planned on staying in Hershey for their entire stay in the U.S., were "adopted" for a weekend by John Vig, Ray Filler, Aaron Murray, and Candy Chen (all from Fort Monmouth, NJ). They were taken to American homes and were exposed to a backyard barbecue, among other things. They were also shown the Statue of Liberty (in a rainstorm, see photo), Manhattan (also in the rain), and taken to various stores and shopping malls. Despite the bad weather, everyone seemed to have a good time.

The tour was just as enjoyable for their hosts. They were able to discuss topics (technical and otherwise) in detail, something that was not possible during the frenzy of the symposium. It is hoped that circumstances will allow continued participation by scientists and engineers from Eastern Europe and the CIS in future Symposia.

David Allan presenting the Rabi Award to James Barnes

John Vig presenting the Sawyer Award to Martin Bloch.

Symposium visitors in front of the Statue of Liberty (not visible in the background due to rain): Paul Hoffman, Poland; Slava Zhukov, Valeri Grousinenko, and Sergei Sadharov from Russia; Candy Chen and John Vig, Fort Monmouth; Alex Rukhlenko, Belarus; and Igor Abramson, Russia.

John Vig relaxing in his backyard with Alex Rukhlenko, from Belarus; Vyacheslav Zhukov, from Russia; and Igor Abramson, also from Russia.

FUTURE ULTRASONICS SYMPOSIA

1993 IEEE Ultrasonics Symposium
Baltimore, MD — 31 October - 3 November 1993
For information contact:

Harry L. Salvo, Jr., *General Chair*
Westinghouse Electric Corporation
Electronic Systems Group
333 Gordon Avenue
Severna Park, Maryland 21146
(410) 765-4290

Susan C. Schneider, *Technical Program Chair*
Marquette University
Department of Electrical
& Computer Engineering
1515 West Wisconsin Avenue
Milwaukee, Wisconsin 53233-2286
(414) 288-7178

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, New Jersey 07962
(201) 455-2482

Bernhard R. Tittmann, *Technical Program Chair*
The Pennsylvania State University
Department of Engineering Science & Mechanics
228B Hammond Building
University Park, Pennsylvania 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, Maryland 20899
(301) 975-6627

OTHER UFFC-S SPONSORED SYMPOSIA

1993 IEEE Frequency Control Symposium
Salt Lake City, UT, — 2-4 June 1993
For information contact:

Gary Johnson, *General Chair*
Sawyer Research Products
35400 Lakeland Boulevard
Eastlake, Ohio 44095
(216) 951-8770

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

1994 IEEE Frequency Control Symposium
Boston, MA — 1-3 June 1994
For information contact:

Gary Johnson, *General Chair*
Sawyer Research Products
35400 Lakeland Boulevard
Eastlake, Ohio 44095
(216) 951-8770

Lute Maleki, *Technical Program Chair*
Jet Propulsion Laboratory/CIT
Time & Frequency Systems Research Group
4800 Oak Grove Drive
MS-298-100
Pasadena, California 91109
(818) 354-3688

1995 IEEE Frequency Control Symposium
San Francisco, CA — 30 May - 2 June 1995

1992 IEEE International Symposium on Applications of Ferroelectrics
Greenville, SC — 31 August - 2 September 1992

Gene H. Haertling, *General Chair*
Clemson University
Department of Ceramic Engineering
Olin Hall
Clemson, South Carolina 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, North Carolina 27695-7907
(919) 737-2867

1993 IEEE Frequency Control Symposium to be Held in Salt Lake City

The 1993 IEEE Frequency Control Symposium will be held June 2-4, 1993, in Salt Lake City, Utah. Authors are invited to submit papers dealing with recent progress in R&D applications in areas represented by the following topics; properties of piezoelectric crystals, theory and design of resonators, processing techniques, filters, SAW devices, microwave and millimeter wave oscillators, synthesizers and other frequency control circuitry, atomic and molecular frequency standards, noise phenomena, aging, radiation effects, frequency and time coordination and distribution, sensors and transducers, and measurements and specifications.

The deadline for submission of summaries is 15 January 1993. Two copies of a summary, together with the author's name, address, and telephone number should be sent to: Jack Kusters, Hewlett Packard Company, 52U/07, 5301 Stevens Creek Blvd., Santa Clara, CA 95052-8059; telephone 408-553-2041, FAX, 408-246-5925. On the first page of the summary, in the right hand corner, please indicate the topic that best describes the paper.

Nominations for the Cady, Rabi and Sawyer Awards should also be sent to Jack Kusters by the 15 January 1993 deadline.

Ultrasonics, Ferroelectrics, & Frequency Control Society Administrative Committee

IEEE HEADQUARTERS

Director, Div. IX	J. Brown	
Secretary, TAB	I. Engleson	

SOCIETY OFFICERS

President	J. F. Greenleaf	*Mayo Clinic*
Vice-President	H. L. Salvo, Jr.	*Westinghouse Electric Corporation, Electronic Systems Group*
Secretary/Treasurer	D. C. Malocha	*University of Central Florida, Orlando*

ELECTED COMMITTEE MEMBERS

1990-1992	H. L. Bertoni	*Polytechnic University, Brooklyn*
1990-1992	G. W. Farnell, *Past President*	*McGill University, Montreal*
1990-1992	M. Levy	*University of Wisconsin, Milwaukee*
1990-1992	C. Maerfeld	*Thomson Sintra DTAS*
1990-1992	C. S. Tsai	*University of California, Irvine*
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 Company, Research Division*
1991-1993	H. Takeuchi	*Hitachi, Ltd.*
1992-1994	E. L. Adler	*McGill University, Montreal*
1992-1994	J. Brown, *Past President*	*Fisher Controls International, Inc.*
1992-1994	H. E. Engan	*Norwegian Institute of Technology*
1992-1994	J. G. Miller	*Washington University, St. Louis*
1992-1994	S. C. Schneider	*Marquette University, Milwaukee*

EX-OFFICIO COMMITTEE MEMBERS

Awards	R. H. Tancrell	*Raytheon Company, Research Division*
Chapters-Membership	K. W. Ferrara	*California State University, Sacramento*
Fellows	R. M. White	*University of California, Berkeley*
Ferroelectrics	L. E. Cross	*The Pennsylvania State University*
Finance	H. van de Vaart	*Allied-Signal, Inc.*
Frequency Control	T. E. Parker	*Raytheon Company, Research Division*
Newsletter	F. S. Hickernell	*Motorola, GEG*
Nominations	B. R. Tittmann	*The Pennsylvania State University*
Standards	A. Ballato	*U. S. Army Research Laboratory*
Transactions	W. D. O'Brien, Jr.	*University of Illinois, Urbana*
Ultrasonics	G. W. Farnell	*McGill University, Montreal*

UFFC-S ADCOM BRIEFS

The Administrative Committee (ADCOM) of the Ultrasonics, Ferroelectrics, and Frequency Control Society (UFFC-S) was called to order at 8:40 AM, February 20, 1992, by J. Greenleaf at the Harvey Hotel, Dallas, Texas. Introductions of attending members were conducted.

D. Malocha moved that the minutes of the December 8, 1991 ADCOM meeting be approved. The motion was seconded by Harry Salvo. Minutes were approved without changes.

Reimbursements of travel up to $750 was discussed by Malocha. Advances cannot be made for ADCOM travel. ADCOM member IEEE number must be included on reimbursement form. Jim Greenleaf has designated the UFFC Treasurer, Don Malocha, as his designee for processing travel request reimbursements. Mail reimbursement requests and information directly to Don Malocha. IEEE conference service is available for anyone needing help; contact Perry Sensi. Tel # (908) 562-3871.

J. Greenleaf presented the president's report. He entertained a motion to disperse extra proceedings, due to printing overruns to colleagues. A motion was approved for $4K to be appropriated for the purpose of mailing extra proceedings overseas to colleagues who are unable to purchase due to financial and currency problems. In old, business, J. Greenleaf stated that at the Dec. 1991 ADCOM meeting, a motion for executive assistant was tabled. Motion remains tabled until all symposia executive committees give input to ADCOM. T. Parker reported that the FCS executive committee is happy with current symposium management. However, FCS will support society administrator as long it is Mike Marachi; until Mike retires. Mike should be considered for UFFC executive assistant and FCS strongly requests involvement in any interview process. B. Tittman reported the new ADCOM member manual is currently under work. A complete summary will be provided at the next ADCOM meeting.

PRESIDENT'S MESSAGE

The Ultrasonics, Ferroelectrics, and Frequency Control Society is having a great year. The citation impact factor for the *UFFC Transactions* is continually improving and is now ninth out of the 42 publications by IEEE. The *Transactions* have traditionally attracted papers which were academic and somewhat theoretical in nature. We are now looking to add some applications papers to the *Transactions* with a joint issue with members of the Ultrasonic Industry Association as described in a separate letter in this newsletter. Our society has one of the highest percentage of IEEE fellows of all IEEE societies. This year our society will sponsor three international meetings, the Frequency Control Symposium in Hershey, PA, May 27-29, the International Symposium on Applications of Ferroelectrics, at Clemson University, August 31-September 2, and the Ultrasonics Symposium in Tucson, AZ, October 20-23. These meetings are attended by at least as many non-UFFC members as members indicating our strong service to the technical communities. These meetings produce 3,000 pages of proceedings. We are currently looking into providing these proceedings on CD-ROM. This year we will begin to videotape some of the short courses at the various meetings. We are also looking into providing selected data bases on CD-ROM but have not as yet made a decision but would like advice. We are beginning to send the extra proceedings and transactions currently held at IEEE headquarters to needy third world countries who cannot afford such material. At the last administrative committee meeting we approved a proposal to help support students and foreign visitors to travel to our symposia. I think we are taking our responsibility for helping third world and developing countries very seriously.

I would like to thank all the members for making the Ultrasonics, Ferroelectrics, and Frequency Control Society a very dynamic and high-quality international electro-technical information exchange society.

James F. Greenleaf
President, UFFC-S

T. Parker reported that a UFFC Symposium proceedings manual is proceeding with discussions with G. Farnell and E. Cross. Tom Parker will put together general information from all three symposia. Hopefully a draft will be completed by next ADCOM meeting D. Malocha provided a first rough draft of the Ultrasonics symposium General Chair "Help" manual. A copy was passed around. The draft will be circulated for comments, changes, inclusions, etc., to interested parties. Malocha stated that manual needs further work and revision.

The transactions editor, Bill O'Brien was snowed-in in Illinois, and could not make the meeting. The transaction report was passed and is included in the minutes. B. O'Brien is looking for new Associate Editors. The transactions currently have no back-log. A special issue on applications is planned in the Fall. ADCOM approved a page budget of 900 pages for 1993 for the IEEE Ultrasonics, Ferrolectrics and Frequency Control Transactions.

F. Hickernell reported that next newsletter is in March and deadline for inputs is March 1. A. Ballato questioned whether complimentary newsletters could be sent to colleagues. F. Hickernell responded positively. Extra copies are available and can be sent either from individual members or through F. Hickernell, given mailing information. J. Brown questioned whether we could have a Newsletter section on portable pension and PACE activities. F. Hickernell agreed if J. Brown could provide articles. R. Adler commented that foreign abstracts have addresses and could be used for possible mailings of the newsletter. This will be explored by Hickernell in cooperation with the Membership chair.

H. van de Vart was unable to attend meeting due to a mandatory company

TOKYO CHAPTER

The 13th Symposium on Ultrasonic Electronics

The 13th Symposium on Ultrasonic Electronics (USE 92) to be held in Sendai on November 30th through December 2, 1992 is sponsored by the Tokyo Chapter.

International Symposium on SAW Devices for Mobile Communication Technology

The International Symposium on Surface Acoustic Wave Devices for Mobile Communication Technology will be held in Sendai on 3-5 December, 1992 after the USE 92. The symposium, sponsored by the 150th committee of JSPS (Japan Society for Promotion of Science), presents only invited talks and discussion on present and future state-of-the-art SAW devices for mobile communications. Those who are interested in the symposium and/or those who have further enquiries should directly contact:

Professor Kazuhiko Yamanouchi
Research Institute of Electrical Communication
Tohoku University
Sendai-shi 980, JAPAN
Tel. & Fax: +81-22-266-5528

Technical Meeting

The following four technical meetings on ultrasonics were held during February - June 1992.

1)	24 February, 1992	6 paper	Tokyo
2)	21 April, 1992	6 papers	Machida,Tokyo
3)	28 May, 1992	6 papers	Tokyo
4)	18 June, 1991	12 papers	Tokyo

Masatsune Yamaguchi
Vice Chairman

meeting. The budget will be approved by mail. The society is healthy financially. J. Greenleaf discussed the fact that society financial surplus should be used to enhance services to our membership. Any means we can use to improve our services should be explored. J. Miller suggested that more participation at symposia by graduate students be pursued. There was an active discussion by several participants.

A motion was passed that states ADCOM will match up to $10K per symposium, regardless of source of match, for student travel support budgeted for each UFFC-S symposia, for the 1993 budget year. The money will be administered by the standing symposium committee chair. The student motion above is explicitly for the 1993 Ultrasonics, FCS and 1994 ISAF.

J. Vig introduced a motion, which passed, which states ADCOM will match up to $6K per symposium, regardless of source of match, for travel support for participants outside North America needing outside support, for the 1993 budget year.

J. Brown made a motion that the ADCOM support the IEEE marketing recommendation for list price of our Transactions. IEEE suggests an increase in subscription price. The motion passed.

H. Salvo moved that Kathy Ferrara be appointed as the UFFC-S Membership Services Chair and this was passed by ADCOM. H. Salvo moved that Don Malocha by appointed as the UFFC-S Secretary/Treasurer for the UFFC-S and was passed by ADCOM.

Joseph Dougherty delivered a report on behalf of L. Cross for the Ferroelectrics symposium. Financial report delivered by ISAF is included in the minutes. The final balance is $15,705.65 and approximately $3K over projections. The 1992 ISAF meeting will be chaired by Gene Heartling. Approximately 200 papers are submitted and it looks to be a very successful meeting. The 1994 ISAF meeting, proposed at Penn State, is currently seeking a Chair. The next ISAF meeting is Sunday April 12, 1993 2PM in conjunction with the American Ceramics Society annual meeting. The main topic is the review of ISAF 1992 abstracts.

Tom Parker handed out a report and summary financial report for the Frequency Control Symposia. Jim Greenleaf attended the Frequency Control Symposium Executive Committee. T. Parker moved a motion for the IEEE Frequency Control Symposium new name change. The motion passed. T. Parker moved inter-changing John Vig and Gary Johnson as FCS symposium chairs. Vig 1997-1998, Gary Johnson for 1993-1994. The motion passed. The surplus from the 1991 FCS is $21,822.37. Jan Brown also indicated that the book broker program at IEEE will yield greater funds to symposia in the future.

Ray Filler, reported on the 1992 FCS. The papers for the technical program accepted 116 papers, 52 foreign submissions, and 26 from the former Soviet Union. Approximately 10% were rejected. Nearly all Eastern European submissions request support. Ray reported that outside support from several sources for travel support were obtained including the Army European Research Office , HP, JPL, and NIST. Good success of paper submissions was achieved by adding technical program members from former Eastern Block countries.

Errol Eernisse reported that the 1993 FCS will be held in Salt Lake City, Marriott Hotel, Hotel Plaza, near the Mormon Tabernacle. The social function is being worked on. San Francisco is currently in negotiations for future FCS. ADCOM approved in principal a joint meeting in Europe for consideration by the Frequency Control committee. Malocha reported that the 1991 Ultrasonics Symposium was very successful from attendance and the technical sessions. The budget should be closed out by the next ADCOM meeting

DISTINGUISHED LECTURER REPORT

As the 1991-1992 Distinguished Lecturer, Moises Levy gave 42 lectures. He visited the six active UFFC-S chapters. He even gave a lecture in Spanish to the IEEE section in Panama, his native land, at the Universidad de Santa Maria la Antigua. He got to present talks at small intimate gatherings where the audience reminisced about their experience in the early days of ultrasonics in superconductivity, and at large gatherings where the audience was very involved in the recent findings on high T_c superconductivity. About 60% of the lectures were given abroad, but 50% in this hemisphere. About 50% were given in university settings, with the others sprinkled among national laboratories, industrial laboratories and dinner meetings. The most finely tuned scheduled was in Japan were five lectures were given in five days in four cities, including two to the UFFC-S Japan Chapter at Tohoku University, in Sendai. The hospitality of all the hosts both abroad and domestically was warm, generous and welcoming. He was very impressed by the scientific development in the Pacific Rim countries and somewhat envious of the wonderful technical facilities in Japan. He tried to inspire the acoustics community in Italy to start a UFFC-S chapter with some subliminally perceived success. The whole year provided a memorable experience.

and should show >$25K surplus. Jan Brown thanked ADCOM for support of the Bolef Symposium.

Fred Hickernell stated that the 1992 Ultrasonics Symposium meeting is scheduled for October 20-23. The student fees have been reduced from the previous year. Student travel support was increased to $7K, per last year.

H. Salvo reported on the 1993 symposium. He has completed obtaining all his symposium committee members. Hotel arrangements are progressing well and he is working toward a final budget for approval.

B. Tittman gave a verbal report on behalf of G. Quentin for the 1994 Ultrasonics Symposium in France. The Hotel Martinique contract is approved and accepted. The meeting is progressing well and the calendar is in place. Harry Salvo gave a short verbal report for G. Blessing on the 1995 symposium to be held in Seattle. Gerry is negotiating with Westin hotel and contract changes are suggested. M. Breazeale reported on the Distinguished Lecturer. It was suggested that the Distinguished Lecturer be chosen and approved as early as possible to allow the person to prepare the presentation, for advertising purposes , and to optimize the Lecturer's time.

John Vig, 1992-93 Distinguished Lecturer, requested resource (not monetary) budget from membership, Proceedings, etc. It was noted that all resources of the various committees are available to the Distinguished Lecturer, such as, the Ambassador Program, extra copies of Proceedings or Transactions, etc. Ray Filler requested a membership list and disk for comparison of FCS versus UFFC members from K. Ferrara. A. Ballato presented a written report and a short verbal presentation on Standards Activities. Our society is currently responsible for eleven different items, six standards and five projects.

B. Tittmann presented the Nominations Committee report. The ADCOM approved the following nominees: for Members at Large: Dr. S. Foster, Prof. A. Kingon, Dr. T. Cutchen, Dr. E. Furgason, Prof. N. Chubachi, Dr. G. Blessing, Dr. T Grudkowski and Outside Regions 1-7: Prof. T Shiosaki, Prof. S. Hirano.

B. Tittmann read a letter from Robert Newnham concerning his possible nomination for an ADCOM seat. Because of the stipulations placed by Dr. Newnham, the Nominations Committee did not place Dr. Newnham's name on the ballot. It was the sense of the ADCOM that this was the correct decision. There was a discussion by ADCOM concerning obtaining greater participation from the ferroelectrics community. ADCOM is attempting to find and implement ways to encourage greater participation by members whose area is ferroelectrics. It was noted that the next ADCOM meeting will be in conjunction with ISAF 1992.

J. Greenleaf turned the meeting over to D. Malocha and J. Greenleaf circulated a letter concerning a joint Russian-American meeting on biomedical and industrial ultrasound to be held in Russia. There was a lengthy discussion concerning joint sponsorship. There were concerns about the amount of money, liability, Russian inflation, and the exchange of currency. ADCOM moved that preliminary discussions leading to co-sponsorship of the first Biomedical and Industrial Ultrasound Symposium to be held in Moscow, July 1993, pending budget and definition of scope of the meeting, be presented at the next ADCOM. The chair of the meeting was turned back to J. Greenleaf.

It was noted that J. Brown is continuing to keep track and reporting, as necessary, on pensions and PACE information for the UFFCS. F. Hickernell indicated that he had attended a PACE meeting and that it was difficult to report through societies and it appeared that reporting and interactions through sections and regions was most successful.

The ADCOM approved the purchase of a notebook-type computer, with software, up to a maximum of $3000 which will be purchased by D. Malocha. There were discussions of leasing and renting a computer and/or a printer. The computer will be used by the Secretary/Treasurer and will be made available to symposia and others, as needed.

The next meeting of the ADCOM will be on August 30, 1992, in Greenville, South Carolina. The UFFCS ADCOM meeting adjourned at 4:40 p.m.

Donald Malocha
UFFC-S Secretary/Treasurer

Distinguished Lecture - High-Accuracy Oscillators and Clocks

The schedule of the UFFC-S Distinguished Lecturer for 1992-93 (the term is from 1 July 1992 to 30 June 1993) is starting to take shape. The lecturer, Dr. John R. Vig, in addition to lectures planned in the U.S.A., is scheduled to lecture in China in early September, and in Japan, in late November. His plans for lectures in Russia and other European countries in the spring of 1993 are being formulated.

For those who may have missed the last Newsletter, the topic of his lecture is "High-Accuracy Oscillators and Clocks". The abstract and biography can be found in the April 1992 Newsletter, and in the July 1992 IEEE Transactions on UFFC. Groups which are interested in scheduling a lecture, or in obtaining further information, should contact John directly (and soon, so that he can organize his schedule in an efficient manner). He may be reached at 908-544-4275 (voice), 908-544-4306 (FAX), or at the Army Research Laboratory, Attn: SLCET-EF, Fort Monmouth, NJ 07703-5601, U.S.A.

An Ultrasonic Symphony? - Why Not!

As chairman for this years Ultrasonics Symposium I find myself deluged with mail from groups interested in providing services for the symposium. One of the more interesting facets of the correspondence is the address label. People have a hard time getting everything straight when addressing the IEEE Ultrasonics, Ferroelectrics and Frequency Control Societies' Ultrasonics Symposium. The names that come out are amusing, but also give your chairman and newsletter editor some thoughts about our society.

One letter was addressed to the I.E.E.E. Ultrasonics Feral Electronics Conference. I have never thought of our constituency as being wild but maybe we should take the hint and be more aggressive in promoting our society and conferences.

Then there was the one addressed to the IEEE Illuminating Engineering Conference. This seemed not even close to our name but the person I'm sure had good intentions. Our symposia are "illuminating" and the technical program committee works hard to keep them that way.

The one I liked best was addressed "Institute of Electrical and Electronic Engineers Ultrasonic Symphony meeting". The thought struck me that our UFFC-Society is like a symphony orchestra made up of a variety of players with several different acoustic instruments. We might even assign some parallels such as phonon studies to represent the piccolos and ultrasonic imaging the bass instruments. The diversity of our players, instruments and compositions is a great strength for our orchestra! Too many strings with no winds or percussion doesn't make for good listening! Always playing, "The More-SAW Concerto" would be equally very boring.

We have string quartets represented by our Chapters who are busy rehearsing during the year. We need more of these groups and you should contact our Chapter Membership Chair, Katherine Ferrara about forming a new Chapter. They represent a grass-root focal point from which our membership grows. The UFFC-S Transactions is a good place to publish your compositions. It is widely respected and read. Bill O'Brien Jr., our editor, and his editorial staff will be more than happy to make sure you don't hit any sour notes. There are several other committees busy rehearsing behind the scenes.

However, membership in our symphony group remains fairly static. Are we sounding some discordant notes so that others are turned off? Are we so intent on reading our own music that we don't take time to listen to others? Are we lax in inviting others to harmonize? Maybe you can pass on to the administrative committee your thoughts on strengthening our orchestra. Talk to the conductor Jim Greenleaf or any other music committee member. Want to be on the music committees? VOLUNTEER!

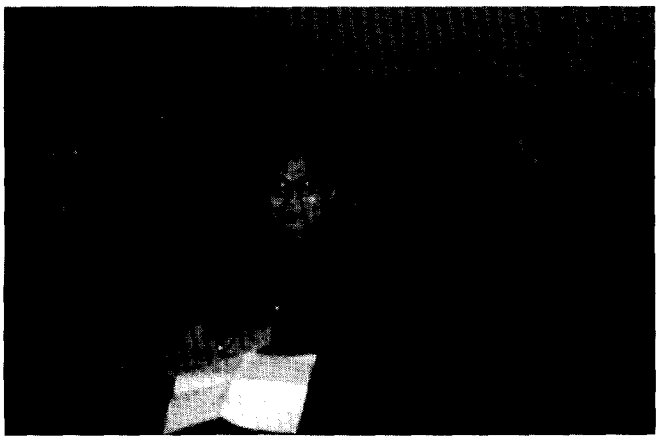
The Ultrasonics Symposium is a good place and time to harmonize our thinking. In our efforts to sound-off lets make sure we don't ignore the other players and listeners, especially the students, foreign visitors and first time attendees who have come for an audition or are just listening to see if they like what they hear. Each year there are a lot of new potential instrumentalists. Take a little time to meet someone new rather than always patting the first violinists on the back. You personally could make the difference in how we sound, ultrasonically.

Presentations by UFFC-S Distinguished Lecturer Professor Moises Levy

1. National Physical Acoustics Center, University of Mississippi, Oxford, Mississippi, May 21, 1991; Ultrasonics of High Tc and Other Unconventional Superconductors.
2. Southern California UFFC-S Chapter, Univ. of California, Irvine, CA, June 3, 1991; Ultrasonics of High Tc and Other Unconventional Superconductors.
3. Astronautics Technology Center, Madison, Wisconsin, July 19, 1991; Surface Acoustic Wave Measurements in Superconducting Films.
4. IEEE Chapter, Universidad de Santa Maria, La Antigua, Panama, Republic of Panama, August 2, 1991; Ultrasonics of High Tc and Other Unconventional Superconductors.
5. KFA, Julich, Germany, September 3, 1991; Ultrasonic Measurements of High Tc and Other Unconventional Superconductors.
6. Dept. of Mining and Metallurgy, Krakow Poland, Sixth European Conference on Internal Friction and Attenuation on Solids, September 5, 1991; Ultrasonics of High T_c and Other Unconventional Superconductors.
7. Mechanical Spectroscopy Workshop, Raba Nizna, Krakow, Poland, September 10, 1991; Surface Acoustic Wave Measurements in Superconducting Films.
8. IEEE TAB Workshop, Mexico City, Mexico, October 3, 1991; Introduction to Superconductivity and Its Applications.
9. Physics Department, University of Illinois, Champaign-Urbana, IL, October 11, 1991; Ultrasonics of High T_c and Other Unconventional Superconductors.
10. Physics Department, John Carroll University, Cleveland, OH, November 7, 1991; Ultrasonics of High T_c and Other Unconventional Superconductors.
11. IEEE UFFFC-S Chapter, Raytheon, Boston, MA, November 20, 1991; Ultrasonics of High T_c and Other Unconventional Superconductors.
12. Naval Research Laboratory, Washington, D.C., November 21, 1991; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
13. Westinghouse Science and Technology Center, Pittsburgh, PA, November 27, 1991; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
14. Physics Department, University of Wisconsin-Milwaukee, Milwaukee, WI, December 4, 1991; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
15. Bolef Symposium in Physical Acoustics, Lake Buena Vista, Florida, December 7, 1991; Acoustoelectric and Phonon Interaction in Superconducting Films.
16. Fujikura Cable Company, Tokyo, Japan, December 16, 1991; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
17. IEEE-UFFC-S Japan Chapter, Tohoku University, Sendai, Japan, December 18, 1991; Surface Acoustic Wave Measurements of Superconducting Films.
18. IEEE-UFFC-S Japan Chapter, Tohoku University, Sendai, Japan, December 18, 1991; Surface Acoustic Wave Measurements of Magnetic Films.
19. Japan Ultrasonic Society, 91 Meeting, Nagoya, Japan, December 19, 1991; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
20. Hoya Class Company, Tokyo, Japan, December 20, 1991; Surface Acoustic Wave Measurements of Magnetic Films.

Professor Levy presenting a talk on the ultrasonics of superconductors to members of the Electronics Technology and Devices Laboratory at Ft. Monmouth, New Jersey.

Deng, Nina, and Zhao, at Chinese Academy of Sciences Institute for High T_c Superconductinity headed by Zhao, newly elected member of the Chinese Academy of Sciences.



Rapt audience at Nanjing University.

Moises and Nina at the Great Wall of China.

Our Man in Shanghai.

Nina and Fred and Elaine Hickernell in Hong Kong.

21. Physics Department, Sogong University, Seoul, Korea, December 24, 1991; Surface Acoustic Wave Measurements of Superconducting Films.
22. Korea Standards Research Institute, Daejeon, Korea, December 26, 1991; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
23. Chinese Academy of Sciences, Beijing, China, December 29, 1991; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
24. Baoji Institute for Nonferrous Metal Research, Baoji, China, January 4, 1992; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
25. Shanghai Institute of Metallurgy, Shanghai, China, January 7, 1992; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
26. Physics Department, Nanjing University, Nanjing China, January 8, 1992; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
27. Physics Department, University of Hong Kong, Hong Kong, January 13, 1992; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
28. Physics Department, National University of Singapore, January 16, 1992; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
29. IEEE Victoria Section, University of Victoria, Victoria, British Columbia, February 7, 1992; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
30. Physics Department, University of Kentucky, Lexington, Kentucky, February 14, 1992; Ultrasonic Measurements of High T_c and Other Unconventional Superconductors.
31. U.S. Army Electronics Technology and Devices Laboratory, Fort Monmouth, NJ, March 3, 1992; Ultrasonics of High T_c and Other Unconventional Superconductors.
32. IEEE-UFFC-S Baltimore, Washington and Northern Virginia Chapter, Baltimore MD, March 11, 1992; Ultrasonics of High T_c and Other Unconventional Superconductors.
33. IEEE-UFFC-S, Orlando Chapter, Orlando FL, April 2, 1992; Ultrasonic Measurements in High T_c and Other Unconventional Superconductors.
34. IEEE-UFFC-S, Dallas Chapter, Dallas, TX, April 30, 1992; Ultrasonics of High T_c and Other Unconventional Superconductors.
35. Space Vacuum Epitaxy Center, University of Houston, Houston, TX, May 1, 1992; Surface Acoustic Wave Measurements of Superconducting Films.
36. University of Aachen, Physics Department, Aachen, Germany, May 22, 1992; Surface Acoustic Wave Measurements in Superconducting Films.
37. Technion University, Physics Department, Haifa, Israel, May 28, 1992. Ultrasonics of High T_c and Other Unconventional Superconductors.
38. Technion University, Physics Department, Haifa, Israel, June 2, 1992; Surface Acoustic Wave Measurements in Superconducting Films.
39. Instituto de Acustica, O.M. Corbino, Rome, Italy, June 4, 1992; Ultrasonics of High T_c and Other Unconventional Superconductors.
40. University of Genova, Physics Department, Genova, Italy, June 9, 1992; Ultrasonics of High T_c and Other Unconventional Superconductors.
41. University of Perugia, Physics Department, Perugia, Italy, June 12, 1992; Ultrasonics of High T_c and Other Unconventional Superconductors.
42. Physical Acoustics Summer School, Asilomar, Monterey, California, June 29, 1992; Ultrasonics of High T_c and Other Unconventional Superconductors.

ACOUSTOELECTRONICS '93

The Institute of Solid State Physics has started preparations for the 6th traditional conference with International Participation "Acoustoelectronics '93" which will be held in the second half of September 1993 in Varna, Bulgaria. The conference "Acoustoelectronics" has been held biannually since 1983 and has been dealing with modern physical and applied problems of excitation, propagation and interaction of acoustic waves in solids and layered structures. Over the years it gained a great deal of popularity among scientists from East and West since it has been the only scientific and technical meeting in the field of modern acoustoelectronics which has given the opportunity of experts from the former Soviet Union and ex-socialist countries to meet leading scientists from the West, exchange experiences and establish contacts with them in an informal and relaxed working atmosphere. On the other hand the meeting has been one of the very few opportunities for scientists from the West to learn about state-of-the-art achievements and new developments of acoustoelectronics in the former socialist countries. All papers accepted for presentation have been published in the Proceedings of the Conference "Acoustoelectronics". The Proceedings of the last two conferences were published in English by "World Scientific Publishing Company" in Singapore and distributed all over the world.

Despite the serious economic difficulties being experienced in Bulgaria, the Institute of Solid State Physics has decided to continue the good tradition and organize the 6th conference "Acoustoelectronics '93". The intention of the Organizing Committee is to organize a meeting with a strong international participation. Leading scientists from the United States, Japan, the European Community and ex-socialist countries will be invited speakers who will be requested to give talks on state-of-the-art achievements in their field of expertise. The policy is not to compete with such prestigious events as the IEEE Ultrasonics Symposium or the IEEE Frequency Control Symposium, both held in the USA, or the European Time and Frequency Forum. These meetings are not affordable for scientists from Central and Eastern European countries unless they are granted full financial support by the organizers. The policy is to organize a meeting which many scientists from ex-socialist countries can afford to attend and can still have the opportunity to meet and establish contacts with leading scientists from the West. Such contacts are essential for future cooperation and starting joint research projects between scientists from East and West.

For additional information on the conference as it becomes available you can contact Dr. Lozan Spassov whose address and telecommunication numbers are given below.

Dr. Lozan Spassov
Institute of Solid State Physics
72, Tzarigradsko Chaussee
1784 Sofia, Bulgaria
Phone: (3592) 74-311 ext. 529
or (3592) 77-25-10
FAX: (3592) 75-50-19

International Symposium on SAW Devices for Mobile Communication Technology

The International Symposium on Surface Acoustic Wave Devices for Mobile Communication will be held at the Sendai International Center in Sendai, Japan, December 3-5, 1992, just after the Symposium on Ultrasonic Electronics (in Japanese) to be held in Sendai, November 30 - December 2. The symposium should be of great interest to engineers and scientists, who will be brought together for the purpose of exchanging information defining the present and future states of surface acoustic wave devices for mobile communication systems. The symposium is sponsored by Japan Society for the Promotion of Science (Nihon Gakujutsu Shinko-kai).

The symposium will cover all aspects of Mobile Communication Systems and SAW devices for the Communication System. The topics for presentations by invited speakers from throughout the world are:

- Mobile Communication Systems
- Spread Spectrum Communication Systems
- SAW Materials and Propagations
- SAW Transducers
- SAW Filters
- SAW Resonators and Oscillators
- SAW Delay Lines
- Nonlinear SAW devices
- Interaction between SAW and Laser Beams and Semiconductor Carriers

For information on the symposium contact:

Professor Kazuhiko Yamanouchi
Research Institute of Electrical Communication
Tohoku University
2-1-1, Katahira, Aoba-ku
Sendai 980, JAPAN
Tel: 81-22-266-5528
FAX: 81-22-266-5528, 81-22-224-7889

IEEE Society on Social Implications of Technology (SSIT)

Background on the Society

The IEEE Society on Social Implications of Technology (SSIT) has a membership in excess of 2300 drawn from a wide variety of specialties in the engineering and technology management professions. The scope of SSIT activities is quite broad and includes a number of areas of interest to a wide range of professionals, such as ethical issues, public policy, and the social impact of technology. A large percentage of SSIT members belong to other IEEE societies. The SSIT magazine, *Technology and Society*, is distributed to SSIT members and to approximately 400 institutions in the U.S. and abroad.

Recent Activities

At the March and May meetings of the SSIT Administrative Committee, a number of items were discussed that may be of interest to members of IEEE Division IX. Highlights are provided below.

The March issue of the SSIT magazine, *Technology and Society*, is a special issue on International Space Year: Mission to Planet Earth. It features nine articles describing ISY activities around the world. The contributors represent national space agencies and other organizations active in the Space Agency Forum for ISY. They emphasize the critical role of space technologies in understanding the Earth's environmental processes and the need to use this information for the benefit of the Earth's inhabitants. The SSIT AdCom gratefully acknowledges the interest and support received from two Division IX Societies (Geoscience and Remote Sensing, and Aerospace and Electronic Systems). For further information about the special issues, contact Ms. Terri Schiesser, IEEE Magazines Editor (908) 562-3953.

Another special issue of the magazine, "Engineers in the Changing World Economy", is being planned for September or December of 1993. The issue will focus on the changing economic environment and its dramatic impact on engineers' lives and the future of the engineering profession as a whole. For further information, contact John Rynn, guest editor, at (212) 316-1135.

The next SSIT INTERNATIONAL SYMPOSIUM ON TECHNOLOGY AND SOCIETY (ISTAS '93), "Technology: Whose Costs, Whose Benefits?" is being scheduled for September 1993 in Washington, D.C. A Call for Papers will be available soon. For further information, contact Dr. William J. Kelly, MITRE Corp. (703) 883-5745.

One of the recommendations adopted by the IEEE Sections Congress in the fall of 1990 reads as follows: "Provide specific measures of support to members who have been placed in jeopardy as a result of ethical actions." In December 1991 the SSIT AdCom unanimously voted to endorse a set of proposals to strengthen the IEEE's support of engineering ethics. As a next step Steve Unger, Chair of the SSIT Ethics Committee will write a letter to The Institute regarding the IEEE Member Conduct Committee (MCC)'s responsibilities and activities, suggesting that the MCC could increase its level of activity and responsiveness. For further information, contact Professor Steve Unger, Columbia University (212) 854-8187.

This report is submitted by Professor Christine Nielsen-Specter, Division IX Representative to SSIT.

IEEE FELLOW NOMINATIONS

It is not too early to be thinking about Senior Members of the UFFC-Society that you would like to nominate for the Fellow grade. Nominations will be due in April of 1993 and forms will be ready by the end of 1992. To refresh your memory on the process it is described in the paragraphs that follow which focuses on the IEEE Fellow Committee and how it operates.

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

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

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

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

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

The Fellow Committee depends upon the Fellow grade references to

comment on the candidate's specific achievements which they are qualified to judge.

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

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

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

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

If you are interested in nominating one of our UFFC Society members you may obtain the necessary forms from IEEE headquarters.

IEEE, UFFC-UIA Special Applications Issue

We all know that the fascination of ultrasonics is the diversity of its effects and applications. Ultrasonic vibrations and waves, when produced at very high frequencies and with precision transducers, are capable of sophisticated process control, defect detection, properties characterization, and signal processing.

When produced at lower frequencies, and at high power levels with robust transducers, ultrasonic waves produce a range of spectacular physical effects such as material heating, cavitation, material fracture, acoustic streaming, and radiation pressure. These phenomena find practical application in medicine and industry being used for tissue fragmentation, extracorporeally induced pressure pulse lithotripsy, drilling, welding, cleaning, chemical activation, process control, etc.

The UFFC is a society, within the framework of the IEEE, whose members have a "professional interest in ultrasonics, ferroelectrics, and frequency control." The *IEEE Transactions of the UFFC* has traditionally attracted papers describing original work in ultrasonics which may find practical application at some future time.

The UIA (Ultrasonic Industry Association) is an organization, founded over 35 years ago, which is dedicated to the advancement of the technology and applications of ultrasonics used to create changes in materials. Its mission is "TO CHANGE THE WORLD OF MEDICINE AND INDUSTRY THROUGH ULTRASONICS." Mr. Lawrence Maloney, Chief Editor of Design News magazine, in a recent editorial quotes Prof. George Beakley of Arizona State University as saying that design has been neglected at engineering schools in favor of theory. Professor Beakley has created an award winning design course which stokes the enthusiasm of engineering students. Operating with this perspective, the UIA has always attracted people "in the field" who were applying theoretical principles to current applications and devices. Responding to the need for cross fertilization between the researcher, academic, acoustician, engineering, and applied physicists, the UIA has recently expanded its membership to include these varied aspects of the ultrasonic field. It thus provides a forum for the study and discussion of the applications of this technology.

Plans for a special applications issue of the *UFFC Transactions* are being made for July, 1993. This is one month after the June 16-17, 1993 Annual Symposium of the UIA which will be held in Columbus, OH, in the facilities of the Battelle Memorial Institute. It seems natural and fitting that the UIA participate in this special issue. Dr. Avi Benetar and Dr. Mark Schafer, from the UIA, have been asked to serve as guest editors for this issue.

Dr. Alan Broadwin, President of the UIA, and I hope that using the combined resources and inputs from our two complementary groups, we will be able to provide an informative and stimulating issue of the *IEEE Transactions of the UFFC.*

James F. Greenleaf, Ph.D.
President of UFFC-S

Welcome to Paradise

I was traveling north out of Pittsburgh, Pennsylvania to visit a relative after the 1988 Ultrasonics Symposium. I was thinking about possible sites for the 1992 symposium, since the administrative committee had confirmed that I was to chair the 1992 symposium in Arizona. Phoenix and Tucson were the possible locations. My thoughts were interrupted by the sight of two hitchhikers by the roadside, a middle aged man and a young man. I never-never pick-up hitchhikers, but for some reason I stopped the car and offered a ride which would take them part of the way to their destination. The young man got in the front and the older man in the back.

As we proceeded, it was quickly evident that the young man was going to be the silent one and the older man the talker. Within ten miles he had given me his life history and the fact that he was a transient who moved about the country with the seasons of the year. It was October and I asked him where he would be spending the winter. His answer was succinct and somewhat puzzling. He said, "paradise." I inquired about "paradise," and he said; "It's where the air is clean, the sun warms you during the day, the nights are clear and cool, and you can reach out and touch the stars. There are wide open spaces and beautiful mountains all around you. The people are friendly and helpful. You can live safely out in the open and a mesquite wood fire helps keep you warm at night. There are cattle, snakes, lizards, scorpions, cactus, and real cowboys". At this point it sounded like paradise might be a place I was familiar with, so I pressed him for the location. "Why it's Tucson," he replied. I said, "That's in Arizona, isn't it?" He said, "Yes," and then spent another half hour talking about the place and insisting that I ought to go there someday. I confess that I didn't let on that I was from the area. As I let him and his companion out at an interstate turnoff, his last words were, "Go to Tucson, it's paradise".

Well, the 1992 Ultrasonics Symposium will be in Tucson, October 20-23rd. The decision was not made by my hitchhiker friend, but could have been influenced by him. Tucson may fall short of the paradise qualities each attendee envisions. However, the charm of the Sonoran desert is like no other in the world. The way of life, the rich blend of cultures, and the scenic beauty do have "paradise" qualities. Be sure to take the time to feel the warmth of the sun, the chill of the night, touch the stars, and enjoy the quiet beauty that surrounds the area. Converse with the people, watch out for the cactus and rattlesnakes, and by all means enjoy your southwestern experience.

Welcome to Paradise

Fred S. Hickernell

Editor's Note

Your newsletter editor thanks all of the members of our UFFC society who contributed articles and pictures to this issue. Kathy Nolan put a number of the articles on disk for Ann Scrupski and her crew at IEEE publishing services to weave into the finished product. Electronic publishing is working exceptionally well, and I appreciate those who submit their articles on a disk. The deadline for the next newsletter will be 15 March, 1993.

Your editor has been occupied with preparations for the 1992 IEEE Ultrasonics Symposium. Gary Montress and his technical program committee have done an outstanding job in putting together the program. Other members of the organizing committee have been busy. My wife, Thresa, has planned some fantastic outings for guests, and we think you will enjoy the other social programs connected with the symposium. Tucson is rich in its cultural heritage and its scenic beauty. I hope to see you in Tucson.

Fred S. Hickernell
Newsletter Editor

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