



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



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**1995 IEEE  
Frequency Control Symposium**

# Medical and Biological Imaging with High Frequency Ultrasound

F. Stuart Foster

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New areas of medical study are being opened by advances in high frequency (40-100 MHz) ultrasound whereby biological structures can be imaged with resolution approaching 20  $\mu\text{m}$ . Because of increased attenuation at high frequencies, the structures of interest must be located within approximately 4 mm of the surface of the body or be accessible by endoscopic means. In contrast, conventional medical diagnostic imaging methods have much coarser resolution on the order of 1 mm and penetration greater than 100 mm. Numerous important clinical applications and benefits of the increased resolution achieved at elevated frequencies are being realized. In this lecture, the principles and applications of high frequency ultrasound are discussed. This form of imaging, which is called ultrasound backscatter microscopy (UBM), is essentially an extension of the power B-mode backscatter methods developed for clinical imaging in the 3-10 MHz frequency range. The development of new high sensitivity transducers in the 40-100 MHz range was critical to the development of UBM technology. The performance characteristics and trade-offs of these new polymers and ceramic devices are reviewed and the implementation of high frequency imaging systems is described.

Initial clinical applications of UBM include imaging of the eye, the vasculature, the skin and cartilage. In the eye, ultrasound backscatter microscopy provides images with fascinating detail not visible using any other means. With the recent introduction of commercial instrumentation for the eye, clinical applications have proliferated. The most important of these applications relating to glaucoma and anterior segment tumours are highlighted.

The development of high frequency probes for invasive imaging applications such as catheter based intravascular imaging pose an interesting engineering challenge for the development of UBM systems. These scanners are designed to provide clinicians with quantitative information regarding the distribution and structure of atherosclerotic plaque in arterial vessels such as the coronary arteries that feed the heart. Because these arteries are so small, the probes and drive systems must be smaller than about 1 mm in extent. The development and evaluation of UBM probes for this application are discussed and images in the 40 to 50 MHz range are compared with those from lower frequency devices.

Skin and cartilage imaging are natural applications of UBM as both are comprised of comparatively thin layers of tissue which undergo structural alteration when diseased. In skin cancers such as malignant melanoma, the stage at which the tumour changes from a lateral growth phase to a vertical growth phase is critical in tumour grading. UBM is particularly useful in assessing vertical growth. Osteoarthritis can change both the thickness and surface roughness of cartilage. Since such changes are typically only on the order of a few tens of microns, UBM may be a useful means of quantifying this process. The management of surgical interventions and the assessment of treatment are important aspects of research in UBM of both skin and cartilage.

Biological application of UBM are illustrated by studies of small animals and tumour models. Finally, the development of high frequency Doppler may offer a new dimension of information on blood flow at the arteriolar and capillary level to complement the structural information in UBM images. Such developments are bound to have an important impact on the study of human diseases.

## UFFC-S Distinguished Lecturer F. Stuart Foster

Francis Stuart Foster was born in Montreal, PQ, Canada on July 29, 1951. He received the B.A.Sc. degree in Engineering Physics from the University of British Columbia, Vancouver, BC, Canada, in 1974, and M.Sc. and Ph.D degrees in Medical Biophysics from the University of Toronto in 1977 and 1980, respectively.

From 1980 to 1990 he was a Senior Scientist with the Ontario Cancer Institute in Toronto, Canada. He is presently a Senior Scientist with the Sunnybrook Health Science Centre and professor of Medical Biophysics at the University of Toronto.

Dr. Foster is the recipient of a Terry Fox Cancer Research Scientist Award from the National Cancer Institute of Canada and has been involved with the development of new ultrasonic imaging systems since 1975. He has made important contributions to the development of systems for the detection and evaluation of prostate, breast, and ocular cancers. His current



research centres on the development of high frequency imaging systems, tissue characterization, and more recently, in two-dimensional array technology and intravascular imaging. In spite of his pathological aversion to writing, Dr. Foster has published over 100 papers in the field of medical ultrasound imaging, and has recently authored a book on high frequency imaging. He has twice won the Ultrasound in Medicine and Biology Prize.

Dr. Foster is a member of the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society Administrative committee and is on

the editorial boards of *Ultrasonic Imaging* and *Ultrasound in Medicine and Biology*.

Stuart, his wife Diane, and children Brett and Danusha enjoy living in Toronto and periodically retreating to their cottage on Moore Lake in the Haliburton region of Ontario. He is a rehabilitating hockey parent.

### Schedule the UFFC-S Distinguished Lecturer Now!

The Administrative Committee of the Ultrasonics Ferroelectrics and Frequency Control Society has announced Dr. F. Stuart Foster as the UFFC-S Distinguished Lecturer for 1995-1996. Dr. Foster will be available to speak before UFFC-S chapters, graduate and undergraduate student university seminars, IEEE groups, and other appropriate scientific and engineering associations. His topic is:

#### Medical and Biological Imaging with High Frequency Ultrasound

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

Dr. Foster may be reached by mail at:

Sunnybrook Health Science Centre and Department of Medical Biophysics  
University of Toronto  
2075 Bayview Avenue  
Toronto, Ontario, M4N 3M5 CANADA

or by the following means:

Telephone: 416 480 5716; Fax: 416 480 5714; Email: [stuart@srcl.sunnybrook.utoronto.ca](mailto:stuart@srcl.sunnybrook.utoronto.ca)

Please make arrangements with Dr. Foster early so he will be able to plan his schedule well in advance and conserve on transportation costs and time.

## Newly Elected Administrative Committee Members



**GEORGE ALERS**

George Alers got his PhD in physics at the State University of Iowa in Iowa City in 1954 with a thesis on ultrasonic attenuation in zinc single crystals. Those were the days when dislocation theory was in fashion and he joined several other metal physicists in expanding the Metallurgy Department of

the Westinghouse Research Laboratories under Clarence Zener. Later, he worked at the Ford Motor Company Scientific Laboratory and the Science Center of Rockwell International applying ultrasonics to problems in physical acoustics and to NDE. As part of an NDE team at Rockwell, he became involved with noncontact, electromagnetic transducers (EMATs) and was a coauthor on several patents that applied these devices to industrial inspection problems. During the decade of the 80's, he was president of a small business that developed and sold EMATs

based on these patents. Currently, he is developing various noncontact transducers for process control in the metals industry at NIST in Boulder, Colorado. His IEEE activities include being Technical Program Chairman for the Ultrasonics Symposia in Los Angeles (1976), New Orleans (1979) and Seattle (1995). He was President of the Administrative Committee of The Ultrasonics, Ferroelectrics, and Frequency Control Society in 1979-80 and the Distinguished Lecturer in 1981.



**NORIYOSHI CHUBACHI**

Noriyoshi Chubachi received the B.S., M.S. and Ph.D degrees in electrical engineering from Tohoku University, Sendai Japan, in 1956, 1962 and 1965, respectively. In 1965, he joined the Research Institute of Electrical Communication, Tohoku University, where he was an Associate Professor from 1966 to 1978. Since 1979 he has been a Professor at the Department of Electrical Engineering, Faculty of Engineering, Tohoku University. From 1982 to 1983 he was a Visiting Professor of Electrical and Computer Engineering, University of California, Santa Barbara, CA. He has worked on piezoelectric materials, ultrasonic transducers, acoustic microscopy, surface acoustic devices, and related problems. He also contributed to the development of VHF and UHF ul-

trasonic engineering through the establishment of ZnO piezoelectric transducer technology. Since 1974 he has been developing a new scientific field of ultrasonic microspectroscopy including ultrasonic microscopy. Recently, he is interested in the development of new ultrasonic equipment to be applied in the field of medical and welfare ultrasonics.

His international activities began when he served as a member of the Steering Committee for the 1968 International Symposium on Acoustoelectronics held in Sendai. The next year he had a chance to give a paper as the only Japanese participant at the 1969 IEEE Ultrasonics Symposium held in St. Louis, MO. Since then, he and his research group at Tohoku University have been playing an important role in the Ultrasonics Symposium. At the 1990 IEEE Ultrasonics Symposium held in Hawaii, he received the Outstanding Paper Award for a paper he co-authored in the 1989 Transactions. In 1988, he co-chaired the 17th International Acousti-

cal Imaging Symposium and International Symposium on Ultrasonic Microspectroscopy, both in Sendai while also serving as Chairman, Tokyo Chapter of IEEE UFFC Society. Recently, he served as one of the guest editors of the special issue of the IEEE UFFC-S Transactions on "Thin-films for Acoustoelectronics."

Dr. Chubachi is a member of the Acoustical Society of America, the Institute of Electronics and Communication Engineers of Japan, the Institute of Electrical Engineers of Japan, the Japan Society of Ultrasonics in Medicine, the Japan Society for Nondestructive Inspection, the Japan Society of Medical Electronics and Biological Engineering, the Japan Society of Mechanical Engineers, and the Society of Japanese Applied Physics. He is currently serving as Vice President of the Acoustical Society of Japan. His personal interests include playing the violin, choiring, swimming, playing "go-game," and recently he is interested in playing golf.

## JAN BROWN



Jan Brown was born in Wyoming and grew up in the Rocky Mountains of Utah, Montana, and Washington. She was educated in St. Louis, MO, at Washington University where she earned her A.B., A.M., and Ph.D. degrees in physics in 1972, 1974, and 1978, respectively. In May 1990, she received a Master's in Business Administration from the University of Texas at Austin.

From 1978-1984 she was a member of the professional staff at Schlumberger-Doll Research in Ridgefield, CT, where she was primarily involved in investigations of materials, devices, and techniques for pressure and temperature measurements in extreme conditions. Jan joined Fisher Control in Austin, TX, in 1984, where she held positions of

increasing responsibility in Technical Management as well as continued materials and sensor research and applications, including assessment and qualification of piezoelectric resonators for measurement applications, and sensor materials research for pressure, temperature, mass flow, liquid level, and pH measurement. Since July 1992, Jan has worked as an independent consultant in the areas of technology management and technology transfer and commercialization including eight months at the Department of Energy.

She has served on several IEEE Committee/Boards and was on the IEEE Board of Directors from 1992 and 1993. Her service to the UFFC-Society has included President 1990 and 1991; Vice President, 1988 and 1989; Associate

Editor UFFC Transactions 1987-Present; Member, UFFC-S Administrative Committee (AdCom) 1984-1994. She has also served in technical activities as the Chair, IEEE Ultrasonics Symposium Technical Program 1987 and 1988; Member, Technical Program Committee IEEE Ultrasonics Symposium 1980-present; Member, Technical Program Committee Frequency Control Symposium 1981-Present.

## JOHN R. VIG



John R. Vig was born in Hungary in 1942. He immigrated to the United States in 1957, received the B.S. degree in physics from the City College of New York in 1964, and the M.S. and Ph.D. degrees from Rutgers — The State University, New Brunswick, NJ in 1966 and 1969, respectively. Since 1969 he has been employed as a research scientist, working primarily on the experimental aspects of quartz crystal devices. As Chief of the Frequency Control and Timing Branch in the US Army Research Laboratory, Fort Monmouth, NJ, he currently leads a research program aimed at the development of high-stability frequency control devices and clocks for future military systems. The results of his research have been published in about 100 papers and book chapters, and he has been awarded 39 patents.

In 1988, John was elected a Fellow

of the IEEE "For contributions to the technology of quartz crystals for precision frequency control and timing." He received the 1990 IEEE Cady Award "for outstanding contributions to the development of improved crystals and processing techniques ...". He was the IEEE UFFC-Society's Distinguished Lecturer for 1992-93, served as the General Chairman of what is now the IEEE Frequency Control Symposium from 1982 to 1988, has been a member of that meeting's Technical Program Committee since 1972, and has been on the Technical Program Committee of the IEEE Ultrasonics Symposium since 1986. He was elected to the IEEE UFFC-Society Administrative Committee for the 1986-1989 term, has been serving as Vice-Chairman of the IEEE Standards Coordinating Committee 27, and as an IEEE Representative on the Hoover Medal Board of Award.

John has been an environmentalist most of his life. He has served on his town's Environmental Commission for the past 20 years, is a life member of the Nature Conservancy, and is a member of several other environmental organizations. His wife is an artist specializing in printmaking. John's favorite pastimes are ballroom dancing, and relaxing in his back yard, where he and his wife have been gradually replacing the grass (which John hates to tend) with numerous varieties of hollies, daylilies and other ornamental plants.

# 1995 IEEE International Frequency Control Symposium

**49th Annual Symposium  
May 31-June 2, 1995**

followed by **Tutorial Sessions** on June 2 & 3

**The Fairmont Hotel, San Francisco, California, USA**

*Sponsored by*

**The IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society**  
with technical participation by personnel of the U.S. Army Research Laboratory

The IEEE Frequency Control Symposium serves as the leading international forum on frequency control and precision time keeping. Topics include:

- Fundamental Properties of Quartz and other Piezoelectric Crystals,
- Theory, Design and Processing of Quartz and other Piezoelectric Resonators and Filters,
- Stable Oscillators and Synthesizers,
- Ultra-stable Atomic clocks and Frequency Standards,
- Frequency and Time Coordination and Distribution including satellite time transfer,
- Phase-noise and frequency stability characterization and measurement

## **Plenary and Invited Papers**

- *Synchronous pico-second Sonoluminescence*, Seth Putterman, UCLA, Los Angeles, CA  
(Plenary Speaker)
- *Quenching of Semiconductor Laser Linewidth*, G. Griffel, Polytechnic University, Brooklyn, NY
- *Applications of Neural Networks in Real-Time Engineering Systems*, Theodore E. Ioakimides,  
The MITRE Corporation, Bedford, MA
- *Diode Lasers for Frequency Standards and Precision Spectroscopy*, L. Hollberg, NIST, Boulder, CO
- *The Origin of 1/f PM and AM Noise in Bipolar Junction Transistor Amplifiers*, F.L. Walls,  
NIST, Boulder, CO
- *Atomic Clocks and Variations of the Fine Structure Constant*, J.D. Prestage, Jet Propulsion Lab,  
Pasadena, CA

*For additional information contact:*

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*For registration and Advance Program:*

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3100 Route 138  
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908-280-2024  
908-681-9314 (FAX)

# 1995 IEEE International Frequency Control Symposium

Tutorial Sessions — 2-3 June  
The Fairmont Hotel, San Francisco, California, USA

## Friday Afternoon, 2:00 p.m.

- A. *The Mathematics of Quartz Part 1: X-rays*  
Dr. Jack Kusters, Hewlett-Packard
- B. *Introduction to Atomic and Molecular Frequency Standards,*  
Dr. Robert E. Drullinger, NIST, Boulder
- C. *Design of SAW Filters for Cellular Phones,*  
Dr. Clemens W. Ruppel, Siemens Corporation

## Friday Afternoon, 4:00 p.m.

### PANEL DISCUSSION

- A. *Resonator Fabrication,*  
chaired by John Vig, U.S. Army Research Lab
- B. *Time and Frequency Transfer,*  
chaired by Thomas Parker, NIST, Boulder

### LECTURES

- C. *Frequency Synthesis Techniques,*  
Prof. Kroupa, University of Prague

## Saturday, Morning, 8:30 a.m.

- A. *Development of Quartz as a Material and New Materials Investigations,*  
Dr. Gary Johnson, Sawyer Research Products

- B. *Phase-noise Measurements: Fundamentals, Definitions and Error Analysis,*  
Ms. Eva Ferre-Pikal and Mr. Franklin Ascarrunz, NIST
- C. *Introduction to SAW Oscillators, Design and Performance, Part 1,*  
Dr. Thomas E. Parker and Dr. Gary K. Montress
- D. *Time Domain Instability Measures in Time and Frequency and for Telecommunications,*  
Mr. David W. Allan, Allan's TIME

## Saturday Morning, 10:30 a.m.

- A. *Introduction to Quartz Resonators as Transducers,*  
Dr. Earl EerNisse, Quartztronics, Inc.
- B. *Phase-noise and AM State-of-the-Art Measurements,*  
Mr. Craig Nelson, NIST
- C. *Introduction to SAW Oscillators, Design and Performance, Part 2,*  
Dr. Thomas E. Parker and Dr. Gary K. Montress
- D. *New Time and Frequency Opportunities using GPS,*  
Mr. David Allan, Allan's TIME

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## Frequency Control Symposium Committee

### GENERAL CHAIRMAN — JOHN R. VIG

(See Dr. Vig's biography  
on page 5)



### TECHNICAL PROGRAM CHAIRMAN — LUTE MALEKI

Lute Maleki is the supervisor of the Time and Frequency Systems Research Group, Communications Systems Research Section, at JPL. Dr. Maleki has been involved in directing and conducting research in a number of areas related to the generation, distribution, and measurement of ultra-stable reference frequen-



cies. The areas of research in Dr. Maleki's group include the development of atomic frequency standards; cryogenic cavity stabilized masers, and other cryogenic oscillators; photonics frequency generation and distribution systems; and investigations of the noise and stability properties of rf and optical frequency sources.

Dr. Maleki's current research include ion confinement and the development of trapped ion frequency sources; development of laser cooled atom traps; the study of various aspects of the physics of frequency standards; laser spectroscopy of free atoms and ions, and ions confined in rf traps; the study of noise properties and stabilization of semiconductor lasers and laser arrays; tests of special relativity using clocks and optical fiber distribution systems.

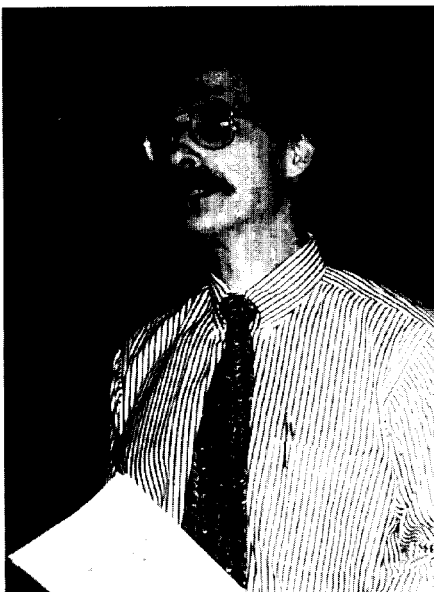
Dr. Maleki received his B.S. in physics from the University of Alabama in 1969, and his Ph.D. in experimental atomic physics in 1975 from the University of New Orleans (Louisiana State Universities). He is an Adjunct faculty at the Center for Laser Studies, University of Southern California. He is also the Associate Editor in the area of Frequency Control-Atomic and Molecular, of the IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control.

In his spare time, Lute Maleki studies French and Saxophone, and teaches a course entitled "Physics and Art" at Pasadena Art Center College of Design.

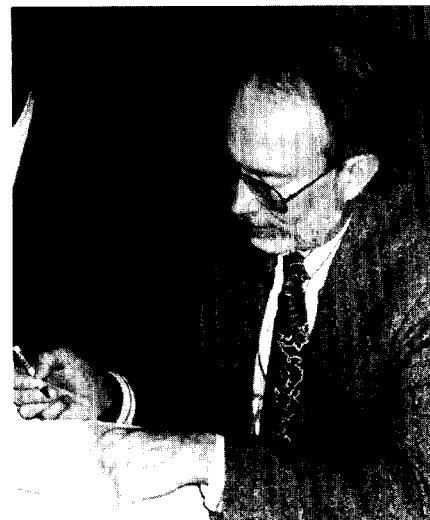
**Scenes from the 1995 Frequency Control Symposium  
Technical Program Committee Meeting in Dallas**



**Robert Smythe**



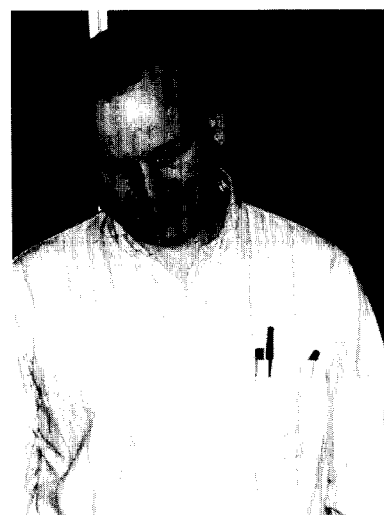
**Ray Filler**



**Errol EerNisse**



**Lute Maleki, Program Chair 1995 FCS**



**Bill Hansen**



**Martin Block (l), Sam Stein (c), Len Cutler (r)**



**Tom Parker (l), Gary Montress (c), Jean-Simon Boulanger (r)**



# 1994 Ultrasonics Symposium

The largest registration for an Ultrasonic Symposium occurred this past November in Cannes, France. There were 770 total registrations with 293 of those occurring on-site. There were a total of 473 papers presented in five parallel sessions and two poster sessions over a three day period. Twenty-nine of these were invited papers and the two poster sessions accounted for 200 of the papers. One hundred and fifty attended the six Short Course programs. The day guest program, beautifully orchestrated by Emma Maerfeld, had over 60 attendees. A highlight was the evening cruise and banquet in the bay of Cannes held on two successive evenings with a total of 290 attendees. On Saturday after the symposium 101 braved the elements for a tour of Nice and Monaco. It was a Saturday to be remembered with torrential rains and flooding in Southern France. With the Nice airport closed for four days, travelers used their wit and ingenuity to travel to other European areas and catch flights home. However, this certainly did not dampen the memories of a wonderful symposium and time well spent on the French Riviera.



A view of the Cannes harbor



President's Speaker, J.L. Lambla,  
Thomson CSF



Gerard Quentin (l), General Co-Chairman; Charles Maerfeld (c),  
Local Arrangements; Harry Salvo (r), President UFFC-S



The Cannes beach and hotel row

# Awards at the Ultrasonics Symposium

## ACHIEVEMENT AWARD

**Dr. Nobuo Mikoshiba** was presented with the Achievement Award during the Plenary Session of the 1994 Ultrasonics Symposium. He received a plaque, certificate and cash award. Dr. Mikoshiba is the fifteenth recipient of the UFFC-S Achievement Award. Dr. Mikoshiba is the Director of the Hewlett-Packard Laboratories Japan (since 1990). He is also Professor Emeritus of Tohoku University, Japan.



**Professor Noriyoshi Chubachi introducing Dr. Mikoshiba.**

Dr. Mikoshiba was cited "for his devotion to engineering education and his leadership in physical acoustics, photoacoustics and acoustoelectronics, and for establishing the first UFFC-S Chapter in Japan."

Professor Noriyoshi Chubachi, a colleague of Dr. Mikoshiba's at Tohoku University, introduced Dr. Mikoshiba to the audience. In his remarks, Prof. Chubachi recalled the first time the two men met in 1968, and the excitement over the new area of acoustoelectronics. Prof. Chubachi stressed Dr. Mikoshiba's broad background in solid state physics and electronic devices. Of particular interest to the UFFC audience is his work on



**Dr. Mikoshiba receiving the UFFC Society Achievement Award from President Salvo.**

SAW devices for signal processing, especially those involving ZnO, AlN/Sapphire, and AlN/Si. The foundations for this work were established by Dr. Mikoshiba's earlier research into the interaction of ultrasound with holes and electrons in semiconductors. Well known for his organizational skills, Dr. Mikoshiba has chaired symposia in several organizations, including Co-Chair of the 1990 Ultrasonics Symposium held in Honolulu, Hawaii. Dr. Mikoshiba's activities in establishing the Tokyo Chapter of UFFC-S in 1983 and serving as its first

Chair are recognized as key elements in fostering contacts among ultrasonic workers throughout the world.

Commenting on Dr. Mikoshiba's personal interests, Prof. Chubachi noted that, as an avid connoisseur and gatherer of mushrooms, Dr. Mikoshiba was missing the best gathering season in Japan by leaving the country for the Symposium in France. His loss, nevertheless, was well compensated by the opportunity here in Cannes to drink the famous Provence wines which he also greatly enjoys.

## DISTINGUISHED LECTURER RECOGNITION

**Professor L Eric Cross**, Distinguished Lecturer of the UFFC for 1994-95, was presented with a certificate by President Harry Salvo.



**Distinguished Lecturer Award to Eric Cross**

## FELLOW AWARDS

**Thomas Grudkowski** and **Gerald Harris** received their IEEE Fellow awards from President Salvo.

## OUTSTANDING PAPER AWARD

Six authors were honored with plaques and certificates for the Outstanding Paper Award during the Plenary Session of the Ultrasonics Symposium for their paper entitled "A Dual-Mode Thickness-Shear Quartz Pressure Sensor," published in the September 1993 issue of Transactions on UFFC. The work described in this paper is a collaboration of groups from three countries, under sponsorship of Schlumberger. The authors and their affiliations are:

**Raymond J. Besson**

École Nationale Supérieure de Mécanique et des Microtechniques, Besançon, FRANCE



**Fellow Award to Thomas W. Grudkowski**

**Jean-Jacques Boy**

École Nationale Supérieure de Mécanique et des Microtechniques, Besançon, FRANCE

**Bernard Glotin**

Études et Productions Schlumberger, Clamart, FRANCE

**Yoshinobu Jinzaki**

Schlumberger K.K., Kanagawa-ken, JAPAN

**Bikash K. Sinha**

Schlumberger-Doll Research, Ridgefield, CT, USA

**Michel Valdois**

Schlumberger Industries, Velizy-Villacoublay, FRANCE  
(currently employed at GE Medical Systems, Buc, FRANCE)



**Fellow Award to Gerald R. Harris**

Two authors, Raymond Besson and Michel Valdois, were unable to attend the ceremonies, and their awards were graciously accepted by one of their coauthors.

The paper describes research and development on an ultrasonic sensor (for oil field exploration) capable of precision operation under harsh ambient conditions. The innovative work exploits the unique properties of quartz crystals (in various cuts) to achieve rapid dynamic response while retaining accuracy for monitoring pressure and temperature over wide ranges of these parameters. Subsequent to publication of the paper, the sensors have been manufactured commercially.

This work combines a solid understanding of basic physics with practical engineering to achieve superior performance. The paper is outstanding not only for its technical achievements but for the clarity of writing as well.



**Outstanding Paper Awardees, (left to right), Jean-Jacques Boy, Bernard Glotin, Yoshinobu Jinzaki, Bikash K. Sinha**



**Roger Tancrél,  
Awards Chairman**

## Retiring Administrative Committee Members

Eric Adler, Jan Brown, Helge Engan, Jim Miller, and Susan Schneider received certificates of appreciation from Harry Salvo for their service to the Administrative Committee of the Ultrasonics, Ferroelectrics, and Frequency Control Society



Eric Adler and Harry Salvo



Jan Brown and Harry Salvo



Harry Salvo and Susan Schneider



Harry Salvo and Helge Engan

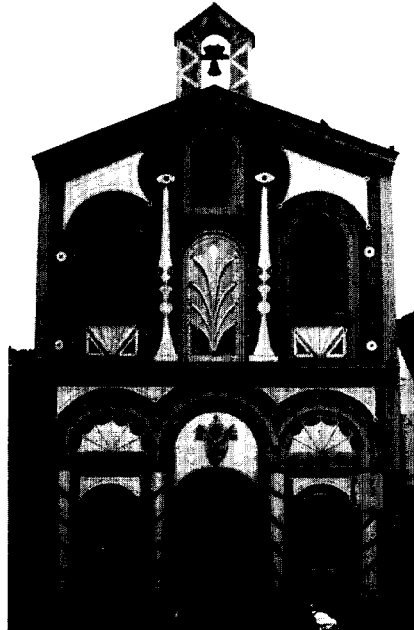


Harry Salvo and Jim Miller

## SCENES FROM THE GUEST SOCIAL ACTIVITIES



Emma Maerfeld, Guest Program Chair



Cocteau Chapel in Villefranche sur Mer



Thresa Hickernell and  
Patricia Newnham at the Perfume  
Factory in Grasse.



The Salvo ladies, Kara, Erika and Elizabeth



Asti Solie and vendor in Nice marketplace.



Suave and Debonair, Solie, Farnell and Adler

## SCENES FROM THE LOVE BOAT



Margaret and Larry Whicker



Eric and Sharon Ferguson



Gerry and Mary Lou Blessing

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### A Note from the President's Wife

Last Fall at the 1994 IEEE Ultrasonics Symposium in Cannes, France, I promised Fred Hickernell that I would write an article for the newsletter. The promise was made during a rather tumultuous time while a sizable number of us stood in the lobby of the Hotel Martinez trying to figure out a way "home" since the airport was closed due to flooding just the day before. And, there was no chance that it would open in time for anyone of us to leave at our scheduled times.

As I now write this, it occurs to me that it may be unusual for the wife of the President of the IEEE UFFC Society to write something for the newsletter since I haven't read an article written by a significant other since my husband has been a member since 1978....

Our trip to France, our first ever to Europe, was an adventure from the beginning when we arrived to find that our luggage had not made the same trip, to our departure when we made major adjustments in our journey home due to serious flooding throughout the region. Many of the attendees at the conference utilized cars, cabs, trains and whatever means available to travel to different airports because the Nice Airport was closed!

There are so many moments in between the beginning and the end that include:

Harry conducting an AdCom meeting from memory because his notes were in the luggage that hadn't arrived and in clothes that he had been wearing for some 48 hours or so....

Thresa Hickernell and Margaret Ballato arriving at my hotel room with a wardrobe for me to choose from, so that I could "dress" for the AdCom dinner. It was quite a fashion show...and then the call from the airport that our luggage was on the way.

Kara and Erika, our daughters experiencing sights, sounds and tastes that they had never had before....window shopping in Cannes desperate for something different to wear (good thing it was a National Holiday and the stores were closed), the Mediterranean Sea, a perfume factory, a mediaeval village,

French open air markets, art museums, mansions, palaces and authentic French cuisine.

Erika, along with Moises Levy and Bruce McAvoy were treated to a tour of the kitchen of a very fine French Restaurant and a picture with the Chef...he would only allow them in the kitchen after he had created our meal. It was exquisite.

During dinner, on the evening cruise, Kara tried her French by ordering a coke. Imagine her surprise when the waiter put 5 bottles of wine on our table!!

Don Malocha instructing his son Curtis, Kara and Erika on the fine art of getting on a train while 40+ of us walked through the streets of Nice to catch a train after we had been on a tour bus in gridlock for 5-1/2 hours due to the flooding where bridges and roads were washed out. In his most scholarly manner he could be heard instructing them to: "Get on the train. Don't worry about exact change, don't worry about a ticket, if the train comes when we get there and there is a turnstile, jump it if you have to, just get on the train!" How many people can say they walked the streets of Nice at 9:30 at night with an Engineering Professor expounding on the techniques of getting on a train in France?

It's been several months since our trip to Cannes and it is something we won't soon forget. Charles and Emma Maerfeld were wonderful as the host and hostess for the Symposium. We especially appreciated their expertise in helping us find other means of travel to the various airports. The flooding in the area was stressful for them, as well, since they both remarked that it was not something they had experienced in the recent past.

Since my husband has been a member of the IEEE UFFC Society, we have had many new experiences, and traveled to new and exciting places, but none of them compare to Cannes, France. And...along the way we've met so many wonderful friends that we look forward to the annual Symposium. I hope to see all of you at the Symposium in Seattle. Harry and I both will use carry-on luggage this trip!

**Elizabeth Salvo**

# IEEE

## ***Ultrasonics, Ferroelectrics, and Frequency Control Society***

### **Administrative Committee**

#### IEEE HEADQUARTERS

Director, Division IX	J. G. Ackenhusen
Secretary, TAB	R. T. Wangemann

#### SOCIETY OFFICERS

President	H. L. Salvo, Jr.	<i>Westinghouse Electric Corporation, Electronic Systems Group</i>
Vice-President	D. C. Malocha	<i>University of Central Florida, Orlando</i>
Secretary-Treasurer	G. K. Montress	<i>Raytheon Company, Research Division</i>

#### ELECTED COMMITTEE MEMBERS

1993-1995	G. V. Blessing	<i>National Institute of Standards &amp; Technology</i>
1993-1995	F. S. Foster	<i>University of Toronto</i>
1993-1995	T. W. Grudkowski	<i>United Technologies Research Center</i>
1993-1995	T. Shiosaki	<i>Kyoto University</i>
1994-1996	B. T. Khuri-Yakub	<i>Stanford University</i>
1994-1996	G. R. Johnson	<i>Sawyer Research Products Inc.</i>
1994-1996	R. E. Newnham	<i>The Pennsylvania State University</i>
1994-1996	R. Lerch	<i>University of Linz, Linz, Austria</i>
1995-1997	G. A. Alers	<i>National Institute of Standards &amp; Technology</i>
1995-1997	J. Brown	<i>JB Consultants</i>
1995-1997	N. Chubachi	<i>Tohoku University</i>
1995-1997	J. R. Vig	<i>U.S. Army Research Laboratory, Fort Monmouth</i>

#### EX-OFFICIO COMMITTEE MEMBERS

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

## ADCOM BRIEFS



**Moises Levy**

The Administrative Committee (AdCom) meeting of the Ultrasonics, Ferroelectrics, and Frequency Control Society (UFFC-S) was called to order at 9:03 A.M., November 1st, 1994, by H. L. Salvo, Jr. at the Hotel Martinez, Cannes, France. Introductions of attending members were conducted.

J. Brown moved to approve the minutes of the June 3rd, 1994 UFFC-S AdCom meeting. The motion was seconded by D. C. Malocha. The motion passed with several minor changes noted and corrected.

H. L. Salvo, Jr. reported that the Engineering in Medicine and Biology Society (EMB-S) has included the UFFC-S Transactions in the subset of IEEE periodicals which EMB-S is planning to market. The marketing effort will focus on institutions that currently do not subscribe to the IEEE's All Periodicals Package (APP).

H. L. Salvo, Jr. reported that the Electron Devices Society (ED-S) proposal to provide microfiche copies of IEEE journals for the last ten years to Eastern European libraries was approved at the last TAB meeting. Twenty libraries have been selected for the first phase of the program.



**Eric Cross**

J. Brown moved to approve UFFC-S participation in this program. The motion was seconded by R. E. Newnham. The motion passed.

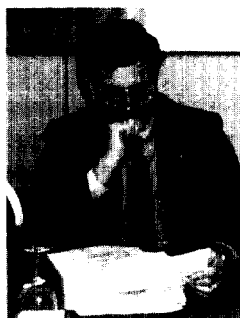
W. D. O'Brien, Jr., UFFC-S Transactions Editor-in-Chief, submitted a written report and also made an oral presentation. At this time there is still not a backlog of papers for the Transactions. He encouraged prospective authors to submit manuscripts to his attention under the Editor

directed procedures outlined in the Transactions. Delays in the paper review process, especially the response time of reviewers, was discussed. He is trying to institute policies that will shorten the review cycle. The Transactions plans to publish approximately 950 pages in 1995.

F. S. Hickernell, UFFC-S Newsletter Editor, presented an oral report. He encouraged the submission of materials for the Spring issue of the



**Bernie Tittmann**



**Tom Grudkowski**



**Tania Skrinnikov**

a long-term investment fund.

L. E. Cross, Ferroelectrics Standing Committee Chair, presented oral and written reports. The IEEE International Symposium on the Applications of Ferroelectrics (IEEE ISAF) Technical Program Committee has been expanded recently to include increased participation from overseas. IEEE ISAF 1994 was held in August 1994 and attendance was very good. The net surplus from the meeting should be approximately \$10k. Two locations for IEEE ISAF 1996 have been proposed. A final decision on the location will be made at the next Ferroelectrics Standing Committee meeting, to be held on November 14th, 1994, in Boston.



**Noriyoshi Chubachi**

the budget for the 1995 IEEE International Frequency Control Symposium as submitted. The motion was seconded by D. C. Malocha. The motion passed. A. Ballato moved to approve T. E. Parker as General Chair for the 1997 and 1998 IEEE International Frequency Control Symposia. The motion was seconded by J. Brown. The motion passed. A. Ballato moved to approve Los Angeles as the location for the 1998 IEEE

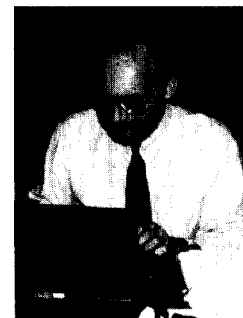
Newsletter, including photographs taken at various Society sponsored conferences and meetings. The UFFC-S AdCom commented favorably on the quality of the Fall issue of the UFFC-S Newsletter.

H. van de Vaart, UFFC-S Finance Committee Chair, presented oral and written summaries of UFFC-S finances. As of August 31st, 1994 the UFFC-S surplus was \$541.8k. A total of \$150k has now been transferred to



**Dick White**

T. E. Parker, Frequency Control Standing Committee Chair, was unable to attend the meeting. A. Ballato presented the oral and written reports. The 1994 IEEE International Frequency Control Symposium was held in June 1994, in Boston. Conference attendance was 335, with 107 also participating in the tutorials. Nineteen attendees received financial support, while nine students also received financial assistance from the symposium. A. Ballato moved to approve



**Gary Montress**





**Gerry Blessing**

International Frequency Control Symposium. The motion was seconded by T. W. Grudkowski. The motion passed.

G. W. Farnell, Ultrasonics Standing Committee Chair, introduced reports from Ultrasonics Symposia representatives. S. C. Schneider, Finance Chair, indicated that the 1992 IEEE Ultrasonics Symposium's Final Financial Report has been submitted, with a surplus of \$33.3k resulting. H.

L. Salvo, Jr., General Chair, reported that the 1993 IEEE Ultrasonics Symposium's Final Financial Report was almost ready for submission, with a target date of early 1995. G. J. Quentin, General Chair, presented an oral report describing arrangements for the 1994 IEEE International Ultrasonics Symposium. G. V. Blessing, General Chair, reported that arrangements for the 1995 IEEE International Ultrasonics Symposium are proceeding nicely. G. A. Alers from NIST (Boulder) is Technical Program Chair. B. T. Khuri-Yakub moved to approve the 1995 IEEE International Ultrasonics Symposium's budget as submitted. The motion was seconded by T. W. Grudkowski. The motion passed. H. van de Vaart moved to approve Toronto as the location for the 1997 IEEE



**Helge Engan**

International Ultrasonics Symposium. The motion was seconded by B. T. Khuri-Yakub. The motion passed. G. W. Farnell will investigate various options for an overseas location for the IEEE International Ultrasonics Symposium in the 1998 to 2000 time-frame.

R. H. Tancrrell, Awards Committee Chair, presented oral and written reports. The 1994 UFFC-S Achievement Award will be presented to Prof. N. Mikoshiba during the opening plenary session for the 1994 IEEE International Ultrasonics Symposium. The Outstanding Paper Award for the 1993 UFFC-S Transactions will be presented during the plenary session to: R. J. Besson (France), J.-J. Boy (France), B. Glotin (France), Y. Jinzaki (Japan), B. K. Sinha (USA), and M. Valdois (France), for the paper entitled "A Dual-Mode Thickness-Shear Quartz Pressure Sensor", which was published in the September 1993 issue of the UFFC-S Transactions.



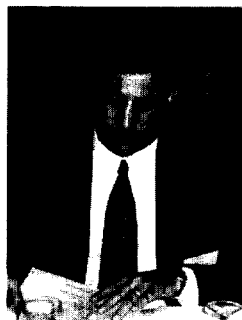
**Bill O'Brien**

E. L. Adler, UFFC-S Distinguished Lecturer for 1993-1994, reported on several additional talks presented around the world. He has presented a total of approximately thirty talks. The UFFC-S Distinguished Lecturer for 1994-1995 is L. E. Cross. His topic is: "Ferroelectric Materials for Electromechanical Transducer Applications". He has already given three talks, with at least twenty-seven more already scheduled.



**Don Malocha**

M. A. Breazeale reported that F. S. Foster has been nominated as the UFFC-S Distinguished Lecturer for 1995-1996. J. F. Greenleaf moved to approve F. S. Foster as the 1995-1996 UFFC-S Distinguished Lecturer. The motion was seconded by L. E. Cross. The motion passed. The title of his talk is: "Medical and Biological Imaging with High Frequency Ultrasound".



**Emad Ebbini**

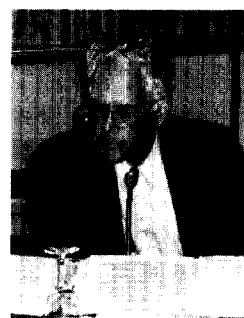
R. H. Tancrrell reported that G. V. Blessing has agreed to serve as Chair of the UFFC-S Major Awards Sub-Committee (under the UFFC-S Awards Committee) to identify candidates for major IEEE awards. This UFFC-S Sub-Committee will also work closely with the recently formed IEEE Accomplishments Search Committee. The Accomplishments Search Committee is looking to identify significant electro-technology areas that might in turn suggest likely candidates for major IEEE awards. R. H. Tancrrell indicated that three significant electrotechnology "accomplishments" have been forwarded to the IEEE committee thus far, specifically: medical ultrasound, stable clocks (oscillators), and surface acoustic wave (SAW) filters for TV and communication system applications. The committee feels that these represent pervasive examples of the application of UFFC-S covered technology areas.



**Robert Newnham**

K. W. Ferrara, Membership Services Chair, was unable to attend the meeting. E. S. Ebbini, Chapters Sub-Committee Chair, presented oral and written reports. As of July 1994, UFFC-S membership continues to increase at a 2% yearly rate, compared to an overall 1.6% yearly rate of decline for IEEE Society membership in general. There is the potential for establishing a Russian UFFC-S Chapter. Also, a UFFC-S chapter in Ilmenau, Germany is possible.

A. Ballato, Standards Committee Chair, presented oral and written reports. The UFFC-S is currently pre-



**George Alers**



**Herman van de Vaart**



**Charles Maerfeld**

sponsible for seven standards and four projects. The area of non-linear properties is under consideration for a new standards sub-committee. E. L. Adler has assumed responsibility for the surface acoustic wave (SAW) devices standards sub-committee from E. Mariani, who recently retired.



**Art Ballato**

J. F. Greenleaf, Long Range Planning Committee Chair, presented an oral report. Consideration is being given to establishing a UFFC-S Wide World Web site. The Long Range Planning Committee will bring proposed by-laws/constitution revisions to the next AdCom



**Reinhard Lerch**

R. M. White, Fellows

Committee Chair, presented an oral report. Nine UFFC-S members have been nominated for the 1995 IEEE fellow selection process. Additional representation on the Fellows Committee from the Ferroelectrics and Frequency Control Communities is under consideration.



**Roger Tancrell**

B. R. Tittmann, Nominations Committee Chair, presented oral and written reports. Four candidates were elected for three year UFFC-S AdCom terms commencing January 1st, 1995. The balloting was conducted during July and August 1994. The four candidates who were elected are: G. A. Alers, J. Brown, N. Chubachi, and J. R. Vig. The nominations committee will meet on November 2nd, 1994 to establish a potential slate of

nominees for next year's (1995) AdCom election.

meeting.

H. L. Salvo, Jr. was elected UFFC-S President for 1995.

D. C. Malocha was elected UFFC-S Vice-President for 1995.



**Pierre Khuri-Yakub**

A motion was made that the next UFFC-S AdCom meeting be held at 9:00 A.M. on 2 February 1995, in conjunction with the 1995 IEEE International Ultrasonics Symposium's 1st TPC meeting and the 1995 IEEE International Frequency Control Symposium's 2nd TPC meeting, in Dallas, Texas. The motion passed.

The UFFC-S AdCom meeting adjourned at 4:45 P.M.

**Gary K Montress**  
**UFFC-S Secretary-Treasurer,**  
**1994/1995**

## UFFC Financial Report

For the first time since our brush with insolvency in 1986, UFFC ran a small deficit. As shown in the accompanying UFFC Operating Financial Statement 12/31/94, UFFC's actual deficit for the year 1994 was \$30.5K versus a budgeted deficit of \$15.5K (the actual deficit is expected to decrease somewhat; year end Interest and All Transactions Income has not been credited to our account yet.). The fact that we were aiming for as close as possible break-even budget was a deliberate decision by AdCom. Our reserves of around \$500K are sufficient to buffer against any financial disaster and makes UFFC, from a financial standpoint, one of the richest societies on a per member basis. Rather than keep building our reserves, it was decided to increase the services to the members. This was accomplished in part by significantly raising support for students and foreign speakers to attend our Symposia. This is reflected in the item "AdCom Expenses," which has grown from \$13K in 1991 to \$54K in 1994. The 1995 budget again aims to balance income and expenses.

The Transactions had a lower than expected income from the individual non-member and all-transactions subscriptions. This was offset somewhat by higher than expected income from voluntary and overlength page charges. Overall, the Transactions ran a surplus of nearly \$43K.

The Symposia continue to do well. The 1993 Ultrasonics Symposium and the 1994 Frequency Control Symposium show a surplus of \$39.2K and \$14.0K, respectively, although the financial reports did not make it in time to be included in the 1994 statement. The 1992 Ultrasonics Symposium was finally closed, showing a surplus of \$33.2K. On the other hand, the 1993 Frequency Control Symposium only had a surplus of \$2.5K.

UFFC's reserves now stand at \$476.1K, approximately \$250 per member. \$200K is invested in an IEEE long term fund; the remainder is in T-bills and cash equivalents.

**H. van de Vaart**  
**Chair Finance and Operations Committee**  
March 4, 1995

# **UFFC OPERATING FINANCIAL STATEMENT 12/31/94**

UFFC	INCOME		EXPENSE		NET	
	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
INTEREST	19.3	9.8	0.0	0.0	19.3	9.8
PERIODICALS	249.0	226.5	195.7	183.6	53.3	42.9
NEWSLETTER	0.0	0.0	9.0	10.6	-9.0	-10.6
NON-PERIODICALS	1.6	1.7	1.2	1.0	0.4	0.7
SYMPOSIA	303.6	240.0	262.3	206.7	41.3	33.3
HQ ADMINISTRATION	0.0	0.0	23.4	26.8	-23.4	-26.8
ADCOM/OTHER	-3.8	1.5	93.6	81.3	-97.4	-79.8
<b>TOTAL</b>	<b>569.7</b>	<b>479.5</b>	<b>585.2</b>	<b>510.0</b>	<b>-15.5</b>	<b>-30.5</b>

TRANSACTIONS	INCOME		EXPENSE		NET	
	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
MEMBERSHIP FEES	26.5	26.5	0.0	0.0	26.5	26.5
INDIVIDUAL NM SUBS.	85.8	67.7	0.0	0.0	85.8	67.7
ALL TRANS. PACKAGE	86.5	76.1	0.0	0.0	86.5	76.1
VOLUNTARY PAGE CHARGES	29.6	32.7	6.2	6.8	23.4	25.9
OVERLENGTH PAGE CHARGES	13.3	20.6	2.5	0.9	10.8	19.7
AIRFREIGHT	2.6	2.6	0.0	3.3	2.6	-0.7
PRINTING/DISTRIBUTION	0.0	0.0	115.2	106.9	-115.2	-106.9
EDITING	0.0	0.0	33.2	31.2	-33.2	-31.2
PUB. ADMINISTRATION	0.0	0.0	4.9	5.0	-4.9	-5.0
UFFC EDITOR	0.0	0.0	25.8	19.1	-25.8	-19.1
SUBSCRIBER HANDLING	0.0	0.0	5.1	5.2	-5.1	-5.2
MISCELLANEOUS	4.7	0.3	2.8	5.2	1.9	-4.9
<b>TOTAL</b>	<b>249.0</b>	<b>226.5</b>	<b>195.7</b>	<b>183.6</b>	<b>53.3</b>	<b>42.9</b>

SYMPOSIA	INCOME		EXPENSE		NET	
	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
1992 ULTRASONICS	0.0	237.5	0.0	204.3	0.0	33.2
1993 ULTRASONICS	193.6	0.0	167.3	0.0	26.3	0.0
1993 FREQ. CONTROL	0.0	2.5	0.0	0.0	0.0	2.5
1994 FREQ. CONTROL	110.0	0.0	95.0	0.0	15.0	0.0
CONF. ADMINISTRATION	0.0	0.0	0.0	2.4	0.0	-2.4
<b>TOTAL</b>	<b>303.6</b>	<b>240.0</b>	<b>262.3</b>	<b>206.7</b>	<b>41.3</b>	<b>33.3</b>

ADCOM	BUDGET		ACTUAL		OUTSTANDING LOANS	
PRESIDENT'S OFFICE	4.6	5.1			1994 ULTRASONICS	50.0
ADCOM EXPENSES	50.5	53.9			1994 FREQ. CONTROL	8.0
CHAPTERS/DIST. LECTURER	16.0	14.2			1995 ULTRASONICS	8.0
TECHNICAL	2.6	0.4			1995 FREQ. CONTROL	8.0
MEMBERSHIP	17.5	6.0			<b>TOTAL</b>	<b>74.0</b>
AWARDS	1.3	1.9				
OTHER	1.1	-0.2			RESERVES 1/1/93	506.6
<b>TOTAL</b>	<b>93.6</b>	<b>81.3</b>			SURPLUS	-30.5
					RESERVES 12/31/93	<b>476.1</b>

## IEEE UFFC-S Members Elected to Fellow Grade

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

Dr. Buturus T. Khuri-Yakub  
Stanford University

*For development of innovative nondestructive evaluation techniques,  
and for contributions to zinc oxide technology.*

Dr. Moises Levy  
University of Wisconsin

*For contributions to the characterization of superconducting  
and magnetic materials by ultrasonic techniques.*

Dr. Gary K. Montress  
Raytheon Research Division

*For contributions in the development of surface acoustic wave based frequency sources,  
and for leadership in their application to high performance military radar systems.*

Dr. Kevin J. Parker  
University of Rochester

*For contributions to the advancement of medical ultrasound,  
including the development of sonoelasticity imaging and ultrasound contrast agents.*

Dr. Harry F. Tiersten  
Rensselaer Polytechnic Institute

*For contributions to the analyses of thickness-shear quartz resonators  
and surface acoustic wave devices.*

Dr. Kazuhiko Yamanouchi  
Tohoku University

*For research and development in surface acoustic waves  
and surface optical waves.*

## Eric Adler UFFC-S 1993-1994 Distinguished Lecture Itinerary

Host, Location, Date

### 1993

Bulgarian Academy of Sciences, Varna, Bulgaria,  
Acoustoelectronics 93, September 10

Technical University, Istanbul, Turkey, September 27

### IEEE Tokyo

Hitachi, Yokohama, December 7

NEC, Kawasaki, December 8

USE Symposium, Yokohama, December 9

Shibaura Inst of Tech, December 10

Tohoku University, Sendai, December 13

IEEE Singapore, Singapore Polytechnic, December 16

### 1994

IEEE Orlando, Lee's Lakeside, Orlando, FL, February 3

RF Monolithics, Dallas, TX, February 21

IEEE UC Irvine, ECE, UC Irvine, February 23

IEEE Phoenix, ASU, Tempe, AZ, February 24

Univ of Wisconsin Milwaukee (Physics), UWM, Physics  
Colloquium, March 21

Marquette U (ECE), ECE Colloquium, March 22

Penn State Materials Research Lab, State College, Pa,  
March 23

US Army Research Lab, Fort Monmouth, NJ, April 19

IEEE Washington, Holiday Inn, Calverton, Md, April 21

Russian Academy of Science, Acoustoelectronics 94 ,  
May 18

St Petersburg State Acad of Aerospace Instrumentation,  
ISSWAS, May 17-23

*IEEE Boston Chapter*, Raytheon, Lexington, Ma, June 6  
*AT&T-Microel.*, North Andover, Ma, June 7  
*Nanjing Inst. of Acoustics, Nanjing, PRC*, International Workshop on Modern Acoustics Sep 4-7, September 4  
*OES/ITRI*, Taipei, ROC, September 8  
*IEEE Australia*,  
 Univ NSW, Sydney, NSW, September 12  
 James Cook Univ Townsville, Qnsld, September 14  
 Mitec, Brisbane, Qd, September 19  
 Griffith Univ, Robinson, Qd, September 19  
 IEE, Canberra, ACT, September 20  
 ANU [tech visit], ACT, September 21  
 RMIT, Melbourne, Vic, September 28

*IEEE NZ*,  
 U of Canterbury, Christchurch, September 29  
 U of Auckland, Auckland, October 12

*IEEE India*,  
 IISc, Bangalore, October 18  
 IIT, Madras, October 19  
 IIT, New Delhi, October 20

*Univ of Perugia*, Perugia, Italy, October 25

*CNR Inst de Acustia*, Rome, Italy, October 27

*IEEE Region 8*, King's College, London, UK, November 9

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## L. Eric Cross UFFC-S 1994/1995 Distinguished Lecture Itinerary

*Host, Location, Date*

### 1994

*Siemens AG*, München, Germany, September 11-12  
*Max-Planck-Institut*, Stuttgart, Germany, September 14  
*Carnegie Mellon University*, Pittsburgh, Pennsylvania, USA, October 27, 1994  
*Laboratoire de Biophysique Medicale*, Cedex, France, November 7-8  
*Laboratoire de Chimie du Solide du CNRS*, Bordeaux, France, November 9-10  
*IEEE Ultrasonics Meeting*, Kyoto, Japan, November 30  
*Murata Manufacturing Co.*, Kyoto, Japan, December 1  
*Mtg. Adaptive Structures ICAS, Sendai International Center*, Sendai, Japan, December 5  
*Tohoku University, Electrical Engineering Dept.*, (sponsored by Tokin Corp.), Sendai, Japan, December 7  
*Toshiba Corporation, Central Research Laboratory*, Kawasaki, Japan, December 8  
*150th Mtg. of Japan Society for the Promotion of Science*, Tokyo, Japan, December 9  
*Tsinghua University*, Beijing, China, December 12  
*Xian Jiaotong University*, Xian, China, December 14  
*Shanghai Ceramic Society*, Shanghai, China, December 16  
*Shanghai Institute of Ceramics, Functional Ceramics Laboratory*, Shanghai, China, December 16

*ICEM, International Materials Society Meeting*, Hsincho, Taiwan, December 18

### 1995

*IEEE Central Pennsylvania Section & Signal Processing Chapter*, University Park, Pennsylvania, January 19  
*Prairie View A&M University, College of Engineering and Architecture*, Prairie View, Texas, January 30  
*Prairie View A&M University, Center for Materials, Microdesign and Microfabrication*, Prairie View, Texas, January 30  
*Texas A&M, Dept. of Electrical Engineering*, College Station, Texas, January 31  
*Waseda University*, Tokyo, Japan, February 3, 1995  
*USC-Irvine, Dept. Elect. Comp. Engr.*, Irvine, CA, February 22  
*Montana State, Physics Colloquium*, Bozeman, MT, February 24  
*Lehigh Univ., Mat. Sci. & Engr.*, Bethlehem, PA, March 6  
*Rutgers University, Graduate Seminar*, Piscataway, NJ, March 7  
*Sawtech, Orlando Section UFFC*, Orlando, FL, March 9  
*Alfred University*, Alfred, NY, March 30  
*Phoenix Chapter*, Tempe, AZ, April 20  
*North Carolina State, Dept. Mat. Sci. and Engr.*, Raleigh, NC, April 28  
*Boston University*, Boston, MA, May 25

## CHAPTER ACTIVITIES



Prof. L. Eric Cross delivered an invited talk at the USE'94.



Prof. Cross, Dr. Mikoshiba, Mr. Murata and Dr. Shibayama with attendees at the Special Lectures after the congratulatory party.

### Tokyo Chapter

The Tokyo Chapter held 6 technical meetings during the second half of 1994, in conjunction with the Technical Group on Ultrasonics of the Institute of Electronics, Information and Communications Engineers of Japan:

Date	Papers	Place
1) July 20, 1994	11	Tokyo
2) August 26, 1994	8	Yokohama
3) September 21-22, 1994	15	Ishinomaki
4) October 13, 1994	6	Tokyo
5) November 16, 1994	9	Shizuoka
6) December 10, 1994	7	Yokohama

#### Dr. Nobuo Mikoshiba, Achievement Award

Dr. N. Mikoshiba, a Fellow of the UFFC-S Tokyo Chapter, Professor Emeritus of Tohoku University and the Director of Hewlett-Packard Laboratories Japan, was presented the Achievement Award of the IEEE UFFC-Society at the 1994 IEEE International Ultrasonics Symposium for his devotion to engineering education and his leadership in physical acoustics, photoacoustics and acoustoelectronics, and for establishing the first UFFC-S Chapter in Japan.

#### Mr. Akira Murata, Pioneer Bridge Builder and Pioneer in the Development and Application of Ferroelectric Ceramics

Mr. A. Murata, a founder and chairman of the Board of the Murata Manufacturing Company, was presented the Pioneer Bridge Builder and Pioneer in the Development and Application of Ferroelectric Ceramics at the 1994 International Symposium on the Applications of Ferroelectrics.

#### 15th Symposium on Ultrasonic Electronics

The Tokyo Chapter sponsored the 15th Symposium on Ultrasonic Electronics (USE'94) on November 28-30, 1994, at the Doushisha-Nizima Kaikan, Kyoto, attended by more than 300 participants. Three invited talks and 149 contributed pa-

pers were presented. The papers will be published in the May 1995 issue of the Japanese Journal Applied Physics.

#### UFFC-S 1994-1995 Distinguished Lecturer Program

Professor L. Eric Cross of Pennsylvania State University in U.S.A., the UFFC-S 1994-1995 Distinguished Lecturer, was invited to Japan and he and Mrs. Cross were here from Nov. 29 to Dec. 9. He favored us with impressive and instructive talks on the topics, "Ferroelectric Materials for Electro-mechanical Transducer Applications" at the USE'94 in Kyoto and at technical meetings held in Kyoto, and Kawasaki. He was invited to the Symposium on Adaptive Structures held on December 7, 1994, at Tohoku University, Sendai.



The Japanese word on the piece of paper held by Prof. Cross was written by Prof. Y. Shimizu, the chairman of the Tokyo Chapter. The word means "auspicious professional" and has the same pronunciation as his name "Cross".

#### Special Lectures and Dinner

To commemorate the receiving award of Dr. N. Mikoshiba and Mr. A. Murata, the Tokyo Chapter offered special lectures with the 150th committee of Japan Society for Promotion of Science on December 9, 1994, in Tokyo. Dr. K. Shibayama, Professor Emeritus of Tohoku University, Dr. N. Mikoshiba, Mr. A. Murata and Professor L. Eric Cross, UFFC-S Distin-

## CHAPTER ACTIVITIES

guished Lecturer were invited to deliver the Special Lectures. The recipients and Distinguished Lecture were then toasted at a congratulatory party.

### 1995 Officers

The new officers of the Tokyo Chapter for 1995 are:

**Chairman:** Professor Kenshiro Takagi, Institute of Industrial Science, University of Tokyo, Roppongi 7-22-1, Minato-ku, Tokyo 106.

**Vice Chairman:** Professor Yasuhiko Nakagawa, Faculty of Engineering, Yamanashi University, Takeda-4, Kofu 400.

**Secretary & Treasurer:** Professor Junichi Kushibiki, Faculty of Engineering, Tohoku University, Aoba, Aramaki, Aoba-ku, Sendai 980.

**Yasuhiko Nakagawa**  
Vice Chairman, Tokyo Chapter

**NOBUO MIKOSHIBA** was born in Nagano Prefecture in Japan on October 3, 1930. He received the B. S. and Ph.D. degrees in Solid State Physics from Nagoya University in 1953 and 1960, respectively. He joined the Electrotechnical Laboratory, Tokyo, in 1957, and was a research associate in the Institute for the Study of Metals, University of Chicago, for two years from 1961 to 1963. He was a professor in the Section of Acoustoelectronics at the Research Institute of Electrical Communication, Tohoku University, Sendai from 1974 to 1990. He was Director of the Laboratory for Microelectronics of the Institute founded in 1984. He engaged in research on SAW convolvers, SAW image scanners, SAW parametric amplifiers and generators, surface acoustooptic devices, SAW charge transfer devices and acoustic DFB lasers. He was actively involved in research on AlN/sapphire and AlN/Si Saw devices for application in signal processing.



**Nobuo Mikoshiba**

Dr. Mikoshiba received, together with Dr. K. Tsubouchi, the 1983 Hattori Award (SEIKO Watch) for contributions to new AlN SAW devices. On January 1, 1988, he was elected to the grade of Fellow of IEEE for contributions to the development of physical acoustics and surface acoustic-wave devices.

He is presently Director of Hewlett-Packard Laboratories Japan. He is Professor Emeritus of Tohoku University since 1990.

**AKIRA MURATA** was born in Kyoto, Japan, on March 25, 1921. He left Kyoto first commercial school in mid-course. He founded Murata Manufacturing to manufacture specialized ceramics particularly titanium ceramic capacitors in 1944 and assumed the position of the Representative Director and the

President of the Company in 1950 and assumed the position of the Chairman of the Board in 1991.

He is a Chairman of the Electronic Materials Manufactures Association of Japan, Vice Chairman of the Electronic Industries Association of Japan and Vice Chairman of the Board of Directors of the Reliability Center for Electronic Components of Japan.

He received Medal with a Blue Ribbon from the Emperor in 1980 and Second Class Order of the Sacred Treasure in 1993.

He published his autobiography, *The Wonder Stones*, in 1994.



**Akira Murata**

## Phoenix Chapter

### IEEE Phoenix waves and Devices Workshop

For the past several years the IEEE Phoenix Waves and Devices Chapter, which now includes the UFFC-Society, has organized a one-day biennial workshop. The workshop for 1994-95 was held on November 14, 1994, at Arizona State University (ASU), with support from the Motorola Phoenix Corporate Research Laboratories and ASU. It covered subjects falling under the title "Enabling Technologies for Portable Communication and Computing." The workshop committee, composed of Jim Aberle, Badawy El-Sharawy, Craig Gaw, Bob Grondin, Irv Kaufman (Chair), Majid Hashemi, and Said Tehrani assembled a program of experts in the following topics: General considerations related to the development of portable communication and computing, circuits, semiconductors, interconnects, packaging, and displays. The speakers were John Escher (Motorola), Ghavam Shabidi (IBM), Peter Zdebel, (Motorola) George Norris (Motorola), Dave Hartman (Motorola), Wayne Wei-Ming Dai (Univ. of California Santa Cruz), Jack MacMahon (Intel), Larry Tannas (Tannas Electronics), and Carlo Infante (CBI Technology). In addition to the oral presentations, each of the ninety participants in the workshop received a 200-page volume of material prepared by the speakers.

The IEEE Phoenix Waves and Devices Chapter expresses its appreciation and thanks to the Motorola Phoenix Corporate Research Laboratories, to ASU, to the speakers, to the organizing committee, and to the participants for making this workshop a success.

### Distinguished Lecturer:

The Chapter will host Professor L. Eric Cross, the UFFC-Society Distinguished Lecturer, at its April 20th meeting at Arizona State University. Professor Cross will speak on "Ferroelectric Materials for Electromechanical Transducer Applications."



# 1995 IEEE INTERNATIONAL ULTRASONICS SYMPOSIUM

November 7-10, 1995

Seattle, Washington

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



## GENERAL CHAIR

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*Moises Levy*

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414-229-4168 (5589 fax)

levy@uwm.edu

## SYMPOSIUM MANAGEMENT

*LRW Associates*

410-647-1591 (5136 fax)

## FINAL CALL FOR PAPERS

**ABSTRACT POSTMARK DEADLINE: JUNE 1, 1995**

Papers are solicited describing original work in the field of ultrasonics. Poster and oral presentation formats will be used at the symposium. Prospective authors should note that poster sessions provide an alternative format which allows for greater flexibility and expanded audience interaction. Please mail an abstract original and two copies, following the preparation instructions provided herein, to:

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

Each abstract will receive careful review and evaluation by the Symposium Technical Program Committee. Evaluation criteria will include originality of the work, contribution to the state-of-the-art, and overall interest to the ultrasonics community. Each abstract should be specific and include quantitative information or data whenever possible. *A good abstract clearly and concisely explains the intent and content of the paper.* Papers are solicited from the following subject classifications:

### GROUP 1 Medical Ultrasonics

MAB Medical Arrays & Beam Steering  
MBE Biological Effects & Dosimetry  
MBF Blood Flow Measurement  
MIM Medical Imaging  
MPS Medical Probes & Sensors  
MSP Medical Signal Processing  
MST Medical Inverse Scattering & Tomography  
MTC Tissue Characterization  
MTH Therapeutics, Hyperthermia, UT in Surgery

### GROUP 2 NDE & Industrial Applications

NAM Acoustic Microscopy  
NDE General NDE Methods  
NMC Materials & Defect Characterization  
NPM Propagation in Commercial Materials  
NSP NDE Signal Processing  
NST NDE Sensors & Transducers  
NUP Ultrasonic Processing

### GROUP 3 Physical Acoustics

PBW Bulk Wave Effects & Devices  
PGP General Physical Acoustics  
PMI Magnetic Interactions  
POI Optical Interactions  
PPF Piezoelectric & Ferroelectric Materials  
PUM Ultrasonic Motors & Actuators

### GROUP 4 Surface Acoustic Waves

SAE SAW Acoustoelectric Effects & Devices  
SDR SAW Delay Lines & Resonators  
SFT SAW Filters & Transducers  
SMP SAW Materials & Propagation  
SSA SAW System Applications  
STD SAW Thin-Films & Devices

**Student Travel Support - Limited funds are available to support student attendance at the 1995 Symposium. Awards will be made on a competitive basis. Further information and application forms can be obtained from Prof. Gerald W. Farnell, Department of Electrical Engineering, McGill University, McConnell Engineering Building, 3480 University Street, Montreal, Quebec H3A 2A7, CANADA (FAX 514-398-4470). The application deadline is August 1, 1995.**

**Former Soviet Union and Baltic States Scientist Travel Support - Limited funds are available, on a competitive basis, from the International Science Foundation to support attendance from these regions at the 1995 Symposium. We ask those who need support, to please so indicate at the bottom of the submitted abstract and to provide an email address for correspondence.**





Leave this corner area blank  
for eventual insertion of an  
abstract number

## ABSTRACT PREPARATION INSTRUCTIONS

Subject Classification: M A B

Please insert appropriate subject  
classification from front page.

### SOUND PROPAGATION IN A VACUUM\*

J. J. JOHNSON and S. S. SMITH Super Ultrasonics Research Institute, Scioncetown, Wyoming 99999

This sample abstract shows the appropriate abstract preparation format for the 1995 IEEE Ultrasonics Symposium. Authors of invited and contributed papers must prepare their abstracts for direct reproduction by offset. The material will appear as the author prepares it. Abstracts must be typed on plain bond paper, single spaced with type no smaller than elite. The typewritten material must fit into a 18 cm x 14 cm rectangle. The title must be in all capitals, underlined and centered. Leave one blank line under the title and type the authors' names, all in capital letters but not underlined, starting at the left-hand edge of the rectangle. The affiliation, city, state, and mail (zip) code of the author(s) should be typed in the style shown in this example. For abstracts from outside the United States, include the name of the country. Leave one blank line after the address and begin the body of the abstract. If desired, support acknowledgments may be added at the end of the abstract as shown in this example.

\* This work was supported by the Agency for Impossible Research.

14 cm

NOTE: Diagrams are not  
drawn to scale.

18 cm

J.J. Johnson  
Building 111  
Super Ultrasonic Research Institute  
Scioncetown, WY 99999  
TEL: 123-456-7890 FAX: 123-098-7654  
email : johnson @ suri . com

3.0 cm

This space contains the name, mailing and  
email addresses, and office & FAX telephone  
numbers of the author to whom all further  
correspondence should be sent.

10 cm

Beneath your address, please indicate

- (a) your session preference: ORAL, POSTER, or EITHER
- (b) if a VHS VCR/MONITOR is required.

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1995 IEEE ULTRASONICS SYMPOSIUM  
1218 BALFOUR DRIVE  
ARNOLD, MD 21012-2150  
USA



CALL FOR PAPERS

## Invited Speakers for the 1995 IEEE Ultrasonics Symposium

- "Design of Sparse Array Imaging Systems" — **Geoff Lockwood**, *University of Toronto*
- "Ultrasound Technology for Laparoscopic Surgery" — **Dennis Dietz**, *Tetrad*
- "Medical and Biological Imaging with High Frequency Ultrasound" — **Stuart Foster**, *University of Toronto*
- "2-D Arrays for Diagnostic Ultrasound: Fabrication Techniques and Sensitivity" — **Steve Smith**, *Duke University*
- "Air Coupled Transducer Design for Low-Z Materials" — **W. A. Grandia and C. M. Fortunko**, *QMI Inc.*
- "Acoustic Microscopy" — **Jan D. Achenbach**, *Northwestern University*
- "Acoustic Biosensors" — **John F. Vetelino**, *University of Maine*
- "Material Characterization using Dynamic Modulus" — **Hassel Ledbetter**, *National Institute of Standards and Technology*
- "Recent Developments in Guided Wave NDE" — **Joseph L. Rose**, *Pennsylvania State University*
- "Synthetic Aperture Sonar" — **Douglas G. Todoroff**, *Office of Naval Research*
- "Recent Developments in Ultrasonic Welding" — **Jiromaru Tsujino**, *Kanagawa University*
- "Advanced Technology for Inspection of Nuclear Reactor Components" — **Steven R. Doctor**, *Pacific Northwest Laboratory*
- "\$2,000,000 for a Stradivari Violin, What's Going On?" — **William Fry**, *University of Wisconsin-Madison*
- "Thermoacoustic Refrigeration" — **Steven L. Garrett**, *Naval Postgraduate School*
- "Probing the Unknowns of Sonoluminescence" — **Seth Putterman**, *University of California at Los Angeles*
- "Automotive Electronics" — **Rahul Dixit**, *TRW Transportation Electronics Division*
- "MFM Resonators for Oscillators, Filters and Sensors" — **Clark T. C. Ngugen**, *University of Michigan*
- "Woodacoustic Characterization by Ultrasonics" — **Woichita Bucur**, *Laboratoire de Photochimie Applique*
- "Acoustothermography: Passive Sensing of the Human Body by Measurements of its Thermal Acoustic Fields" — **Yuri V. Gulyaev**, *Institute of Radioengineering and Electronics*
- "Applications of SAW Devices in Cellular and Cordless Phones" — **Juergen Machui**, *S+M Components*
- "Surface Mount Type SAW Filter for Hand-Held Telephones" — **Toshio Tagami**, *Oki Electric Industry Co., Ltd.*
- "Acceleration Sensitivity of SAW and STW Devices" — **John A Kosinski**, *U. S. Army Research Laboratory*
- "A Coupling-of-Modes Formalism for Surface Transverse Wave Devices" — **Benjamin P. Abbott**, *RF Monolithics, Inc.*
- "SPUDT-Based Saw Filter: Design Principles and Optimization" — **J. M. Hode**, *Thomson Microsonics*
- "Shear Surface Acoustic Waves in Solids" — **Yuri V. Gulyaev**, *Institute of Radioengineering and Electronics of the Russian Academy of Sciences*
- "SAW-Based Systems for Communication Satellites" — **Robert C. Peach**, *COM DEV Ltd.*
- "Longitudinal Leaky Surface Waves for High Frequency Device Applications" — **Takahiro Sato**, *ACROTEC MICROELECTRONICS Japan Energy Corporation*
- "SAW Devices on Diamond" — **Shin-ichi Shikata**, *Sumitomo Electric Industries Ltd.*

## 1995 IEEE Ultrasonic Symposium Short Course Program

Course 1:	<b>Composite Piezoelectric Materials for Acoustic Imaging Transducers</b>
Instructor:	Wallace Arden Smith, Office of Naval Research
Time:	Tuesday Morning, November 7, 1995 8:00 AM - 12:00 Noon
Course 2:	<b>Medical Ultrasonic Transducer Arrays Design and Applications</b>
Instructor:	Charlie Desilets, Ultrasound Solutions
Time:	Tuesday Afternoon, November 7, 1995 1:00 PM - 5:00 PM
Course 3:	<b>SAW Devices for Public Communication Systems</b>
Instructor:	Gerd Riha, Siemens Matsushita Components
Time:	Tuesday Evening, November 7, 1995 6:00 PM - 10:00 PM
Course 4:	<b>Medical Imaging Systems</b>
Instructor:	Tom Shoup, Imaging System Division, Hewlett-Packard
Time:	Tuesday Morning, November 7, 1995 8:00 AM - 12:00 Noon
Course 5:	<b>Ultrasonic Blood Flow Imaging and Measurement</b>
Instructor:	Peter Burns, University of Toronto
Time:	Tuesday Afternoon, November 7, 1995 1:00 PM - 5:00 PM
Course 6:	<b>Therapeutic Ultrasound</b>
Instructor:	George H. Harrison, University of Maryland School of Medicine
Time:	Tuesday Evening, November 7, 1995 6:00 PM - 10:00 PM

### Travel Fund Support

Former Soviet Union and Baltic States Scientists Travel Support — Limited funds may be available (on a competitive basis) from the International Science Foundation to support FSU scientist attendance at the Seattle Symposium. We ask that FSU scientists who need support to please indicate that at the bottom of the abstract and supply an email address for correspondence.

### Guest Program in Seattle

The guest program for Seattle is shaping up nicely. Wednesday afternoon after an introductory overview of Seattle, we will tour the city, giving everyone a brief glimpse into Seattle's colorful past, its exciting present and some breathtaking scenery. On Thursday, it's off for an all day tour to the "Emerald Isle" — Whidbey Island, via the Washington State ferry system. The day will include a visit to the artist community of Langley, a lovely village by the sea with an interesting array of shops. On Friday morning we will visit Pioneer Square, via the new Seattle bus tunnel which will provide an opportunity to experience Seattle's public art. While at Pioneer Square you may choose to visit the art and glass galleries, the Klondike Museum and the Underground Tour of Seattle. Most importantly, we will see old friends and make new ones. Registration for these tours will be provided by the the tour firm and may be completed as soon as the preliminary program is received. See YOU there!!

Mary Lou Blessing

### Seattle-Emerald City

Blue water surrounds the so-called "Emerald City" of Seattle. Cupped between the Olympic Mountains to the west and the Cascade Range to the east, the city sits on a narrow strip of land between Puget Sound and Lake Washington. It is 83.9 square miles in land area. It's 1994 population is 531,400, with the greater metropolitan region having a population of 2,183,900. Frequent rains and mists keep the surroundings cleaner and greener than most other cities of similar size; the city receives about 80 percent of its rainfall October through April.

Seattle is a city that offers everything from mountains to rain forests, from backpacking to boating, from local wines and beers to coffee, from Pearl Jam to the Seattle Opera, and more. Famous companies like Boeing and Microsoft find their homes in Seattle. "Sleepless in Seattle" has brought more tourists to the city.



# FUTURE UFFC-S SPONSORED SYMPOSIA

## ULTRASONICS SYMPOSIA

### 1995 IEEE International Ultrasonics Symposium

Seattle, WA — 7 - 10 November 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 (Phone)  
(301) 417-0514 (FAX)

George A. Alers, *Technical Program Chair*  
National Institute of Standards & Technology  
Materials Reliability Division  
Division 853  
325 Broadway  
Boulder, Colorado 80303  
(303) 497-7899 (phone)  
(303) 497-5030 (FAX)

### 1996 IEEE International Ultrasonics Symposia

San Antonio, TX — 3 - 6 November 1996

*For information contact:*

Jeffrey S. Schoenwald, *General Chair*  
Rockwell International Science Center  
Mail Code A9  
1049 Camino dos Rios  
Thousand Oaks, California 91358

(805) 373-4236 (Phone)

(805) 373-4810 (FAX)

### 1997 IEEE International Ultrasonics Symposium

Toronto, Canada

*For information contact:*

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

## FREQUENCY CONTROL SYMPOSIA

### 1996 IEEE International Frequency Control Symposium

San Francisco, CA — 31 May - 3 June 1995

*For information contact:*

John R. Vig, *General Chair*  
U.S. Army Research Laboratory  
AMSRL-EP-ME  
Fort Monmouth, New Jersey 07703-5601  
(908) 544-4275 (Phone)  
(908) 544-4223 (FAX)

## IEEE Frequency Control Symposia

Year & No.	Dates	City & Hotel	General Chairman	Technical Program Chairman	Tutorial Chairman	Local Arrangements	Comments
1995 49th	May 31 to June 2	San Francisco Fairmont Hotel	John Vig	Lute Maleki	Dave Allen	Jack Kusters	
1996 50th	June 5-7	Hilton Hawaiian Village Hotel, Honolulu, Hawaii	Prof. Kazuhiko Yamanouchi & John Vig	Fred Walls	TBD	Dean Okayama, NIST WVVH	50th Anniversary Bash
1997 51st	May 28-30	Orlando, FL Hilton Disney World Village	Tom Parker	Fred Walls	TBD	Don Malocha	
1998 52nd	TBD	Tentative Los Angeles	Tom Parker	TBD	TBD	TBD	
1999 53rd	TBD	Tentative France	Don Sullivan	TBD	TBD	TBD	
2000 54th	TBD	TBD	Don Sullivan	TBD	TBD	TBD	

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) 364-3688 (Phone)  
(818) 393-6773 (FAX)

**1996 IEEE International Frequency Control Symposium**  
Honolulu, HI — 5 - 7 June 1996  
*For information contact:*

John R. Vig, *General Co-Chair*  
U.S. Army Research Laboratory  
AMSRL-EP-ME  
Fort Monmouth, New Jersey 07703-6601  
(908) 544-4275 (Phone)  
(908) 544-4223 (FAX)

*or*

Kazuhiko Yamanouchi, *General Co-Chair*  
Research Institute of Electrical Communication  
Tohoku University  
Katahira, Aoba-ku  
Sendai 980  
JAPAN  
(81) 22-266-5528 (Phone)  
(81) 22-266-5528 (FAX)

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

**1997 IEEE International Frequency Control Symposium**  
Orlando, FL  
*For information contact:*

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Boulder, Colorado 80303  
(303) 497-7881 (Phone)  
(303) 497-6461 (FAX)

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

**1998 IEEE International Frequency Control Symposium**  
Los Angeles, CA  
*For information contact:*

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National Institute of Standards & Technology  
Time & Frequency Division  
325 Broadway  
Boulder, Colorado 80303  
(303) 497-7881 (Phone)  
(303) 497-6461 (FAX)

**1996 IEEE International Symposium on Applications of  
Ferroelectrics**  
East Brunswick, NJ  
*For information contact:*

Ahmad Safari, *General Chair*  
Rutgers University  
Center for Ceramics Research  
Brett & Bowser Roads  
P.O. Box 909  
Piscataway, New Jersey 08855-0909  
(908) 445-4367 (Phone)  
(908) 445-3258 (FAX)

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## ISEE '95

ISEE '95, International Symposium on Electronics and the Environment will be held May 1-3, 1995, in Orlando, Florida. The conference is sponsored by the IEEE Technical Activities Board and its Environment, Health and Safety Committee. Discussions will focus on the manufacturing and design efforts of both small and large companies to improve environmental aspects of processes and products. An exhibition and tutorials are part of the program. For information contact IEEE/ISEE Registrar, P.O. Box 1331, Piscataway, NJ 08855-1331; phone (908) 562-3878; Fax (908) 981-1769.

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## 14th International Symposium on Nonlinear Acoustics — Nanjing, 1996

The 14th International Symposium on Nonlinear Acoustics (ISNA-14) will be held in Nanjing, China, 17-21 June 1996. This meeting, the first ISNA to be held in China, will be organized by the Institute of Acoustics of Nanjing University. Information about the main topics of the symposium as well as details concerning arrangements can be obtained from Professor Ronjue Wei, Nanjing University, Institute of Acoustics, Nanjing 210008, China. He can also be reached via Fax +86 25 330 2728.

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# 1995 World Congress on Ultrasonics

## General Theme

The 1995 World Congress on Ultrasonics, expected to be the largest in science and applications of ultrasound, will be distinguished from previous international ultrasonics conferences by three unprecedented aspects:

- Under academic management, the resulting low fees are affordable for young researchers from all over the world.
- It is supported by the major acoustical societies.
- As first World Congress on Ultrasonics, it starts a future series of triad-hopping WCU's.

Do not miss the first WCU, which in Berlin will provide an unprecedented, broad opportunity to work with our colleagues from the Eastern European Countries.

## A Selection of Major Topics

- *Scientific:* Bio-Effect Research; Cavitation Research; High-frequency Ultrasound; Physical Acoustics
- *Particular:* Acoustic Microscopy; Acoustooptics / Photoacoustics; Certification / Conformity Testing; Human Safety; International Standardization; SAW-Techniques; Signal Processing; Transducer Materials; Underwater / Geophysical Acoustics
- *Industrial:* Acoustic Emission; Cleaning; Macrosonics; Motors; Non-Destructive Testing; Processing; Sensors; Sonochemistry; Welding
- *Medical:* Exposimetry; Lithotripsy; Ultrasonic Diagnostics; Phantoms; Ultrasonic Surgery / Therapy; 3-D Imaging

## Technical Exhibition

The Exhibition will give an outstanding opportunity to become acquainted with modern products in the field of medical and industrial ultrasonics from the leading manufacturers all over the world. Moderate stand fees will encourage small companies to participate in the exhibition, next to the lecture halls.

## Berlin — The Host City

With the disappearance of the infamous Berlin Wall, Berlin now offers richer opportunities for exchange of ideas and viewpoints, stimulating cooperation and competition across frontiers. The rich heritage of architecture and visual arts together with the performing arts, developed separately in a period of division to serve two major capitals, now have become amalgamated to form an outstanding civil and cultural setting for the discerning guest. For those who wish to spend all of their time at the congress, tempting offers for pre- and post-conference excursions will be available.

## Further Congress Information:

### WCU'95 Secretariat:

Prof. Dr. J. Herbertz  
Gerhard-Mercator-Universität  
D-407048 Duisburg  
Germany  
Phone: +49 (203) 379-3243  
Fax: +49 (203) 37 35 34

### Congress Venue:

Humboldt-Universität  
Unter den Linden 6  
D-10099 Berlin  
Germany

# The 22nd International Symposium on Acoustical Imaging

September 4-6, 1995, Firenze, Italy

## Scope of Symposium

The International Symposium on Acoustical Imaging represents a unique opportunity for researchers involved in the various areas of acoustical imaging to come together and share reciprocal ideas and experiences. This is the 22nd of a series of highly regarded interdisciplinary scientific meetings, regularly organized since 1968.

Contributed papers describing original work in the field of Acoustical Imaging are solicited. Topics and technical areas of interest appropriate for the Symposium include:

- *Mathematics and physics of acoustical imaging:* Inverse scattering, Reconstruction algorithms, Three dimensional Imaging, Wave propagation.
- *Components and systems:* Transducers and arrays, Signal Processing methods, Imaging systems, Acoustical holography.
- *Applications in medicine and biology:* Ultrasound echography, Flow imaging, Tissue characterization, Novel imaging methods.
- *Applications in nondestructive testing:* Acoustic microscopy, Material characterization.
- *Applications in geophysics and underwater acoustics:* Seismic tomography, Elastic waves, Waveform inversion, Ocean tomography, 3-D Imaging.
- *Industrial applications:* robotics vision, Sensors.

## Electronic Information and Abstract Book

A Gopher will be available on Internet for all people interested in the Symposium. This gopher will contain updated information about the Symposium (deadlines, accommodations, social events, etc.). To access this free service you can connect with a gopher client program specifying the address "gopher.area.fi.cnr.it". After the connection with the gopher, a menu will appear with several options; by choosing "Events and Congress in Florence" you reach another menu from which you can select "ACOUSTICAL IMAGING '95" to access in our gopher area. An electronic copy of the Abstract Book will be made available with full-text on-line search facilities.

## Symposium Arrangements and Fees

The 22nd International Symposium on Acoustical Imaging will be held on September 4-6, 1995, at the Centro

Affari in Florence. The Centro Affari is located in the heart of the City, lying directly in front of S.M. Novella Central Railway Station.

All symposium participants must register and receive badges. To provide additional opportunities for interaction, most meals will be provided for conference participants as a part of the registration fee. The Symposium registration fee of approximately \$380 will also cover technical sessions with coffee breaks, the book of abstracts, and one copy of the 1995 Symposium Proceedings to be published by Plenum Press.

## Location

The Centro Affari is situated in the Middle of the city, in the heart of an area surrounded by popular symbols of history such as Fortezza da Basso and Santa Maria Novella. Within a few minutes walking distance lie Piazza del Duomo, Palazzo Vecchio and Ponte Vecchio: a walk into the Italian Renaissance. As a possible alternative, within twenty minutes by car there are the Tuscan Hills, the vineyards, and olive groves in one of the most recognizedly famous regions of the world.

## Accommodation

A wide range of hotels with discounted rates for Symposium participants will be available in the area at close proximity to the commercial centre of Florence. A limited number of cheap accommodations will also be reserved for foreign students.

## Important dates:

Mailing of preliminary program	15 May 1995
Deadline for early registration	15 July 1995

## For further information, please contact:

Professor Piero Tortoli, Chairman  
22nd International Symposium on Acoustical Imaging  
Electronic Engineering Department  
University of Florence  
Via S. Marta, 3  
50139 - Florence, Italy  
FAX: +39 55 494569  
E-mail: acoima95@ingfi1.ing.unifi.it

## CALL FOR PAPERS

### ***Special Issue on Applications***

**(Submission Deadline: July 1, 1995)**

The *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* invites the submission of Applications Papers on any of the following topics:

- Acoustic Microscopy
- Biological and Medical
- Devices
- Elastic Wave Phenomena
- Ferroelectrics-Applied
- Ferroelectrics-Fundamental
- Flow Techniques and Applications
- Frequency Control-Acoustics
- Frequency Control-Atomic & Molecular
- Imaging
- Materials
- Measurement and Control Applications
- Nondestructive Evaluation
- Nonresonant SAW Devices
- Optical Interaction
- Physical Acoustics
- Piezoelectric Thin Films and Micromachining
- Sensors
- Systems Applications
- Therapeutics
- Underwater Sound

The contributed papers must have a significant applications component in order to fall within the scope of this Special Issue. Consult the inside cover of the UFFC Transactions for a more detailed breakdown of each of these topics. Contributed papers should be sent to the Editor-in-Chief

William D. O'Brien, Jr.  
Department of Electrical and Computer Engineering  
University of Illinois  
405 North Mathews  
Urbana, IL 61801

In the transmittal letter, from the above list, identify the specific topic of the contribution. All papers will be subjected to the normal peer-review process of the UFFC Transactions. Submission deadline is July 1, 1995 and the expected publication date is early-1996.

## CALL FOR PAPERS

### ***Special Issue on Therapeutic Ultrasound***

**(Submission Deadline: October 1, 1995)**

The *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* invites the submission of Therapeutic Ultrasound Papers on any of the following topics:

- Hyperthermia
- Surgery
- Drug Activation
- Lithotripsy
- Novel Applicator Systems
- Invasive and Noninvasive Feedback
- Image Guidance
- Treatment Planning

A number of prominent authors have agreed to submit contributions to the special issue, including M. Fink, J. Hunt, K. Hynynen, and S. Umemura. The contributed papers must have a significant therapeutic ultrasound component in order to fall within the scope of this Special Issue. Consult the inside cover of the UFFC Transactions for a more detailed breakdown of each of these topics. Contributed papers should be sent to the Editor-in-Chief

William D. O'Brien, Jr.  
Department of Electrical and Computer Engineering  
University of Illinois  
405 North Mathews  
Urbana, IL 61801

The Guest Editor for this Special Issue is Emad Ebbini, University of Michigan. In the transmittal letter, from the above list, identify the specific topic of the contribution. All papers will be subjected to the normal peer-review process of the UFFC Transactions. Submission deadline is October 1, 1995 and the expected publication date is mid 1996.



## CALL FOR PAPERS

The *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* invites the submission of Finite Element Applications in Ultrasonics papers on any of the following topics:

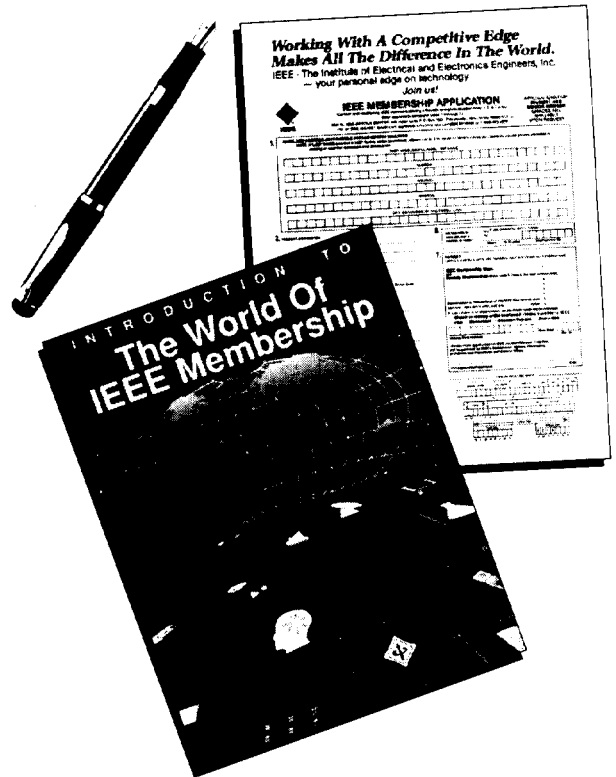
- Transducer Techniques and Applications
- Imaging Techniques and Applications
- Measurement Techniques and Applications
- Medical Techniques and Applications
- NDE Techniques and Applications
- SAW Techniques and Applications
- SONAR Techniques and Applications

The contributed papers must have a significant finite element or boundary element application component in order to fall within the scope of this Special Issue. Consult the inside cover of the UFFC Transactions for a more detailed breakdown of each of these topics. Contributed papers should be sent to the Editor-in-Chief at the following address:

William D. O'Brien, Jr.  
Department of Electrical and Computer Engineering  
University of Illinois  
405 North Mathews  
Urbana, IL 61801

In the transmittal letter identify that the contribution is being submitted for publication consideration for the Finite Element Applications in Ultrasonics Special Issue. Consult the "Information for Contributors" for manuscript preparation requirements. All papers will be subjected to the normal peer-review process. Submission deadline is December 1, 1995 and the expected publication date is late 1996. The Guest Editor for this Special Issue is Reinhard Lerch of Johannes Kepler University, Linz, Austria.

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# Request For Nominations

## UFFC-S ACHIEVEMENT AWARD

You are invited to nominate a member of the UFFC Society for special recognition through the ACHIEVEMENT AWARD. The award is given in recognition of significant technical publications in Ultrasonics, Ferroelectrics, or Frequency Control, for presentation of lectures, and/or service to the Society. The award covers the entire society and includes all technical specialties. Selection is made by the Officers and Awards Committee.

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

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

Nominee's Name & Main Contributions: \_\_\_\_\_

\_\_\_\_\_

Your Name/Address: \_\_\_\_\_

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\_\_\_\_\_

Send by December 1 to: Roger H. Tancrell  
Chair, UFFC-S Awards Committee  
225 Walden Street  
Suite 5C  
Cambridge, MA 02140  
Tel/FAX: (617) 547-6639  
e-mail: roger@world.std.com

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## Call For Nominations

### FOR THE NEXT DISTINGUISHED LECTURER AND/OR TOPIC

Every year the UFFC-S selects a Distinguished Lecturer to represent the Society at Colloquia around the world. Recent lecturers have spoken to local IEEE chapters, universities and companies throughout North America, Japan, Europe, China and South America. The Distinguished Lecturer represents our Society to the larger technical community, and stimulates interest in the Society's professional areas.

What topics would you like to hear, and who are speakers whom you think can represent our Society? Here's your chance to influence the next lecturer!

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

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

\_\_\_\_\_

Your Name/Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Send by December 1 to: Prof. Mack A. Breazeale  
Chair, UFFC-S Distinguished Lecturer  
Subcommittee  
The National Center for Physical Acoustics  
University of Mississippi  
University, MS 38677  
Tel: (601) 232-7490  
FAX: (601) 232-7494

## Editor's Note

"Le Chaos des Crues" is what the headlines read in the Nice Sunday paper on November the 6th, 1994. We who were on the Saturday excursion along the coast to Nice and Monaco after the Ultrasonics Symposium had a view of snarled traffic, sunken cars, and a raging river inundating the area around the airport as we returned to the hotel that evening. The enduring memories will not be of that storm with its unfortunate devastation but of those places we visited which lifted our spirits. There was the Chagall museum with its explosion of color in paintings and stained glass, the market place of Nice with its own explosion of flowers, farm products and congenial vendors, the upstairs room of the French Cafe where we talked and ate a leisurely lunch, and the silence and elegance of the cathedral at Monaco. And during the week those not attending conference sessions had the added pleasure of excursions and lunches around the Cannes area. The opening reception and the cruise dinner attracted a large group for conversation and relaxation. Thresa and I were fortunate in being invited by the Eric and Lee Adler to take a drive and visit some beautiful areas before the start of the symposium. The hotel location and accommodations were superb. A walk along the promenade next to the beach was an everyday necessity.

The opening session pictures were courtesy of Thomson CSF, the area pictures by Elke and Reinhard Lerch, the retiring AdCom member photos by Jan Brown, and the "Love Boat" photos by Thresa Hickernell. The pictures and accompanying text help but do not replace the experience of having been in Cannes for the symposium. The symposium was well organized and as noted in the statistics was the largest ever. It provided a wonderful opportunity for the European community to participate. It was a pleasure to see several European friends and former "Ultrasonics", who had been active in the field earlier and had either retired or moved into other fields, who came to the symposium. Our thanks go out to all those who contributed to its success; the co-chairman Gerard Quentin (highly visible with his French charm) and Herman van de Vaart (who managed a low profile throughout), Bernie Tittman, the Program Chairman, (who with his committee managed to bring 453 presented papers under control), Charles and Emma Maerfeld (who magnificently managed the local arrangements and the excursions), Majid Belkerdid, Finance Chairman, (his knowledge of French and international banking were of utmost assistance), Janpu Hou, Tutorials, (a large attendance) and Moises Levy, (the ever faithful contributor), Proceedings. The list is not complete without recognition of Whicker and Associates (that's Larry and Margaret). The Ultrasonics Symposium has been in their administrative watchcare for the past several years regarding organization, registration, vendor exhibits, and publications. Finally after all these years we have been able to capture them on film

as one of the "Love Boat" couples. They do make a lovely pair.

Our new Distinguished Lecturer is Stuart Foster. Be sure and schedule him for a presentation. Welcome to the new elected Administrative Committee members; Noriyoshi Chubachi, (a long time UFFC Society member but new a face on the committee) and Alers, Brown, and Vig (familiar returning faces on the committee). The upcoming Frequency Control Symposium is featured on the cover and with some pictures of principals and the Technical Program Committee at work. It will be a great conference and San Francisco is a fun place.

A message from the President of the Society, Harry Salvo, was not forthcoming, so the president's wife, Elizabeth (Liz) Salvo, has some words about the Salvo family European outing. It makes much more interesting reading than what Harry was going to say anyway. Nothing from our Vice President, Don Malocha, (who is keeping a low profile) except that overheard at the railway station in Nice as quoted in Liz's article. Our secretary-treasurer Gary Montress came through with the pertinent information from the AdCom meeting in Cannes which is nicely framed and brought into life with pictures taken by Jan Brown and arrayed by Ann Scrupski. Herman indicates the Society is fiscally fit. Congratulations to our newly elected IEEE Fellows. The Erics have shared their distinguished lecture itineraries with us and two of the Chapters have reported in. Our special congratulations to Mr. Akira Murata and Dr. Nobuo Mikoshiba for their awards which recognizes outstanding contributions in technology. Gerry Blessing, Chairman of the 1995 IEEE Ultrasonics Symposium in Seattle has gotten some advanced information for us. There is information on upcoming conferences and calls for papers.

All in all, we are looking forward to another great year for the UFFC Society. Bill O'Brien will be shepherding the Transactions, there will be several conference opportunities to see other members, and hopefully there is a local group of UFFCers in your local area. If not get one started. The email ([h.salvo@ieee.org](mailto:h.salvo@ieee.org)) and phone (410-765-4290) lines are open to the president if you want to volunteer for service to the society or pass along some idea. The newsletter is also a place where you can contribute an article or photos. I will need inputs for the next newsletter by August 9th. My communication net remains as: phone: 602-441-2923, fax: 602-441-7714, email [f.hickernell@ieee.org](mailto:f.hickernell@ieee.org) or [p04564@email.mot.com](mailto:p04564@email.mot.com), and address Fred Hickernell, Motorola GSTG, 8201 E. McDowell, Scottsdale AZ 85252. Special thanks go to Ann Scrupski and her coworkers at IEEE Magazines/Newsletters for final assembly and editing of this newsletter edition. It is Ann's touch that makes the newsletter come alive.



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