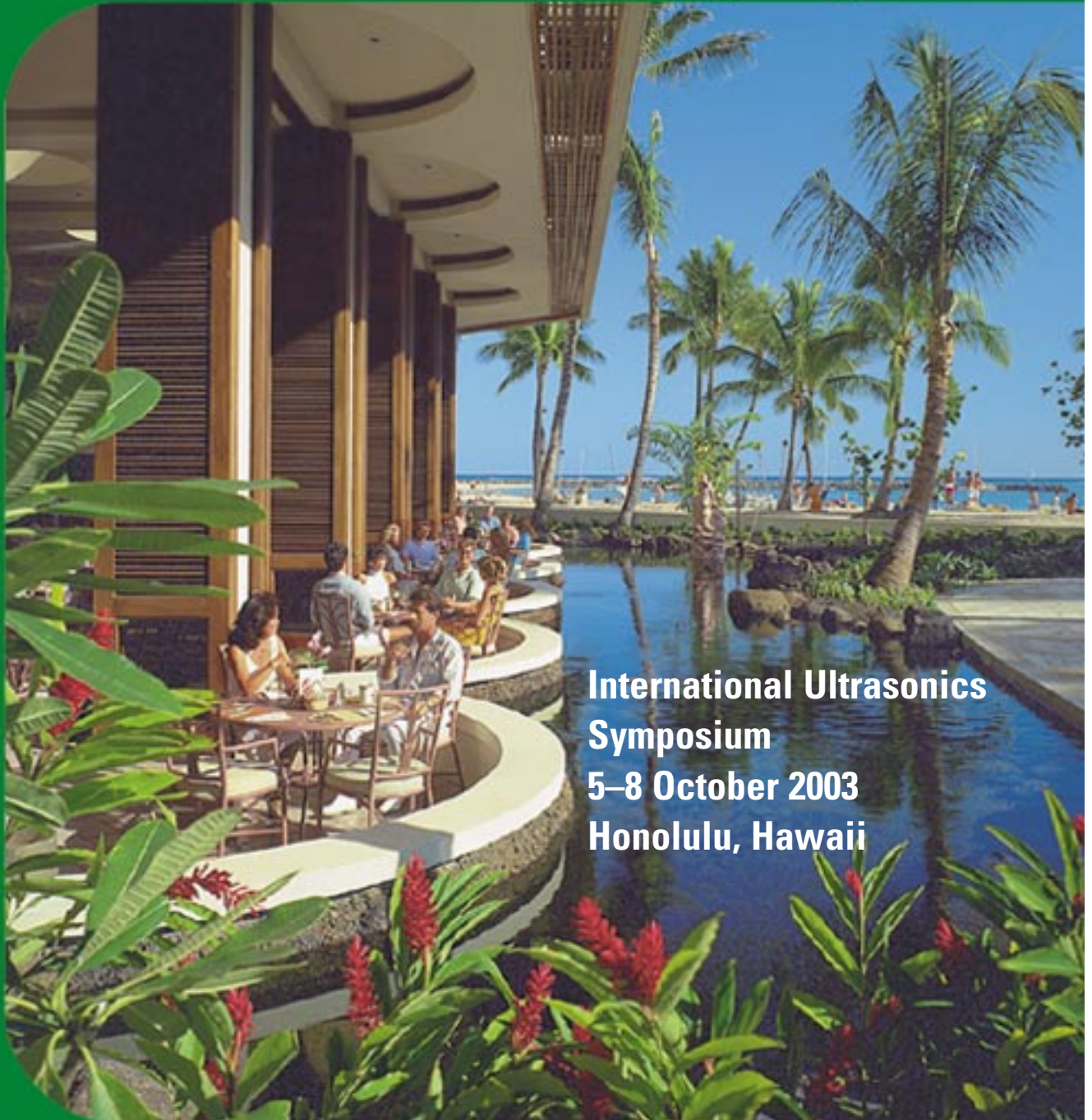


UFFC Newsletter

Ultrasonics, Ferroelectrics, and Frequency Control



**International Ultrasonics
Symposium
5–8 October 2003
Honolulu, Hawaii**

Dear IEEE-UFFC Members:

It has been a great privilege and distinct honor to serve the Society in the last two years as your President. I would like to thank the AdCom members, committee members, and the membership at large for their hard work and kind support.

Reflecting back two years, I remember setting out to bring young blood to the society and expand the membership base. I am pleased to see that quite a few new and energetic people have joined in serving the UFFC, some of whom also agreed to chair some of the standing committees beginning next year. Also, there has been some increase in the membership in the last year despite the downturn in the economy. I have also created two new committees --publicity and education—which will enhance the visibility of UFFC. It seems to me that the trend we initiated will most likely to continue, which makes me very optimistic in that regard.

The transition to the manuscript central system for the UFFC Transactions has been completed during my tenure. Now, turnout time for publications to the Transactions of the UFFC has been dramatically reduced and the efficiency of the over all process has been substantially augmented. I am sure that such positive changes will make the Transactions even more attractive for authors in the pertinent areas of research.

Last year, we initiated a review and evaluation process for the three technical standing committees (Ultrasonics, Ferroelectrics and Frequency Control) under the UFFC umbrella. The purpose of that initiative was to review all aspects of each standing committee's activities, and to recommend changes if needed. All three standing committees'



reviews have been thoroughly conducted and the appointed committee rated their activities most favorably. That, I believe, is a clear indication of how dedicated the members and officers have been in the last few years to take their committees to the next level.

With regard to finances, I am pleased to inform you that the financial situation of the UFFC has been steady. We worked hard to prevent financial hardship and I believe we succeeded. With continued hard work in expanding the UFFC, especially the membership, I am confident that the financial situation will much improve once the economy picks up again.

This year, I have been working closely with president-elect Gerry Blessing in all aspects of the UFFC administrative functions. Therefore, I am sure that the transition to Gerry's presidency will be seamless, thereby ensuring no loss in momentum in the upward trend in the UFFC. I would like to give my best wishes to president-elect Gerry Blessing and wish him the best of success in the ensuing two years.

In closing, let me remind you that the UFFC will be celebrating the 50th anniversary in year 2004. On that occasion, the Ultrasonics, Ferroelectrics and Frequency Control standing committees' annual meetings will be jointly held in Montreal, Canada. It is my hope that all of you will join us in Montreal in celebrating such a joyous event.

**Best Regards,
Ahmad Safari
President**

UFFC Newsletter FALL 2003

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IEEE Ultrasonic, Ferroelectrics, and Frequency Control Society (ISSN 1060-0264) Newsletter is published two times per year by The Institute of Electrical and Electronics Engineers, Inc., 445 Hoes Lane, Piscataway, NJ 08854. © 2003 IEEE. Information contained in this newsletter may be copied without permission provided that copies are not made or distributed for direct commercial advantage, and the title of the publication and its date appear on each copy. Printed in the U.S.A. [No Style Helvetica Condensed 7/9]

Ultrasonics

2003 IEEE International Ultrasonics Symposium

5 – 8 October 2003

Honolulu, Hawaii

Special Notes

- Hotel reservation deadline is September 4, 2003.
- Call 1-800-HILTONS (1-800-445-8667). Identify the meeting by "IEEE Ultrasonics Symposium" and the group code by "AND" or FAX the room reservation request form to 1-909-791-8521.
- Advance registration deadline: September 4, 2003.
- Complete symposium information may be found at: <http://www.ieee-uffc.org/2003/>

Invitation to Attend



General Co-Chairs (from l. to r.): James F. Greenleaf (jfg@mayo.edu) and William D. O'Brien, Jr. (wdo@uiuc.edu).

Aloha! We invite you to join us at the 2003 IEEE International Ultrasonics Symposium that will be held October 5-8, 2003, at the Hilton Hawaiian Village in Honolulu, Hawaii. Located on Waikiki's widest stretch of beach, the Hilton Hawaiian Village Beach Resort & Spa features lush tropical gardens, waterfalls, exotic wildlife and priceless artwork. Honolulu means "protected harbor," is the capital of Hawaii and is Oahu's largest city. The Technical Program Committee has been enhanced and we expect a stimulating technical program. As before, there will be a mix of invited and contributed papers. The Social Committee has prepared an attractive program for participants and guests. We are looking forward to an excellent program, and to meeting you in Honolulu.

Mahalo,

*James F. Greenleaf
William D. O'Brien, Jr.
General Co-Chairs*

Message from the Technical Chair

On behalf of the Technical Program Committee I would like to invite you to join us at the 2003 IEEE International Ultrasonics Symposium to be held October 5 - 8, 2003 in Honolulu, Hawaii.



**Helen Routh,
Technical
Chair**

Since the first symposium held in Hawaii in 1990, the meeting has continued to grow significantly in size. Over the last three years we have received more than 750 submissions for each meeting. For the 2003 meeting, we expect to receive a record number of abstracts. These abstracts cover the five areas of focus of this meeting: Medical Ultrasonics, Sensors, NDE and Industrial Applications, Physical Acoustics, Surface Acoustic Waves, and Transducers & Transducer Materials. After reviewing all the abstracts in each group, the Technical Program Committee along with FASS, the symposium management group, will put together a program of oral and poster sessions. As the Symposium has grown, the number of poster and oral sessions has been increased in order to keep the rejection rate around 30%. We have decided to keep to this level this year in order to maintain the high technical quality of this meeting. The meeting will therefore continue to be three full days of mixed oral and poster sessions.

We will continue the tradition of invited papers with a total of 21 papers that either highlight new technologies or give overviews of key areas. As in the past, we will arrange the invited oral presentations so they do not overlap each other, allowing attendees the opportunity to attend these key presentations in all areas. New for this year, we have also asked that the invited posters be left up for the duration of the meeting - along with the posters that are being considered for the Student Paper Award. Four finalists for the Student Paper Award have been selected from each of the five focus areas, and they will be judged by a panel of experts from each area. The five winners will be announced at the Symposium Reception on Monday evening and will each receive a certificate and a \$100 cash award. Their names will also be published in the IEEE UFFC Newsletter.

I feel sure that in addition to the technical program, all the attendees will enjoy the social and guest programs and the opportunities to relax in this tropical setting.

Aloha!

*Helen F. Routh
Technical Program Chair*

Symposium Site Information

This year's symposium will take place on Waikiki Beach in the heart of Honolulu on Oahu, Hawaii. Come and experi-

ence the diversity of an island paradise where cosmopolitan conveniences are surrounded by breathtaking scenery. Envelop yourself in the Aloha Spirit, a way of life in the islands that will leave you longing to return to Oahu, the heart of Hawaii. Follow your heart to world-famous Waikiki Beach, one of the most popular vacation destinations in the world. A short drive out of town in any direction will bring you face to face with uncrowded beaches, natural wonders and beautiful scenery.

Oahu's Attractions

Oahu is home to historic Honolulu, exciting Waikiki, legendary North Shore and much more. Enchanting for naturalists to explore tropical gardens, lush rainforests and 125 miles of white sandy beaches. Adventurous for outdoor enthusiasts to hike exotic mountain ranges, kayak sapphire bays, golf the most challenging courses, and wind-surf at the world's best beaches. Fascinating for history buffs to discover Hawaiian heiau, plantation history and Pearl Harbor. Experience local traditions, learn to quilt, string lei, surf, eat shave ice and dance hula. Swim with dolphins, snorkel Hanauma Bay and ride outrigger canoes. Oahu is where the Heart of Hawaii beats loudest.

Hilton Hawaiian Village

Located on Waikiki's widest stretch of beach, the Hilton Hawaiian Village® Beach Resort & Spa features lush tropical gardens, waterfalls, exotic wildlife and priceless artwork. As Waikiki's only true resort, it offers you the Village Experience: a perfect blend of luxurious accommodations, over 20 restaurants and lounges, shopping, recreational and cultural activities, nightly entertainment and more!

Hotel Registration

BOOK YOUR ROOM EARLY as there are a limited number of rooms available in each category. Requests will be fulfilled on a "first come, first served" basis. Hotel reservation deadline is September 4, 2003.

There are two ways to make reservations:

1. Call 1-800-HILTONS (1-800-445-8667). Identify the meeting by "IEEE Ultrasonics Symposium" and the group code by "AND."
2. FAX the room reservation request form to 1-909-791-8521

If your requested category is not available, you will be confirmed in the next higher available category.

This reservation request must be accompanied by a one-night deposit and received no later than September 4, 2003. After this date, reservation will be subject to availability. Cancellations received within 72 hours of arrival date will be assessed a "late cancellation" charge of a one-night room rate plus 11.41% Hawaii state tax. After check-in, departure prior to the stated departure date will be assessed a \$50.00 charge.

Visit <http://www.ieee-uffc.org/2003/> to see the latest information about the Symposium.

Plenary Session



Shrimp, Snap, Bubble, and Pop

Michel Versluis,
University of Twente,
Enschede, The Netherlands

The oceans may be deep, but they are not at all quiet. Sounds in the ocean include those of waves, produced by tides, winds and thunderstorms, and those of falling rain, hail and snow. In addition, one can hear biological sounds of fish, dolphins, whales and snapping shrimp. The latter, in particular, produce the dominant level of ambient noise in (sub)tropical shallow waters throughout the world. These shrimp live in colonies in such large numbers that there is continuous snapping, providing a permanent crackling background noise.

The snapping sound can be heard day and night, with source levels as high as 200 dB which severely limits the use of underwater acoustics for active and passive sonar, both in scientific and naval applications. The frequency spectrum of a snap is extremely broad, ranging from tens of hertz to beyond 200 kHz. The snapping shrimp produces the impulsive click by an extremely rapid closure of its so-called snapper claw. It was commonly believed that the sound is generated when the two claw halves hit each other.

In this talk we will in fact see that the sound of snapping shrimp originates solely from the collapse of a cavitation bubble that is generated by the fast water jet resulting from the rapid claw closure. The water jet velocity is so high that the corresponding pressure drops below the vapor pressure of water and a cavitation bubble is generated which will initially grow in size, then it collapses violently when the pressure rises again.

In the course of our experiments on snapping shrimp sound we also discovered a short intense flash of light emitted at bubble collapse. The light emission reveals the extreme pressures and temperatures of at least 5000 K in the bubble interior at bubble collapse. In light of the apparent similarity with sonoluminescence, the light emission of a bubble periodically driven by ultrasound, we have termed this phenomenon shrimpoluminescence.

Student Paper Competition

This is the third year of the student paper competition. The awards consist of a certificate, and are a prestigious addition to the students CV. Students who are submitting abstracts for presentation are also invited to participate in this student paper competition.

Abstracts submitted by students for the Student Paper Competition will be reviewed as usual by the Technical Program Committee (TPC). At that time the TPC will select 15 finalists in the Student Paper Competition. The finalists will be notified and asked to produce a poster of their papers to be displayed during a special student poster ses-

sion. The poster is required independent of whether the student's paper has been selected as an oral presentation. On the first day of the symposium, October 6, all Student Finalist Posters will be presented in a special room for judging by a panel of judges representing the paper's technical group. The posters will remain on display for the duration of the three-day symposium.

Prizes will be given for papers in each of five areas of the TPC:

1. Medical Ultrasonics.
2. Sensors, NDE & Industrial Applications.
3. Physical Acoustics.
4. Surface Acoustic Waves.
5. Transducers & Transducer Materials.

Selection criteria are:

1. Student is first author.
2. Work is of high quality and done by the student.
3. Abstract clearly describes the work and includes results.
4. Student has not won the student prize previously.

At the time of judging the judges will evaluate:

1. Clarity of student's presentation.
2. Depth of student's knowledge.
3. Degree of the student's contribution to the project.
4. Relevancy of the work to the field.

Short Courses

Course #1: Fundamentals of Ultrasonic Waves **Instructor: David Cheeke** **Concordia University** **Montreal, Quebec, Canada**

Time: 8:00 am - noon, October 5, 2003.

Abstract: The objective of this course is to provide a sound physical basis for understanding the propagation of acoustic waves in solids. The course is aimed at newcomers to the field with at least BSc level in Physics or Engineering and also to those with experience in practical ultrasonics but who lack a theoretical basis. The material is divided into four equally balanced parts. The first deals with the propagation of bulk waves in infinite media, the wave equation, and the relation of acoustic properties to the appropriate material parameters. This is followed by a detailed treatment of the solid-liquid interface, with emphasis on the partial reflection and transmission of acoustic waves. This leads into a discussion of surface acoustic (Rayleigh) waves in the third section. These concepts are extended in the final section to a consideration of guided waves (Lamb, Love, SH, etc.) in various multilayer structures. Where appropriate, applications of these modes will be discussed.

David Cheeke received the Bachelors and Masters degree in Engineering Physics from UBC, Vancouver, in 1959 and 1961, respectively, followed by the PhD in Low Temperature Physics from Nottingham University in 1965. He then joined the Low Temperature Laboratory, CNRS, Grenoble, also as a Professor of Physics at the University of Grenoble. In 1975, he moved to the Université de Sherbrooke, Canada, where he set up an ultrasonics laboratory, specialized in physical acoustics, acoustic microscopy, and acoustic sensors. In 1990, he joined the Physics Department at Concordia University, Montreal, where he is Head of an Ultrasonics Laboratory and was Chair of the Department 1992-2000. He has published over 120 papers on various aspects of ultrasonics. He is senior member of the IEEE, a member of the ASA, and an Associate Editor of the IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control.

Course #2 Medical Ultrasound Transducers **Instructors: Douglas G. Wildes and L. Scott Smith** **GE Global Research Center** **Niskayuna, NY**

Time: 8:00 am - noon, October 5, 2003.

Abstract: This course will provide an introduction to the design, fabrication, and testing of medical ultrasound transducers. Starting from an overview of the basic types of phased-array transducers (linear, convex, sector), we will discuss how the design for a probe is derived from its target application and how equivalent-circuit, finite-element, and acoustic field models can be used to optimize the design and accurately predict performance. A discussion of the structure of an ultrasound probe will lead to a survey of the different types of materials used in probes and their critical properties. Typical fabrication processes will be introduced and common problems in probe manufacturing will be summarized. Methods for evaluating completed transducers will be discussed. We will conclude with some examples of newer probe technology, e.g. multi-row arrays, single crystal piezoelectrics and cMUT transducers, and will discuss performance advantages and fabrication difficulties which may be associated with each.

Douglas G. Wildes is a physicist with GE Global Research. He earned an A.B. in physics and mathematics from Dartmouth College and a Ph.D. in low-temperature physics from Cornell University, then joined GE in 1985. Since 1991, Dr. Wildes' research has focused on aperture design, fabrication processes, and high-density interconnect technology for multi-row transducers for medical ultrasound. The results of his work are reflected in GE's growing line of Matrix Array probes, for which he has received several GE awards. Dr. Wildes has 16 issued patents and 18 external publications. He is a member of the American Physical Society and the IEEE.

L. Scott Smith is a physicist with GE Global Research. He earned B.S. and Ph.D. degrees in physics from the University of Rochester and the University of Pennsylvania

respectively. Joining GE in 1976, he developed phased array probes for medical ultrasound. More recently, he examined novel probe materials and led projects on pediatric endoscopes and adaptive acoustics. Dr. Smith has 32 issued patents and over 30 refereed publications. He is a member of the American Physical Society and a Senior Member of the IEEE where he serves as Vice Chair for Transducers and Transducer Materials on the Ultrasonics Symposium's Technical Program Committee.

Course 3: Recent Trends in Beamformation in Medical Ultrasound

Instructor: Kai E. Thomenius
General Electric's Corporate R&D
Niskayuna, NY

Time: 8:00 am - noon, October 5, 2003.

Abstract: The goal of this short course is to review analytical methods used in developing the design of a typical beamformer in use in diagnostic ultrasound today. Two specific methods, angular spectrum and spatial impulse response, will be discussed in some detail. The key points to be covered deal with methods of analysis of arrays and beamformers, the interaction of transmit and receive beams with clinically relevant targets, and how this interaction is used in image formation. The means by which these analytical methods contribute to a beamformer design and the trade-offs involved are reviewed. The techniques developed for such analysis will be applied to current topics involving beamformation such as elevation focusing, sparse arrays, harmonic imaging, and phase aberration correction. Heavy use of graphical techniques will be made to illustrate the concepts.

Kai E. Thomenius is the Manager for the Ultrasound Program at General Electric's Corporate R&D facility in Niskayuna, NY. Previously, he has worked at ATL Ultrasound, Inc. and Interspec Inc. as well as several other ultrasound companies. Dr. Thomenius' academic background is in electrical engineering with a minor in physiology; all of his degrees are from Rutgers University. His current interests are in beamformation, propagation of acoustic waves in inhomogeneous media, generation of harmonic energy during acoustic propagation, the potential of bioeffects due to those acoustic beams, and retrieval of additional diagnostic information from the echoes that arise from such beams.

Course #4: Recent Advances in Acoustic Microscopy

Instructor: Roman Gr. Maev
University of Windsor
Ontario, Canada

Time: 1:00 pm - 5:00 pm, October 5, 2003

Abstract

Part I (Approximately 1 hour) The goal of this course is to introduce the attendees to the fundamentals of high-resolution acoustical imaging and quantitative acoustic

microscopy. The course will begin with a discussion of the basic knowledge of acoustic imaging, general principles of image processing, harmonic signal and short-pulse methods. Various types of ultrasonic transducers will be introduced such as: planar; point-focus; line-focus; multi-lens; synthetic aperture arrays; 2D matrix arrays; ultrasonic immersion scanning technique; A, B & C modes; transmission and reflection modes of operation; wanted and unwanted signals, as well as the dependence of the output signal on the local acoustical properties and the structure of the sample under investigation will be discussed. Further, different principles of scanning acoustic microscopes will be presented. During this part of the course, basic information will be provided about surface acoustic waves (SAW) and SAW systems, and devices for acoustic imaging.

Part II (Approximately 2 hours) This section will be related to general aspects of quantitative methods in scanning acoustic microscopy. The theoretical basis as well as experimental fundamentals for quantitative characterization of the contrast response in the acoustic microscope will be described. Together with the well known $V(z)$ method, new techniques for the measurement of acoustical parameters will be discussed. This will include the $V(x,t)$ method, ultrasonic micro-spectrometry, air-coupling pair measurement technique for the reflection mode, as well as the $A(z)$ method for the transmission mode. Both the theoretical and experimental fundamentals of the $A(z)$ method will be discussed. Further, based on the most successful experimental results, there will be provided various examples of different applications.

Improvement of imaging resolution using higher harmonics is one of the priorities to be addressed. This will be one of the possible methods of enhancing the quality of ultrasound images to exploit the effect of nonlinear propagation on the acoustic signal. The possibility of resolution improvement using a nonlinearly generated higher harmonics has long been determined in acoustic microscopy, both in the transmission and reflection modes. An important conclusion from various recent results presented by different research groups is that the contrast of nonlinear acoustic image, determined by local material nonlinearity, can be substantially enhanced in the presence of micro-inhomogeneous defects. The effect of these two factors on the operational capability of acoustic imaging instruments, primarily acoustic microscopy imaging and signal processing will be discussed. Discussed will also be new opportunities for non-linear material characterization using parametric acoustic imaging.

Part III (Approximately 1 hour) The last part of this course will be related to recent developments of high-resolution acoustical linear and non-linear imaging techniques for practical uses. It include evaluation of advanced material structure; industrial quality control of joints, parts and components. This is a basis for modern NDE techniques to monitor and control as many stages of the production process as possible. The last part of this course will provide a brief review of the most recent research results in acoustical microscopy related to the new development and improvement in acoustic microscopy instrumentation to investigate the physical, mechanical and acoustic properties of advanced materials. Applications of different physical phenomena, such

as nonlinear effects of inhomogeneities, elastic material anisotropy propagation of acoustical waves in layer and multilayer structures, adhesive bonding and others will be discussed. Finally, new principles for rapid 2D and 3D image evaluation of bulk acoustical properties based on new concept of portable electronic system together with matrix array will be reviewed. For most of the above considerations, the role of high-resolution acoustical imaging techniques is changing rapidly and will do so dramatically in the future.

Roman Gr. Maev is the Chairholder of the NSERC/DaimlerChrysler/University of Windsor Industrial Research Chair in Applied Solid State Physics and Material Characterization. Dr. Maev has been the Director of the Centre for Imaging Research and Advanced Material Characterization at the University of Windsor since its conception in 1997. Prior to joining the University of Windsor in 1994, Dr. Maev was the Director of the Acoustic Microscopy Centre at the Russian Academy of Sciences, Moscow. Dr. Maev, a theoretical solid-state physicist, graduated from the Moscow Physico-Engineering University, worked for the Russian Academy of Sciences and received his PhD and later his Doctor of Sciences from the Russian Academy of Sciences. In recognition of his contribution to the development of ultrasonic techniques, Dr. Maev was awarded the Pioneer Award by the American Institute of Ultrasound in Medicine in 1988 and in 1989, was awarded the Centenary Ernst Abbe Medal from the World Microscopical Society.

The intent of Dr. Maev's current research activity in acoustic microscopy-based procedures and device for rapid detection of microdefects in various joint structures like welded metal joints, rivets and adhesive bonding, is to provide the scientific knowledge for the development of a novel high-frequency acoustic imaging system for the imaging and characterization of structures of advanced material such as: metals and alloys, ceramics, composites and polymers. Using high frequency acoustic waves, Dr. Maev has also been able to interpret acoustic data to locate metal fatigue, evaluate the quality of castings, analyze the composition of alloys, assess volume, evaluate adhesives and joints, and conduct other analyses of various materials. Besides developing new ultrasound technology and methods for industrial and biomedical applications, Dr. Maev's research interests involve the fundamentals of physical acoustics and acousto-optics, ultrasonic imaging and acoustic microscopy, the study of physico-mechanical and biophysical properties of heterogeneous structures, advanced material characterization and biomedical ultrasound for which he has published over 250 articles, several reviews and holds fifteen patents.

Course #5: Micromachined Ultrasonic Sensors and Actuators

Instructors: Amit Lal, Cornell University, Ithica, NY and Richard M. White, University of California, Berkeley, CA

Time: 1:00 pm - 5:00 pm, October 5, 2003

Abstract: The goal of this course is to introduce the fundamentals of micromachining and the way they affect the

design and performance of ultrasonic sensors and actuators. The first part (~1.5 hours) of this course will cover established micromachining techniques, such as bulk micromachining and surface micromachining on silicon. It will also cover new techniques such as XeF₂ etching and PDMS soft micromachining. The relevant acoustic and ultrasonic properties of materials used in MEMS will be discussed for predictable device design. In the remaining time, the following topics will be discussed with the help of case studies: (1) Electrostatic actuation of micromachined membranes: Nonlinearities and effective electromechanical coupling, (2) Comparison of PZT and thin-film piezoelectric actuation of silicon bulk and surface micromachined structures: silicon horn design, microphones, speakers, impact/spalling actuation of MEMS (3) Flexural plate waves and bulk waves in micromachined devices: the role of internal stresses and material properties on waves, (4) Nonlinear ultrasound in microfluidic devices.

Amit Lal is an assistant professor of electrical and computer engineering at Cornell University. He received his Ph. D. in electrical engineering from the University of California, Berkeley in 1996, and the B.S. degree from the California Institute of Technology in 1990. He was at the University of Wisconsin-Madison as an assistant professor from 1998-2002. Amit Lal is the leader of the SonicMEMS group at Cornell University, which focuses on ultrasonics, micromachining, modeling of piezoelectric systems, and design and analysis of integrated circuits. He has published papers on ultrasonic sensors and actuators at conferences in ultrasonics and micromachining. He serves on the Technical Committee on Physical Acoustics in the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society. He holds patents on micromachined acoustic sources/receivers, and silicon-based high-intensity ultrasonic actuators. He is also the recipient of the NSF CAREER award for research on applications of ultrasonic pulses to MEMS.

Richard M. White is a professor of electrical engineering and computer sciences at the University of California, Berkeley. He is also a founding co-director of the Berkeley Sensor & Actuator Center, an NSF/Industry/University Cooperative Research Center. White received his university education at Harvard, completing the Ph.D. in applied physics. After five years at the General Electric Microwave Laboratory in Palo Alto, he joined the faculty of the University of California at Berkeley. There he has been primarily concerned with teaching and research in solid-state electronics, with particular emphasis in ultrasonic and sensors.

White's publications and patented inventions concern sensors, ultrasonic phenomena and devices, thermoelastic effects and microwave electronics. He has co-authored three books: *Electrical Engineering Uncovered*, Prentice-Hall, 1997 (an introductory text); *Acoustic Wave Sensors*, Academic Press, 1997 (a reference book); and *Solar Cells: From Basics to Advanced Systems*, McGraw-Hill, 1984 (a reference and text). He is an IEEE Fellow, recipient of the IEEE Cledo Brunetti award and the Cady award, a Guggenheim fellowship, and the IEEE Society's Achievement Award for contributions to the field of ultra-

sonics in photoacoustics, surface acoustic wave devices, and sensors. In 1994 White was elected to the National Academy of Engineering and made a Fellow of the American Association for the Advancement of Science, and in 1996 he was made a Chancellor's Professor at Berkeley.

Course #6: Ultrasound contrast agents: Theory and experimental results.

**Instructor: Nico de Jong
Erasmus University
Rotterdam, the Netherlands**

Time: 1:00 pm - 5:00 pm, October 5, 2003

Abstract: The course consists of 6 main topics:

- a) First an overview will be presented of the (clinical and pre-clinical available) contrast agents, including the properties and characteristics of the gas inside the bubble and the shell surrounding it.
- b) Models of the behavior of small bubbles in a ultrasound field will be discussed. Simple models based on a one dimensional mass-spring system and more complicated models including gas and shell properties.
- c) Experimental ultrasound methods for UCA will be presented for characterizing the bubbles in a UCA, like harmonic and subharmonic scattering, absorption and attenuation. Also the influence of ambient pressure, temperature and gas concentration will be discussed.
- d) Experimental optical methods for characterizing individual bubbles.
- e) Imaging methods for contrast agents, like fundamental, harmonic, subharmonic and superharmonic and multi-pulse methods like pulse inversion, power modulation etc. and new methods like chirp excitation.
- f) Ultrasound mediated drug delivery: Interaction between mammalian cells and ultrasound in the vicinity of bubbles will be discussed.

Nico de Jong graduated from Delft University of Technology, The Netherlands, in 1978. He got his M.Sc. in the field of pattern recognition. Since 1980, he has been a staff member of the Thoraxcenter of the Erasmus University Medical Center, Rotterdam, The Netherlands. At the Dept. of Biomedical Engineering, he developed linear and phased array ultrasonic probes for medical diagnosis, especially compound and transesophageal transducers. In 1986 his interest in ultrasound applications shifted toward the theoretical and practical background of ultrasound contrast agents. In 1993 he received his Ph.D. for "Acoustic properties of ultrasound contrast agents." Currently he is interested in the development of 3-D transducers and fast framing camera systems. De Jong is the project leader of STW and FOM projects on ultrasound contrast imaging and drug delivery systems. Together with Folkert ten Cate, MD, he is organizer of the annual European Symposium on Ultrasound Contrast Imaging, held in Rotterdam and attended by approximately 175 scientists from all over the world.

Course #7: Synthetic Aperture Ultrasound Systems

Instructor: Jørgen Arendt Jensen, Svetoslav I. Nikolov and Kim L. Gammelmark Technical University of Denmark Lyngby, Denmark

Time: 6:00 pm - 10:00 pm, October 5, 2003

Abstract: The objective of this course is to give a basic introduction to synthetic aperture (SA) ultrasound systems. The course is divided into three parts. First the basics of SA data acquisition and beamformation are described, when synthesizing either the transmitting or receiving aperture. Equations for the obtainable resolution and side lobe levels are given, and the compromise between number of emissions and resolution are explained. The second part describes the methods implementation for clinical imaging. Issues regarding signal-to-noise ratio, the use of coded excitation and aspects of focusing will be explained. The concept of recursive imaging will be introduced, and it will be shown how very fast imaging in two and three-dimensions can be obtained. The final part of the course describes velocity imaging using SA techniques. It is shown how SA systems can acquire data suitable for flow imaging, and that many of the problems encountered in current flow systems can be solved using SA imaging. This includes problems with stationary echo canceling, limited precision, and finding the correct velocity magnitude without angle correction.

The course is intended for Ph.D. students and researchers interested in the signal processing involved in synthetic aperture ultrasound system for two and three-dimensional imaging for visualizing both anatomy and the blood flow in the human body.

Jørgen Arendt Jensen earned his Master of Science in electrical engineering in 1985 and the Ph.D. degree in 1989, both from the Technical University of Denmark. He received the Dr. Techn. from the university in 1996. He has published a number of papers on signal processing and medical ultrasound and the book "Estimation of Blood Velocities Using Ultrasound", Cambridge University Press in 1996. He has been a visiting scientist at Duke University, Stanford University, and the University of Illinois at Urbana-Champaign. He is currently full professor of Biomedical Signal Processing at the Technical University of Denmark at the Ørsted*DTU and head of Center for Fast Ultrasound Imaging. He has given courses on blood velocity estimation at both Duke University and University of Illinois and teaches biomedical signal processing and medical ultrasound imaging at the Technical University of Denmark. His research interest are currently focused on fast ultrasound imaging using synthetic aperture techniques for anatomic and flow imaging.

Svetoslav Ivanov Nikolov got his Master of Science in electrical engineering and Master of Business and Administration in international business relations from the Technical University, Sofia in 1996 and 1997, respectively. In 2001 he got a Ph.D. degree from the Technical University of Denmark, Lyngby. His dissertation explored approaches

for synthetic aperture tissue and flow imaging and their applicability for real-time 3D imaging. He is currently an assistant professor at the Technical University of Denmark at the Ørsted*DTU, where he teaches courses in digital design and software development. His research interests are currently focused on ultrasound 3D real time imaging.

Kim L. Gammelmark was born in Fakse, Denmark on May 1st, 1975. He received his M.S. degree in Electrical Engineering from the Technical University of Denmark, Kgs. Lyngby, Denmark, in August 2001. He is currently a Ph.D. student in Biomedical Engineering at the Ørsted*DTU department at the Technical University of Denmark. His major research interests are the application of synthetic aperture techniques in medical ultrasound imaging, and synthetic aperture radar techniques.

Course 8: Finite Element Modeling of Electromechanical Transducers

Instructor: Reinhard Lerch and Manfred Kaltenbacher
University of Erlangen
Erlangen, Germany

Time: 6:00 pm - 10:00 pm, October 5, 2003

Abstract: The development of electromechanical transducers, such as piezoelectric ultrasound transducers, micromachined silicon sensors or, actuators based on electromagnetic transducing principles, e.g. electroacoustic magnetic transducers (EMATs), is a difficult task in general. Due to their high number of free parameters which have to be chosen right in order to come to an optimum design, precise computer simulations based on finite elements (FE) or boundary elements (BE) are often utilized within the design process. In the first part of that course, the theory of appropriate FE and BE schemes allowing the modeling of electromechanical coupled field problems as well as basic examples for piezoelectric, electrostatic and magnetomechanical transducers will be reviewed. The second part will focus on present real life applications. Therefore, the practical computer aided design of piezoelectric sensors and actuators, especially ultrasound antennas for imaging purposes, smart piezoelectric structures, micromachined capacitive sensors and actuators, micromachined capacitive ultrasound transducers (cMuts), micromechanical systems (MEMS) and, electromagnetic transducers like electrodynamic loudspeakers or EMATs will be demonstrated. The main goal of this course is to give a basic understanding of finite element transducer modeling as well as the know-how for its practical application to modern transducer design. A brief report on latest research regarding the determination of material parameters is also presented. Here, recent approaches based on a combination of measurements and simulations have led to significant enhancements. Finally, practical examples will be performed on a PC, therewith demonstrating that with nowadays simulation software even complex simulation tasks can be performed within reasonable time on low-cost hardware.

Reinhard Lerch received his master degree in 1977 and his Ph.D. degree in 1980 in Electrical Engineering from the

Technical University of Darmstadt, Germany. From 1981 to 1991, he was employed at the Research Center of Siemens AG, where he introduced new computer tools supporting the design and development of piezoelectric transducers. Dr. Lerch is author or coauthor of more than 100 papers in the field of electromechanical sensors and actuators, acoustics and, signal processing. He received several scientific awards for his innovative work in the field of computer modeling of electromechanical transducers. From 1991 to 1999, he had a full professorship for Mechatronics at the University of Linz, Austria. Since September 1999 he is head of the Department of Sensor Technology at the University of Erlangen-Nuremberg. His current research is directed towards establishing a computer aided design environment for electromechanical sensors and actuators, including all major transducing principles. Dr. Lerch is serving on Technical Program Committees of several Technical Conferences. He is a member of the IEEE, the German Society of Electrical Engineers (VDE), the German Acoustical Society (DEGA), as well as the Acoustical Society of America (ASA).

Manfred Kaltenbacher received his Dipl.-Ing. in Electrical Engineering from the Technical University of Graz, Austria in 1992 and his Ph.D. in Technical Science from the Johannes Kepler University of Linz, Austria in 1996. He is currently an Associate Professor at the Department of Sensor Technology at the Friedrich-Alexander University of Erlangen. Dr. Kaltenbacher is author and coauthor of more than 30 papers in the field of numerical simulation techniques for coupled field problems and the identification of material parameters. His research interests are Computer Aided Engineering of electromechanical sensors and actuators with special emphasis on numerical simulation techniques such as multigrid methods. Furthermore, he is working on numerical algorithms that enable a precise and automatic reconstruction of material parameters from relatively simple measurements. Dr. Kaltenbacher is a member of the IEEE Society, ÖVE Society and the International Compumag Society.

Course #9: Elasticity Imaging
Instructor: Stanislav Emelianov
University of Texas
Austin, Texas

Time: 6:00 pm - 10:00 pm, October 5, 2003

Abstract: Elasticity imaging is rapidly evolving into a new diagnostic and treatment-aid tool. The primary purpose of this course is to provide both a broad overview and comprehensive understanding of elasticity imaging, and, as such, it is well suited for both newcomers and active researchers in the field. Following a brief historical introduction to elasticity imaging, the analysis begins with a discussion of both the equation of equilibrium and the wave equation to lay a foundation for static (reconstructive) and dynamic (shear wave) approaches in elasticity imaging, respectively. The theory of elasticity is presented in the context of the mechanical properties of soft tissues. Then, practical and experimental aspects of elasticity imaging will be discussed with emphasis on data capture and

measurements of internal tissue motion induced by either internal or surface applied forces. Motion tracking algorithms will be introduced, and methods to increase and optimize signal-to-noise ratio in strain imaging will be overviewed. Finally, techniques to map elasticity and other mechanical properties of tissue will be presented and discussed. The course will conclude with a review of commonly used elasticity imaging techniques, including a discussion of the advantages and limitations of each approach, and a presentation of current and potential clinical applications.

Stanislav Emelianov received the B.S. and M.S. degrees in physics and acoustics in 1986 and 1989, respectively, from the Moscow State University, and the Ph.D. degree in physics in 1993 from Moscow State University, and the Institute of Mathematical Problems of Biology of the Russian Academy of Sciences, Russia. In 1989, he joined the Institute of Mathematical Problems of Biology, where he was engaged in both mathematical modeling of soft tissue biomechanics and experimental studies of noninvasive visualization of tissue mechanical properties. Following his graduate work, he moved to the University of Michigan, Ann Arbor, as a post-Doctoral Fellow in the Bioengineering Program, and Electrical Engineering and Computer Science Department. From 1996 to 2002, Dr. Emelianov was a Research Scientist at the Biomedical Ultrasonics Laboratory at the University of Michigan. During his tenure at Michigan, Dr. Emelianov was involved primarily in the theoretical and practical aspects of elasticity imaging. Dr. Emelianov is currently an Assistant Professor of Biomedical Engineering at the University of Texas, Austin. His research interests are in the areas of medical imaging for therapeutics and diagnostic applications, ultrasound microscopy, elasticity imaging, opto-acoustical imaging, acousto-mechanical imaging, and radiation pressure imaging.

Guest Program

MONDAY, OCTOBER 6TH, 2003 SCENIC SHORES o TEMPLE o RAIN FOREST TOUR

PRICE PER PERSON \$68.00

Better known at Diamond Head, the early sailors thought that they had discovered diamonds on the slopes of Mount



Leahi. Soon they found the diamonds were only useless crystals. It was a shame they did not purchase the real estate in that area. The land is now worth more than diamonds today!

As we continue our scenic coastal drive along the southeastern shores for of picturesque sights and historical landmarks.



Hanauma Bay

As you continue your drive eastward around Maunalua Bay to Koko Head and the Hawaii Kai neighborhood, you'll approach one of the island's natural treasures, Hanauma Bay State Park, which is considered the island's best snorkeling spot.



Halona Blowhole

A natural ocean geyser formed over time by forces of nature. Breaking surf is forced through an "L" shaped lava tube and, under tremendous pressure, water explodes upward in a miniature geyser, creating a spectacular natural wonder. Below Halona is the Ka Iwi Channel, one of the most dangerous, unpredictable ocean channels in the world.

Makapuu Beach

Makapu'u Beach Park is located on the eastside of the island. Right across the street of Sea Life Park. It's one of the most



favorite spots for body boarding. The name refers to a black stone's image of 8 protrusions that looked like human eyes, said to be located on the base of the cave.

Lunch At Eastern Gardens – Exquisite Cantonese and Szechuan Cuisine located on the Windward side of Oahu.



Byodo In Temple

The Byodo-In temple in Oahu is a replica of the 900 - year old Byodo-In temple in Uji, Japan. The temple was designed to reflect the Buddhist belief of the "mystical promise of the Phoenix."

The gardens at the temple include ponds, streams, and various shaped hedges and sand gardens such as this one.

The bell outside the temple was created to replicate the look and sound of the bell in the original temple. It is 5 feet tall and weighs about 3 tons. The 9-foot-2-inch tall statue of Amida, the Buddha of the Western Paradise, is the largest wooden Buddha carved in the last 900 years. The carp symbolizes order and perseverance according to the Japanese. Several hundred of them live in the ponds and streams surrounding the temple.

Rain forest of Nuuanu And Pali Lookout

Continuing your journey to the windward part of Oahu, you'll arrive at the Pali Lookout. This majestic lookout rises 1,186 feet above sea level and provides a sweeping panorama of the windward side of Oahu. In 1795, King Kamehameha's invading army drove retreating defenders off the wind-buffed precipice at Nu'uuanu Pali

TIMING

9:30 AM	Depart the Waikiki
12:30 PM	Lunch At Eastern Gardens
1:45 PM	Depart For Byodo In Temple
2:45 PM	Depart For Nuuanu Pali
4:00 PM	Approximate Return Time To Hotel

TUESDAY, OCTOBER 7TH, 2003 HAWAII'S CULTURAL TREASURE TOUR TOUR PRICE PER PERSON \$91.00



ʻIolani Palace

A trip back in time to the fascinating and tumultuous history of the Hawaiian monarchy. Privately narrated by experienced and knowledgeable docents on the subject of the Royal Family of Hawaii.

The interior of the palace is graced with European style furniture, which boldly reflects the culture on old Hawaii. Both King Kalakaua and his sister Queen Lili'uokalani lived in the palace until 1893 when a group of American businessmen staged a coup d'etat and abolished the monarchy. In 1895 after a vain retaliation led by the Queens royalist, Lili'uokalani was returned to the palace and ultimately convicted of high treason. Here she was held under house arrest and prisoner of the provisional government on the second floor of her own palace. Not many people realize that Hawai'i is home to America's only Royal Palace. The history of Hawai'i is a journey into the changing world of our 19th-century monarchy.



Lunch At Willow's Restaurant

Enjoy a Hawaiian buffet luncheon in an open-air setting beside the pond and waterfall. Etched glass panels, a charm-

Visit Your UFFC Web Site! <http://www.ieee-uffc.org>

ing little chapel for small weddings, an outrigger floating on the main pond is part of the restaurant's ambiance.



Experienced local Artisans on site to demonstrate their craft and to assist you with your creation of the Hawaiian lei's and Haku (Head lei). The Haku is ideal for extra-special occasion's such as weddings, award ceremonies, and of course Luau's and parties. Many variations of materials are used in creating a Haku lei so have fun and enjoy your Hawaiian art experience!

TIMING

- 9:15 AM Depart The Hotel
- 9:45 AM Arrive At ʻŌlani Palace – Video Presentation Followed By Tour With Docents
- 11:45 AM Depart ʻŌlani Palace For Lunch At Willows
- 12:15 PM Arrive At Willow's
- 1:30 PM Depart For Kailua Beach Park – Work With Artisans
- 4:00 PM Return To The Hotel

WEDNESDAY, OCTOBER 8TH, 2003
ARIZONA MEMORIAL o ALOHA TOWER
MARKETPLACE o BISHOP MUSEUM
TOUR PRICE PER PERSON \$78.00



Arizona Memorial

Today we embark and relive the dramatic events of Pearl Harbor on this fully narrated and informative tour. At Pearl Harbor, your historic adventure begins with a documentary film recounting the haunting details of the bombing on

December 7, 1941. You will board the Arizona Memorial, a 184-foot white concrete structure that spans the length of the sunken battleship. It is the final rest place for more than 1,100 servicemen who lost their lives at Pearl Harbor.



Lunch At Chai's Island Bistro

An exquisite dining experience awaits you with award winning, Hawaiian Regional Pacific Rim Cuisine. Chef & owner Chai Chaowasaree has created a feast for all senses. His innovative, Pac-Rim Cuisine draws from the bounty of Hawaii's harvest - both on land and sea. Fresh local ingredients are used to prepare your meals, from Kona Lobster to organically grown Big Island baby greens. Chef Chai combines the freshest local seafood, meats, herbs and vegetables into an unforgettable dining experience.



Bishop Museum

Bishop Museum has become recognized over the past 100 years as the premiere guardian, chronicler, and exhibitor of Hawaii's rich natural and cultural heritage-as one of Hawaii's truly irreplaceable assets. The Museum was founded in 1889 by Charles Reed Bishop as a memorial to his wife, Princess Burnoose, last direct descendant of the royal line of. It was her family heirlooms that comprises much of the original collections. Bishop Museum today is much more than a treasure house of Hawaiian. It's a living adventure.

TIMING

9:30 AM Depart Hotel
 10:00 AM Arrive At Arizona Memorial
 10:15 AM Approximate Tour
 12:00 PM Depart Arizona Memorial For Aloha Tower Marketplace
 12:30 PM Lunch At Chai's Island Bistro
 1:45 PM Depart For Bishop Museum
 2:00 PM Hula Show Followed By Touring Of Museum
 3:30 PM Depart Museum
 4:00 PM Approximate Return To Hotel

Symposium Registration Information

To take advantage of the reduced advance registration fees, the registration form found at <http://www.ieee-uffc.org/2003/> must be returned by 4 September 2003.

Registration Fees

IEEE Member:	Advance	\$425	On Site	\$500
Non-IEEE Member:	Advance	\$600	On Site	\$675
Student::		\$ 90		
Retiree:		\$ 90		
Life Members:		\$ 0		
One Day Registration:		\$300 (without Proceedings)		
Guest Registration		\$ 40		

Proceedings

Additional CD-ROM Proceedings	\$ 50
Soft-Cover printed Proceedings	\$150
Postage for Printed Proceedings (outside North America)	\$ 55

UFFC CD Archive

The UFFC CD Archive is available to UFFC Members only for \$60.

Short Course Registration

The registration fee for each short course is \$150 for members and non-members and \$60 for students and retirees.

Symposium Organizing Committee



Bill O'Brien and Jim Greenleaf



Jim Greenleaf and Don Yuhas

General Co-Chairs: James F. Greenleaf
 William D. O'Brien, Jr.
Finance: Herman van de Vaart
Short Courses: K. Kirk Shung
Proceedings: Donald E. Yuhas
Technical Program Chair: Helen F. Routh
Exhibits: J. David N. Cheeke

Technical Program Committee

Group 1 (Vice Chair: John Hossack - Medical Ultrasound)

Olivier Basset	University of Leicester, France
Genevieve Berger	Laboratoire Imagerie Parametrique, France
Richard Y. Chiao	GE Medical Systems, USA
Lawrence A. Crum	University of Washington, USA
Emad S. Ebbini	University of Minnesota, USA
Stanislav Emelianov	University of Texas at Austin, USA
Helmut Ermert	Ruhr University, Germany
David Evans	
Katherine Ferrara	University of California-Davis, USA
Mathias Fink	Universite Denis Diderot, FRANCE
Stuart Foster	Sunnybrook Health Science Center, CANADA
James F. Greenleaf	Mayo Clinic, USA
Peter Hoskins	
Michael Insana	University of California-Davis, USA
Joergen Arendt Jensen	The University of Toledo, Ohio, USA
Leonardo Masotti	University of Florence, Italy
James G Miller	Washington University, USA
Kathy Nightingale	Duke University, USA
William D O'Brien, Jr	University of Illinois, USA
Helen F Routh	Philips Research, USA
Ton van der Steen	Erasmus University Rotterdam, The Netherlands
Tom Thomas	Siemens USA
Kai Thomenius	GE CRD, USA
Pierro Tortoli	University of Florence, Italy
Keith Wear	Food and Drug Administration, USA

Group 2 (Vice Chair: David Cheeke - Sensors, NDE & Industrial Applications)

Robert C. Addison	Rockwell Science Center, USA
Walter Arnold	Fraunhofer Institute for Nondestructive Testing, Germany
Narendra K. Batra	Naval Research Lab, USA
Eric S. Furgason	Purdue University, USA
Donna C. Hurley	NIST, Boulder, CO, USA
David A. Hutchins	University of Warwick, England
Bernhard Jakoby	Vienna University of Technology, Austria
Lawrence W. Kessler	Sonoscan, Inc., USA
Pierre T. Khuri-Yakub	Stanford University, USA
Jun-ichi Kushibiki	Tohoku University, Japan
Lawrence C. Lynnworth	GE Panametrics, USA
Roman Gr. Maev	University of Windsor, CANADA
Massimo Pappalardo	University Di Roma TRE, Italy
Jafar Saniie	Illinois Inst. of Technology, USA
Tony Sinclair	University of Toronto, CANADA
Bernhard R. Tittmann	Pennsylvania State University, USA
Jiromaru Tsujino	Kanagawa University, JAPAN
Donald E Yuhas	Industrial Measurement Systems, Inc, USA
John F. Vetelino	University of Maine, Maine, USA

Group 3 (Vice Chair: Bikash Sinha - Physical Acoustics):

Arthur Ballato	US Army CECOM RDEC, USA
Mack A. Breazeale	University of Mississippi, USA
Jan Brown	JB Consulting, USA
Helge F Engan	Norwegian Inst of Technology, NORWAY
David L. Hecht	Palo Alto Research Center, USA
Fred S. Hickernell	Motorola Inc., USA
Kenneth Lakin	TFR Technologies, Inc., USA
Amit Lal	Cornell University, USA
John D. Larson	Agilent Laboratories, USA
Moises Levy	M and N Consulting, USA
George D. Mansfield	Russia Academy of Sciences, RUSSIA
Kiyoshi Nakamura	Tohoku University, JAPAN
Valeri Proklov	Inst of Radio Engineering & Electricity, RUSSIA
Susan C Schneider	Marquette University, USA
Bikash K Sinha	Schlumberger-Doll Research, USA
Kenshiro Takagi	University of Tokyo, JAPAN
Joseph Trivisonno	John Carroll University, USA
Yook-Kong Yong	Rutgers University, USA
John R Vig	US Army CE COM, USA
Smaine Zeroug	Schlumberger-Doll Research, USA

Group 4 (Vice Chair: Don Malocha - SAW):

Benjamin P. Abbott	Sawtek Inc., USA
Ali Bagi-Wadji	Mints Radiotechnical Institute, RUSSIA
Kushal Bhattacharjee	CTS Wireless Components, USA
Serguey Biryukov	Leibniz Institute Dresden, Germany
Yasuo Cho	Tohoku University, JAPAN
Yasuo Ebata	
Ken-ya Hashimoto	Chiba University, JAPAN
Daniel Hauden	CNRS-LPMO, FRANCE
Mitsutaka Hikita	Hitachi, Ltd., JAPAN
William D Hunt	Georgia Institute of Technology, USA
Shen Jen	Crystal Photonics, Inc., USA
John A. Kosinski	US Army Communications Electronics Command, USA
Don C. Malocha	University of Central Florida, USA
David Morgan	
Mauricio Pereira da Cunha	University of Maine, USA
Viktor Plesski	Thales Microsonics, SWITZERLAND
Bob R. Potter	Vectron International, USA
Arne Ronnekleiv	Norwegian Institute of Technology, NORWAY
Clemens C. W. Ruppel	EPCOS AG, Germany
Martti M. Salomaa	Helsinki University of Technology, Finland
Peter M. Smith	McMaster University, CANADA
Robert Weigel	University of Erungen, AUSTRIA
Group 5 (Vice Chair: Lewis Brown - Transducers):	
Lewis F. Brown	South Dakota State University, USA
Levent Degertekin	
Jean-Francois Gelly	Thomson Microsonics, FRANCE
Hal Kunkel	Philips Medical Systems/ATL Ultrasound, USA
Reinhard Lerch	University of Erlangen, GERMANY
Geoff Lockwood	Queen's University, CANADA
Clyde Oakley	
Mark E. Schafer	Sonic Tech Inc., USA
K. Kirk Shung	University of Southern California, USA
Stephen W. Smith	Duke University, USA
Wallace A. Smith	Office of Naval Research, USA
Yasuhito Takeuchi	Kagoshima University, JAPAN
Roger H. Tancrell	Airmar Technology Corp., USA
Vasandara Varadan	
Qiming Zhang	Pennsylvania State University, USA

Scenes from the Second Technical Program Committee Meeting

Group 1: Medical Ultrasound



The papers are on the table, what do we do now?
Stanislav Emelianov, Richard Chao, Helen Routh, Tom Thomas, Ton van der Steen



John Hassock, Vice Chair Group 1



Helen Routh, John Hassock, Jian-yu Lu, Emad Ebbini, Richard Chiao, Stanislav Emelianov



Stanislav Emelianov,
Ton van der Steen

Group 2: Sensors, NDE, and Industrial Applications



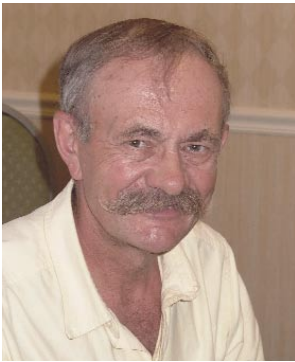
Don Yuhas, David Cheeke, Gayle Gleichman, Donna Hurley, Roman Maev, Larry Lynnworth



Roman Maev, Jiromaru Tsujino, Narendra Batra, Eric Furgason, Jafar Saniie



Donna Hurley



John Vetelino



I'm really paying attention Eric Furgason



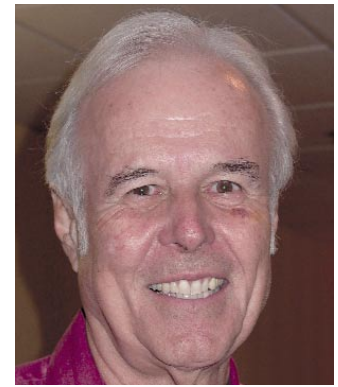
Jan Brown and Bikash Sinha in a sidebar



Larry Lynnworth, Jiromaru Tsujino, Narendra Batra



John Vig



Fred Hickernell

Group 3: Physical Acoustics



Bikash Sinha, Vice Chair Group 3

Group 4: Surface Acoustic Waves



Robert Weigel, Viktor Plessky, Bob Potter, Clemens Ruppel, Peter Smith, and Don Malocha – Vice Chair Group 4



Ken Lakin, Art Ballato, Fred Hickernell, Jan Brown



Bob Potter, Sorah Rhea, Louise Audrieth, Mauricio da Cunha

Group 5: Transducers and Transducer Materials



Whose turn to write on the board? Scott Smith, Roger Tancrell, Clyde Oakley, Jean-Francois Gelly



Qiming Zhang, Roger Tancrell, Jean-Francois Gelly, Scott Smith



Scott Smith, Clyde Oakley, Kirk Shung, Mark Schafer

Frequency Control

Joint Meeting 2003 IEEE International Frequency Control Symposium and PDA Exhibition and 17th European Frequency and Time Forum

If pictures tell the story, the Joint meeting of the 2003 IEEE International Frequency Control Symposium and PDA Exhibition and the 17th European Frequency and Time Forum held in Tampa, Florida, 4 – 8 May was a resounding success.

A Pictorial Account of the Symposium and Forum



Brigitte and Ewald Benes from Vienna after practicing a Viennese Waltz.



Breaking the ice - Brigitte Benes and John Vig starting a ball room dancing tutorial at the IEEE FCS conference banquet in Tampa



Brigitte Benes and Bernd Neubig, Sawyer Award laudator for Peter Kreml.



3Bottles+3Men: From Left to right (skipping the bottles (1 – r) Roger Bourquin, Bernard Dulmet, Ryszard Lec.



Ryszard Lec, chairman of group 4, dancing with unknown lady (One might expect that people know with whom they are dancing ...).



Jörg Biniensch, Birgit Zwickert, Leonhard Reindl, Brigitte and Ewald Benes, Clemens Ruppel, Ryszard Lec



Jaroslav Nosek and Lidmila Burianova from Technical University Liberec, Czechia.



4 Bottles + 3 Men: (l-r) Leonhard Reindl, Clemens Ruppel, Bernd Neubig



(l-r) Ahmad Safari, Mike Garvey, Debra Coler, Jaleh Safari



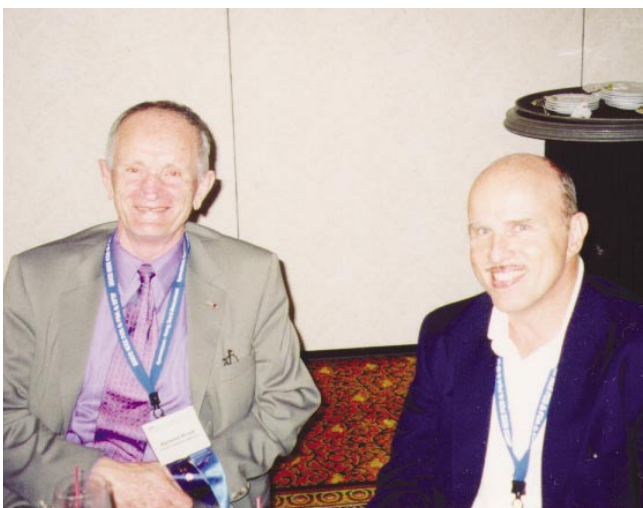
Tania van de Vaart, Jaleh Safari, and Thresa Hickernell



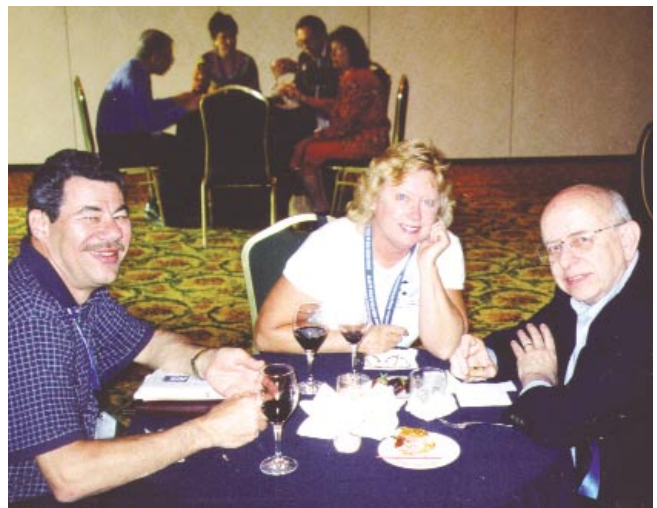
(l-r) Eva Ferre-Pikal, Ray Filler, John Kosinski



Ken Lakin Seems to be enjoying himself!



Raymond Besson and Don Malocha posing for a candid shot



Jack Kusters and friends share a repast at the reception.





Attendees of the Space Clock Workshop

Workshop on Space Clocks

A workshop on Space Clocks took place following the Joint Meeting of the 2003 IEEE International Frequency Control Symposium and the 17th European Frequency and Time Forum in Tampa Florida on May 8, 2003. The Workshop was sponsored by the US National Aeronautics and Space Administration and the European Space Agency.

The Workshop was chaired by Pierre Thomann and Lute Maleki. Panel speakers at the Workshop included: Christophe Salomon, Noël Demarcq, Wolfgang Schäfer, Stephen Feltham, Don Sullivan, Kurt Gibble, John Lipa and David Seidel. Topics of common interest to the International Space Station project teams were discussed, including time/frequency transfer issues, orbitography and scientific exchanges."

Frequency Control AWARDS

During the opening ceremony of the Joint Meeting of the 2003 IEEE International Frequency Control Symposium and PDA Exhibition and the 17th European Frequency and Time Forum in Tampa, Florida a number of awards were presented by both the IEEE UFFC Frequency Control Technical Committee and the European Frequency and Time Forum.

W. G. Cady Award

The W. G. Cady Award is to recognize outstanding contributions related to the fields of piezoelectric or other classical frequency control, selection and measurement; and resonant sensor devices. The Cady Award consists of \$1000, a laminated certificate, and a quartz crystal ball on a wood base.

2003 W. G. Cady Award Recipient

The IEEE UFFC Society offers its congratulations to the 2003 W. G. Cady Award recipient, Kenneth M. Lakin, TFR Technologies, Inc., USA.

Fred S. Hickernell presented the 2003 W. G. Cady Award to Kenneth M. Lakin "For outstanding and innovative work leading to the development of miniature, thin film resonator filters in commercially viable products"



Fred Hickernell presenting the 2003 W. G. Cady Award to Kenneth Lakin

Past Recipients of the W. G. Cady Award

2002 - Eugene N. Ivanov

- "For the development of ultra-low noise microwave oscillators and pioneering research in the field of microwave circuit interferometry"

2001 - David B. Leeson

- "For clear physical insight and model of the effects of noise on oscillators"

2000 - Richard M. White & Clinton S. Hartman

- "For pioneering the early understanding of SAW devices".

1999 - Raymond L. Filler

- "For contributions to the fundamental understanding of acceleration sensitivity, hysteresis and the aging of

quartz resonators".

1998 - Gary K. Montress

- "For outstanding contributions in the research, development, and implementation of precision SAW oscillators based on 'all quartz package' SAW devices"

1997 - Michael M. Driscoll

- "For outstanding contributions to low noise signal generator technology."

1996 - Albert Benjaminson

- "For his contributions to quartz resonator sensors, quartz crystal oscillators, dual-mode oscillators, and computer-aided design of oscillators."

1995 - Jean-Jacques Gagnepain

- "For major contributions to our understanding of environmental and nonlinear effects, and pioneering results on 1/f noise in piezoelectric resonators."

1994 - Thomas E. Parker

- "For outstanding contributions to the theory and applications of high-precision SAW oscillators."

1993 - Hirofumi Kawashima

- "For outstanding contributions to Photolithographic miniature quartz crystal units with excellent temperature stability."

1992 - Raymond J. Besson

- "For fundamental contributions to both quartz resonator fabrication technology and understanding of nonlinear effects leading to devices of superior performance."

1991 - Robert C. Smythe

- "For contributions to the development of single and dual mode quartz resonators for filter applications."

1990 - John R. Vig

- "For outstanding contributions to the development of improved quartz crystals and processing techniques, significantly advancing the field of precision frequency control and timing."

1989 - Darrell E. Newell

- "For contributions to the development of the TCXO and for stimulation and education of students in the field of frequency control."

1988 - Baldwin Sawyer

- "For his work leading to the development of improved cultured quartz crystals, improved qualification techniques, and his tireless contributions to the frequency control industry."

1987 - Virgil E. Bottom

- "For contributions to fundamental theory and experiments, stimulation of growth of the industry, and education in quartz resonator technology."

1986 - Juergen H. Staudte

- "For his pioneering contributions to the photolithographic processing of quartz devices, especially the development and commercialization of quartz tuning forks for timekeeping."

1985 - John A. Kusters

- "For his contributions to the development of SC-cut and other doubly rotated quartz resonators."

1984 - Arthur W. Warner

- "For his contributions to the development of high precision quartz crystal units."

1983 - Errol P. EerNisse

- "For his theoretical prediction of planar stress compensation in doubly rotated quartz plate resonators leading to the realization of the SC-cut."

I. I. Rabi Award

The I. I. Rabi Award is to recognize outstanding contributions related to the fields of atomic and molecular frequency standards, and time transfer and dissemination. The award consists of \$1000, an original print, and a laminated certificate.

2003 I. I. Rabi Award Recipient

Congratulations on behalf of the IEEE UFFC Society to



Steven Jefferts presents the 2003 I. I. Rabi Awards to Andreas Bauch

Andreas Bauch, the 2003 recipient of the I. I. Rabi Award.

The 2003 Rabi Award was presented by Steven Jefferts to Andreas Bauch "For outstanding contributions to the development, evaluation, and operation of primary frequency standards."

Past Recipients of the I. I. Rabi Award

2002 - Jon H. Shirley

- "For profound and continuing contributions to the understanding and advancement of the science of accuracy evaluation in primary frequency standards."

2001 - Lute Maleki

- "For outstanding contributions and scientific leadership in the development of a wide range of atomic clocks and oscillators supporting the U.S. space program."

2000 - William J. Riley Jr.

- "For outstanding achievement in the development of high performance gas cell rubidium frequency standards and for contributions to the understanding of frequency stability analysis".

1999 - Bernard Guinot

- "For outstanding contributions to the definition and the

implementation of the concepts on which international time-keeping is based."

1998 - David J. Wineland

- "For the first laser cooling of any atomic species and the demonstration of innovative methods for laser cooling of trapped ions, providing the foundation for the next generation of atomic frequency standards"

1997 - Harry E. Peters and Nikolai A. Demidov

- "For the development and manufacture of the hydrogen maser for precision timekeeping applications."

1996 - Andre Clairon and Robert E. Drullinger

- "For significant contributions to the improvement of the SI second through the realization of superior accuracy primary standards."

1995 - Fred L. Walls

- "For major contributions to the characterization of noise and other instabilities of local oscillators and their effects on atomic frequency standards."

1994 - Jacques Vanier

- "For his contributions to the application of quantum theory to the development of atomic frequency standards, and for this leadership in promoting the whole field and making it widely accessible to students and junior colleagues."

1993 - Robert F. C. Vessot

- "For contributions to hydrogen maser technology and applications."

1992 - James A. Barnes

- "For contributions and leadership in the development of the statistical theory, simulation and practical understanding of clock noise and the application of this understanding to the characterization of precision oscillators and atomic clocks."

1991 - Andrea DeMarchi

- "For contributions to significant improvements in the accuracy and stability of cesium beam frequency standards."

1990 - Claude Audoin

- "For original contributions to the theoretical experimental foundations of microwave frequency standards and their metrology."

1989 - Leonard S. Cutler

- "For consistent technical and managerial contributions to the development of atomic cesium, rubidium and mercury ion frequency standards."

1988 - Gernot M.R. Winkler

- "For early development of worldwide clock synchronization through use of portable clocks; encouragement and support for the development of atomic frequency standards from their earliest days; and international leadership in the time and frequency community."

1987 - Louis Essen

- "For contributions to cesium atomic beam and quartz frequency standards."

1986 - Jerrold R. Zacharias

- "For his contributions to the development of atomic frequency standards, especially his scientific leadership, pioneering demonstration of the technology, and entre-

preneurial initiative which led to the commercialization of atomic standards."

1985 - Norman Ramsey

- "For his contributions to the development of atomic frequency standards."

1984 - David W. Allan

- "For his contributions to the statistics of atomic clocks, measurement techniques, time scale and time coordination and distribution."

1983 - I. I. Rabi

- "For theoretical and experimental contributions to atomic beam resonance spectroscopy leading to the development of practical atomic frequency standards."

The C. B. Sawyer Memorial Award

The C. B. Sawyer Memorial Award ("Sawyer Award") is to recognize outstanding contributions in the development, production or characterization of piezoelectric materials of interest to the Symposium Technical Program Committee, or to recognize entrepreneurship or leadership within profit or non-profit organizations in the frequency control community (including all parts of the community). The award consists of \$1000 and an appropriately engraved quartz crystal.

2003 C. B. Sawyer Memorial Award Recipient



Peter Krempl receiving the C. B. Sawyer Memorial Award from Bernd Neubig

The UFFC Society offers its congratulations to Peter W. Krempl, the 2003 C. B. Sawyer Memorial Award, "**For outstanding contributions and leadership in the development of Gallium Orthophosphate crystals for sensor and frequency control applications**".

Past Recipients of the C. B. Sawyer Memorial Award Recipient

2002 - R. Michael Garvey

- "For exceptional leadership and technical contributions in the successful development of commercial atomic

frequency standards and other time and frequency products".

2001 - Yakov L. Vorokhovskiy

- "For outstanding entrepreneurship in leading Morion Inc. to a world class company and for many years of dedication to the quartz crystal industry".

2000 - Prof. Boris Mill

- "For pioneering the development of the langasite family of single crystal piezoelectric materials".

1999 - Shih S. Chuang

- "For contributions and leadership in the development and commercialization of micro-machined quartz crystal devices".

1998 - Donald B. Sullivan

- "For leadership in supporting and encouraging the development of frequency and time standards technology"

1997 - Peter G. Sulzer

- "For the evolution of a curiosity about quartz resonators into the low noise, low drift rate Sulzer oscillator design that was the foundation for Sulzer Laboratories, Inc."

1996 - Charles J. Jensik

- "For leadership in the manufacture and design of precision AT, BT and SC-cut quartz resonators and oscillators."

1995 - Lidya I. Zhourkina

- "For outstanding contributions to international standardization, and 30 years of leadership on the IEC Technical Committee No. 49, "Piezoelectric and Dielectric Devices for Frequency Control and Selection."

1994 - Roger Ward

- "For technical and industrial contributions to the design and fabrication of quartz crystal resonators."

1993 - Jack L. Saunders

- "For leadership in the development and manufacture of quartz resonator measurement equipment used throughout the industry."

1992 - Martin Bloch

- "For that rare combination of scientific and entrepreneurial par excellence dedicated to the frequency control industry."

1991 - John G. Gualtieri

- "For significant contributions in further understanding alpha quartz as regards to sweeping, etch channels, irradiation, and developing high yields in photolithographic processing."

1990 - William H. Horton

- "For technical and industrial leadership in the development and manufacture of quartz crystals, filters, and oscillators."

1989 - The award was not presented due to insufficient nominations.

1988 - Charles A. Adams

- "For contributions to the development of unique devices and manufacturing technology."

1987 - John A. Kusters

- "In recognition of outstanding contributions in engineering, technology development and management relating to quartz crystals and devices."

1986 - Larry E. Halliburton

- "For his contributions toward the characterization of cultured

quartz using infrared absorption, electron spin resonance, acoustic loss, and thermoluminescence measurements."

1985 - Thrygve Meeker

- "For his contributions to the theory and design of piezoelectric quartz devices."

1984 - William B. Benedick, Robert A. Graham and Frank W. Neilson

- "For their fundamental experimental studies of the physical properties of crystalline quartz under extreme pressures and rates of loading leading to applications including a high pressure quartz stress gauge with nanosecond time resolution."

1983 - Erich Hafner

- "For technical contributions and leadership in the fields of quartz resonator research, technology and measurement, and high precision frequency control."

1982 - No award given in this year (due to lack of suitable award nominations).

1981 - Eduard A. Gerber and Roger A. Sykes

- Gerber: "For pioneering research in VHF and UHF precision oscillators and filter crystals and international leadership in the field of frequency control."
- Sykes: "For outstanding contributions in the development and application of quartz crystals in the frequency control industry."

1980 - Peter Chung-Yi Lee

- "For contributions to the theory of vibrations in quartz crystal plates."

1979 - Harry F.R. Tiersten

- "For contributions to the theory of piezoelectric resonators."

1978 - Arthur D. Ballato

- "For contributions in the field of piezoelectric crystals such as; stacked filters, electric circuit analogues and stress effects in doubly rotated plates."

1977 - Virgil E. Bottom

- "In recognition of theoretical and practical contributions to the Quartz Crystal Industry, and inspiration to his students to choose this field of endeavor."

1976 - Warren L. Smith

- "For outstanding contributions in the field of precision crystal controlled oscillators of high spectral purity and monolithic crystal filters."

1975 - Morio Onoe

- "For theoretical and practical contributions in the field of frequency control and selection, as well as leadership in national and international committees on piezoelectric devices."

1974 - Robert A. Laudise, Robert A. Ballman and David W. Rudd

- "For outstanding contributions to the synthesis of crystalline quartz with special properties for resonator applications."

1973 - James C. King

- "For major contributions to the understanding of the fundamental properties of quartz crystals, and methods for improvement of these properties in synthetic quartz."

1972 - William J. Spencer

- "For advances in the theory and development of piezo-

electric crystal devices."

1971 - Donald L. Hammond

- "For development and applications of crystal devices to highly precise frequency control, and temperature and pressure instrumentation."

1970 - Issac Koga

- "Theoretical and experimental investigations of quartz and tutorial leadership in the field of piezoelectric crystals."

1969 - Arthur W. Warner, Jr.

- "Contributions to the development of high frequency thickness shear quartz resonators for precise frequency control and as an aid to the measurement of the intrinsic Q of quartz material."

1968 - Daniel R. Curran and David B. Fraser

- Curran: "For original and imaginative design of multi-electrode piezoelectric resonators, contributing significantly to the rapid advance of the quartz filter art in the past few years."
- Fraser: "For contributions to the knowledge of the mechanisms of acoustic loss in crystalline quartz, and the evaluation of this acoustic loss by optical methods."

1967 - Raymond D. Mindlin

- "For fundamental contributions to the theory of vibration in piezoelectric resonators leading directly to advancements in the art."

1966 - Warren P. Mason and Rudolf Bechman

- Mason: "For outstanding contributions in quartz crystal devices, particularly in the field of frequency selection."
- Bechman: "For outstanding contributions in quartz crystal devices, particularly in the field of frequency control."

Frequency Control Award Nominations

Eligibility Criteria

Any of the three awards is open to any worker in any of the fields traditionally associated with the Frequency Control Symposium. The nominee should be responsible for significant contributions to the field selected. The awards shall be given to one or more specific individuals rather than to laboratories or groups. No posthumous awards will be made. The time span over which the contributions have occurred is not limited. The significance of the contributions may be measured, in part, by: the degree of initiative, ingenuity, and creativity displayed; the quality of the work and degree of success attained; and the overall importance of the work and its impact on frequency control and associated communities.

Nominating Procedure

An Awards Chairman to oversee the nominating process is appointed by the Frequency Control Vice President. The Awards Chairman has the responsibility to solicit nominations and to make every effort to assure a high quality slate of nominees. Nominations are welcome from anyone and should be submitted to the Awards Chairman (see the current Call-For-Papers for contact information). All nominations must be submitted in writing (e-mail preferred) and must contain a proposed citation.

Each written nomination must include the following:

- Name of the nominee
- Current address (regular or e-mail) of the nominee
- Name of the award for which nominated
- Description of accomplishments (for example initiative, ingenuity, creativity, quality and degree of success, etc.) and their importance to the frequency control community
- Proposed citation (see examples on the first pages of any Proceedings since 1983)

The nomination should not exceed two typewritten pages and must contain the name and address of the nominator.

Selection of Recipients

The selection of the recipient for each award will be made by the Frequency Control Symposium Technical Program Committee during its paper selection meeting. The decision of the committee is final. If, in the opinion of the committee, no suitable nominee exists, no award will be given.

European Frequency and Time Award

2003 European Frequency and Time Award Recipients

Dr. Tom Parker, NIST Boulder, and Dr. André Clairon, BNM-SYRTE Paris, share the 2003 European Frequency and Time Award presented by Dr. Raymond Besson, Chair of Awards for the European Frequency and Time Forum.



Tom Parker receiving the European Frequency and Time Award from Raymond Besson



André Clairon (center) receiving the European Frequency and Time Award from Raymond Besson (right) and Christophe Salomon

During the opening ceremonies Raymond Besson presented to Tom Parker the Award with the citation: **“considering his outstanding achievements in several fields of time and frequency, in particular his recent results regarding the operation and comparison of primary frequency standards and the realization of an hydrogen-based time scale as a frequency reference of outstanding stability”**.

Christophe Salomon gave the laudatory remarks for André Clairon and presented him with the Award **“for profound and continuing contributions to the Time and Frequency Metrology and the outstanding and pioneering realization of high accuracy atomic fountain frequency standards”**.

EFTF Young Scientist Award



Eva Ferre-Pikal receives the EFTF Young Scientist Award from Warren Walls (l) and Raymond Besson



Ekkehard Peik receiving the EFTF Young Scientist Award from Raymond Besson



Peter Wolf (center) receives the EFTF Young Scientist Award from Raymond (l) Besson and Giorgio Santarelli

2003 EFTF Young Scientist Award Recipients

The recipients of the 2003 European Frequency and Time Forum Young Scientist Award are Dr, Eva Ferre-Pikal , University of Wyoming, Dr, Ekkehard Peik, P.T.B. Braunschweig (Germany), and Dr, Peter Wolf, BIPM on leave at BNM-SYRTE Paris .

Warren Walls presented the Young Scientist Award to Eva Ferre-Pikal citing her **“for major contributions to the measurement, specification and understanding of the origins of noise in electronic components and systems”**.

Ekkehard Peik received the Young Scientist Award from Raymond Besson with the citation: **“considering his achievements in several fields of frequency standards development, in particular in connection with the development of an optical frequency standard based on trapped indium ions”**

Giorgio Santarelli gave the remarks for the presentation of the Young Scientist Award to Peter Wolf **“for important contributions to the understanding of relativistic effects applied to satellite time and frequency transfer and the realization of tests of Special Relativity”**

Other Frequency Control Meetings to Note

PTTI

35th Annual Precise Time and Time Interval (PTTI) Systems and Applications Meeting

December 2-4, 2003

Hilton San Diego Resort, San Diego, California

35th Annual Precise Time and Time Interval (PTTI) Systems and Applications Meeting

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General Chair

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EFTF

The 18th European Frequency and Time Forum (EFTF) will be held at University of Surrey, Guildford, Surrey, UK (near London) on 5-7 April, 2004. The Chair of the meeting is Prof. Michael Underhill (m.underhill@surrey.ac.uk). Look at their website www.eftf.org for details.

Chapter Activities

Japan Chapter

Honoring Dr. Yoshio Satoh

On 13 May, 2003, Dr. Yoshio Satoh of Fujitsu Laboratories LTD, Japan, received a Medal with Purple Ribbon from the Japanese Government for his honorable achievements on the development of high performance surface acoustic wave (SAW) devices. The award recognizes extraordinary contributions to scientific and cultural areas, and he is one of the youngest recipients in the history of this order.

Dr. Satoh received his B.S., M.S. and Dr. Eng. degrees in Electronics Engineering from Tohoku University in 1972, 1974, and 1996, respectively. In 1974, he joined the Fujitsu Laboratories LTD, where he was involved in the research and development of bubble memory devices for the first 14 years, and then from 1988 he has devoted himself to the realization of high performance SAW devices.

Amongst various achievements, his contributions to RF SAW devices are outstanding and received international recognition. The most impressive one is the proposal of the ladder-type SAW filter. This idea enabled the ultimate reduction of device insertion loss, and made SAW devices key



Yoshio Satoh

components in modern mobile communications. His endeavors to realize high performance SAW antenna duplexers are also notable. His tireless efforts and unique innovations on various related technologies such as device design, material processing, etc. have made miniature and high performance SAW antenna duplexers possible. SAW technologies developed by Dr. Satoh are indispensable for the present mobile phones and have been the major driving force for the expansion of the SAW device market in last decade.

Due to his excellent research activities and their impact on industry, Dr. Satoh has also received various awards: 43rd Ohm Technology Award from Electric Science Technology Promotion Society (1995), Director of Science and

Technology Agency Award (1999), 47th Okochi Memorial Technology Award (2001), and The Prize of the Minister of Education, Culture, Sports, Science and Technology (2001).

In 2003, he was appointed as a fellow of Fujitsu Laboratories LTD, the highest engineering rank in the company.

Dr. Ken-ya Hashimoto , Japan Chapter

UFFC AdCom

UFFC-Society AdCom Meeting Minutes of 4 May 2003 [Subject to AdCom Approval]

The Administrative Committee (AdCom) meeting of the Ultrasonics, Ferroelectrics, and Frequency Control Society (UFFC-S) was called to order at 8:28 am, 4 May 2003, by Society President Ahmad Safari. The meeting was held in conjunction with 2003 Frequency Control Symposium held in Tampa, Florida.

Gerry Blessing summarized for the group who is a voting member of AdCom.

Lute Maleki made and Art Ballato seconded a motion that passed To approve the 7 October 2002 (Munich, Germany) AdCom minutes as corrected.



Art Ballato



Lute Maleki

Attendees

Art Ballato
Ray Besson
Gerald Blessing
Jan Brown
Mauricio P. daCunha
Mike Driscoll
Mathias Fink
Mike Garvey
Asha Hall
Gordon Hayward
Fred Hickernell
Jacqueline Hines
John Hossack
Eunki Hong

John Kosinski
Jian-yu Lu
Lute Maleki
Rajesh Panda
Sorah Rhee
Clemens Ruppel
Ahmad Safari
Tom Shroul
Susan Trolrier-McKinstry
Bruce Tuttle
Herman van de Vaart
John Vig
Marjorie P. Yuhas
Don Yuhas

(Note: 20 voting members were present for most of the meeting's business)

President's Report

Ahmad Safari welcomed new AdCom members. He commented on Jim Greenleaf's wonderful service in the position of VP Ultrasonics, and welcomed Clemens Ruppel as the new VP Ultrasonics. Yesterday the President, 2 past presidents, and elected members reviewed FC activities. This

meeting was open for all interested AdCom members. The results of the Ferroelectrics review will be discussed by Gerry. Ultrasonics will be reviewed in Hawaii. Once all three have been reviewed, we will review one area each year, so each is reviewed every three years. Ahmad said that if anyone has served more than 10 years, this must be brought to AdCom for an approval vote. Regarding Symposia – Ultrasonics, FC, and ISAF were three outstanding meetings with good surpluses, thanks to general chairs of these meetings.

We have agreed to discontinue cross-society agreement for Explore with EDS and MTT to save money. This change will take effect in 2004. All members have the ability to look at all IEEE abstracts now.

Secretary's Report



Jackie Hines

Jackie Hines requested that attendees update the AdCom listing and took counts for lunch and dinner.

Finance Report



Herman van de Vaart

Chair Herman van de Vaart provided written and oral reports of the Society's finances. 2002 was budgeted for a \$15 k deficit but ended up with a deficit of \$244.6 k. There were two main reasons – the major one was the 2001 symposia – Ultrasonics budgeted for \$91.9k surplus, which we knew was high and we projected at \$61 k surplus, but ended up with a deficit of \$41.7 k – three weeks after 9/11 – a difference of -\$130 k. The 2001 FC was budgeted at \$42.5 k surplus ended up with -\$26.1k. Second, FASS transactions charges were way over budget – up by about \$54k. Also – larger IEEE infrastructure charges hurt us as well. These charges were similar to 2001, but we as a society were not able to raise money to cover these costs. Our society net worth was down to \$131k at end of 2002. A

discussion ensued regarding the infrastructure charges and how they are determined, with Ahmad and Herman agreeing to look into this further as it seems we are being much more heavily taxed per member than other societies.

The 2003 budget has already been approved. There is a budgeted surplus of \$100k, which we expect to go up to about \$200k because the symposia did well. The 2002 net \$54k budget had actual \$150k due to symposia surpluses and reduced transactions editing costs. Our net worth should be about \$330k at end of the year. Regarding the 2004 budget (first pass), AdCom needs to vote on the amount of membership dues and individual non-member subscriber rates. IEEE recommends raising this from \$475 to \$510. We are still negotiating printing costs with FASS, so this item in the budget may still change.

Herman van de Vaart made and Art Ballato seconded a motion **To approve the 2004 budget as stated here.**

A brief discussion ensued regarding the cost of the Digital Archive, how many are sold, and whether the update for the CD archive was included in the budget, but it was determined to be a small enough expenditure to be considered "in the noise".

Jan Brown made a motion and Art Ballato seconded an amendment that Herman van de Vaart accepted, **To approve the input data for first pass 2004 budget.** The motion passed (18 in favor, 0 opposed).

Publications

Jan Brown, Publications VP, presented a report. She gave estimates for various options for a CD update to the archive, which we had voted at the last meeting to provide at no charge. Jan indicated that to catch up would cost about \$5 k for intervening three years. It would be nice to have this update for our 50th anniversary year next year and to provide it to members free of charge.

Jan Brown made and John Kosinski seconded a motion that passed (19 in favor, 0 opposed) **That we provide the 2001-2003 addition to the Archive to all our members free of cost as part of the 50th anniversary and to provide to all attendees at joint 2004 meeting.**

Lute Maleki suggested the newsletter could be web based with e-mail reminders, which would reduce mailing costs. We should try to increase society membership by providing upgraded services at minimal costs to us.

Jan Brown welcomed Don Yuhas as the new vice VP of publications. They have spent a lot of time evaluating IEEE and FASS quotes. FASS wants a three year contract – fixed cost – based on 1872 page budget and 3000 printed copies. Actual costs may go down as print goes out of favor and more members choose electronic access. Charges for additional pages would be extra, as are web and CD charges. A discussion ensued regarding the desirability of auditing FASS, since the guidelines for conferences are that conferences with expenses over \$100k require audits. Expenses here much more than that. The discussion then turned to the FASS contract, with some indicating they had never seen such a contract, and Jan saying it is just the standard IEEE vendor form – very general. We have been working on a

time and materials basis with FASS through 2003 and will go to fixed price for 2004, so there is almost no point in auditing after 2004.



Don Yuhas

Don Yuhas summarized the pros and cons of working with IEEE and FASS. The issues considered include page size, real-time, Xplore compatibility (a significant issue since, if we do not get compatible, IEEE will charge us \$17.50 per page – but one that FASS has worked on and IEEE has not yet evaluated our attempts), multimedia, responsiveness, depth, inertia, electronic process, web posting, linkage impact, IEEE policies, and trust.

John Vig mentioned that IEEE business complexity is very high. Part of this is perceived to be due to societies publishing inside IEEE. IEEE is considering mandating that societies publish within IEEE. IEEE spends more than \$15M a year on IT. It would be helpful for this argument to be written up so John can submit it to argue that societies should be allowed to continue to publish outside. 3 yr contract with FASS can include clauses on breaking contract early that take into account IEEE demands.

Jan Brown made a motion on behalf of the publications committee (no second needed) that passed (19 in favor, 1 opposed) That we continue our contract with FASS and negotiate with them a three year contract for transactions.

Publications committee consists of the chair, vice chair, Transactions EIC and AIEC, Newsletter Editor, TMI, Journal of Lightwave Technology reps (2), Finance chair and Web Editor. It would be nice to get proceedings editors for the three conferences included.

Ahmad Safari put motion forward a motion to modify the Bylaws relating to Transactions EIC and AIEC as follows: Replace current term of office of 5 yrs with opportunity for reappointment to 3 yrs with opportunity for one additional term.

Jan Brown pointed out that the bylaws say we can't vote on such a motion, since they require the AdCom have at least 15 days advance notice for votes changing bylaws – so this motion will come forward for a vote at the next AdCom meeting. Following such a vote (2/3 vote required for approval), the change would be sent to the TAB secretary, and there would be a notification of the membership. Additional comments were made regarding rethinking term structure, and the EIC being able to dismiss Associate Editors.

Transactions

Marj Yuhas is taking care of the legacy system and is down to 22 from 170 manuscripts in the system. Jian-yu Lu gave a presentation on Manuscript Central, and presented statistics on papers submitted – 278 from June 1 2002 to May 3 2003. Of these, 82 were accepted (73%), 30 were rejected (rate 23%), and 11 were withdrawn (155 are under processing). The average time from acceptance to assign to issue is 105 days.

A discussion ensued on the time from submission to print. The EIC, AE's, reviewers and Authors are responsible for all the time from submission to acceptance. The time from acceptance to publication is controlled by the production process at FASS. The goal is to reduce the current 105 days to 55 days. The current extended time may be due in part due to staffing changes at FASS.

As of January 1, 2001, the time from getting the manuscript from AE to acceptance averaged 200-400 days. This is now down to 132 days. A discussion of whether looking at the average time is a good metric ensued – perhaps something else like a median would be more useful? The 50th anniversary issue was discussed, with topics ranging from guest editors to making it our first multimedia transactions and put fireworks on the cover.

Ahmad mentioned that at TAB meetings, every motion has to have a corresponding budget implication included. We should take on this procedure at the next meeting of AdCom.

Newsletter

Jan Brown is looking for a Vice Chair, Newsletter Editor, and on-line newsletter editor. Lute wants on-line only newsletter. More expensive to handle complication of opt-in or opt-out business expense at HQ than it is to mail hardcopy to everyone. Straw vote showed more people wanted hardcopy only than wanted electronic only. Fred and Gerry said it is a good publicity tool for the society. Continue with hardcopy for 2004. Jan willing to accept anyone being editor of new on-line newsletter between major issues – who wants to volunteer for this?

Web



Sorah Rhee and Ahmad Safari

Sorah Rhee took over in January 2003 from John Vig, who did a great job getting it set up and running. Sorah is responsible for interface with FASS, as Web EIC, she reports to VP publications. Sorah checked on web maintenance costs - \$45/hr at FASS, outside companies start at \$60/hr and up. Stay with FASS – plus they are very responsive.

Sorah discussed member access to digital archives, the Fellows gallery, and the new format for the web site (currently only on the home page). An on-line archive for con-

ference data was discussed, and Sorah indicated it would take FASS about 15 hours of time to go back and get info from past conferences. Jan Brown made and Lute Maleki seconded a motion that passed (14 in favor, 1 opposed, 4 abstain): We allow the expenditure of funds to obtain the information we are interested in for all conferences for the years 2000 through 2002.

Nominations

No report.

Ferroelectrics Committee

Susan Trolier-McKinstry, Ferroelectrics VP, gave an oral report about the 2003 Ferroelectrics Achievement Award which will be presented at the 2004 conference.

Herman van de Vaart noted that HQ cannot close the last conference due to proceedings not being closed financially). Regarding the 2004 joint conference, Susan deferred to Mike's discussion. The 2006 ISAF will be in Raleigh NC, May-Aug TBD, in the Raleigh convention center. General Chair John Paul Maria has his committee all set. By March 2004 we will have made the final decision on whether or not to make it a joint conference.

Susan Trolier-McKinstry made and Bruce Tuttle seconded a motion that passed (unanimously) **That we approve John Paul Maria as General chair for the 2006 ISAF.**

On the Ferroelectrics committee - 11 of 35 members will be continuing beyond the ten year term. Susan Trolier-McKinstry made and Bruce Tuttle seconded a motion that passed (8 in favor 1 abstain – with only the 12 elected AdCom voting - per bylaws) **That AdCom approve that 11 individuals be allowed to continue as members of the Ferroelectrics subcommittee beyond the ten year standing committee term guidelines stated in the bylaws.**

Frequency Control Committee

Lute Maleki, Frequency Control VP, stated that the review of the FC standing committee was very productive, resulting in several suggestions, and also raising issues that need to be addressed. Thanks many for their constructive suggestions.

2002 FC symposium books almost closed and we did a little better than expected, ending with a surplus. The current meeting is more of a concern Mike Garvey to report on this. This is a joint meeting with EFTF. Two good abstract review meetings led us to expect 550 attendees, but in reality we have only about 325 attendees. IEEE conference services renegotiated the hotel agreement from loss of about \$130k to about a tenth of that. We expect to end up with about a break-even conference. War, SARS, visa issues – all are impacting foreign attendees dramatically. Some new things for this conference – we set up abstract distribution through the use of IEEE aliases – worked pretty well. Also, we only did an electronic call for papers – no mail version. A discussion ensued regarding whether the war, SARS, or other factors could realistically have caused such a poor showing, and

Lute said we are extremely surprised – not even up to regular non-joint meetings, which run about 400 people normally. The conference will collect statistics and see if participation a lack of certain countries, etc., and we should have a better answer at next AdCom.

Mike Garvey submitted a status report on the 2004 meeting, which will be a joint meeting with Ultrasonics and Ferroelectrics in Montreal. 24-27 August 2004, Short courses 23 Aug (Monday). The overall structure of the meeting will be discussed at TPC planning meetings. Ahmad assured all three areas than no one will dominate the conference, and the convention center has plenty of room for more parallel sessions if needed.

Mike Driscoll, General Chair for 2005 FC (joint with PTTI) reported that this meeting will be in the Hyatt reGENCY in Vancouver near end of Aug 2005. ADCOM approved MOU with PTTI pending review by HQ, they approved it, and so it is now pending signatures. A ROM budget has been revised based on estimates of 384 attendees and Synergistics cost estimates. The budget is tight (only 6% surplus) and there are no obvious items that might end up being for free.

For 2006, Baltimore is the main city prospect. This will not be a joint meeting. Hotel visits in next few months.

Lute Maleki stated that there are two FC committee members that have been serving for more than 10 years. Lute, on behalf of the FC committee, made a motion that passed (8 in favor, 0 opposed, 1 abstain – elected member vote) To approve the FC Committee members that have been serving for more than 10 years.

Standards



Eva Ferre-Pikal

Art Ballato introduced Dr. Eva Ferre-Pikal, who will take over as chair of the Standards Committee after he gives his report in Hawaii. Art stated that the committee has been thoroughly re-worked, with new subcommittee chairs on most of the subcommittees. Everyone is either new or almost new.

Ultrasonics Committee

Clemens Ruppel, Ultrasonics VP, gave a brief oral report. Herman van de Vaart gave a written finance report – the conference was great! Some bills are still outstanding, but we hope to close the meeting out in 2-3 weeks. Gerry thanked Clemens for his hard work getting support from his locale (over a third or surplus was from sponsorship). This year the Ultrasonics Symposium will be in Hawaii. The 2004 joint meeting has already been discussed, and 2005 in Rotterdam (Ton van der Steen) is relatively set, contracts should be ready for signing in May. Yesterday we approved in Ultrasonics committee Stu Foster for '06 general chair.

Clemens Ruppel introduced a motion from the Ultrasonics Committee that passed (unanimously) To approve Stu Foster as General Chair of the 2006 Ultrasonics Symposium. The Ultrasonics Committee is considering a proposal for '07 for Philadelphia, with R. Lec as potential general chair, and there is discussion on holding the 2008 meeting in Beijing or Nanjing, although they remain open for suggestions for other locations as well.

Awards

Jackie Hines mentioned that the Awards Committee needs to be aware of potential tax implications for awards. Last year, one award recipient got a tax form showing he had tax due on the income from the award when he had not yet even gotten the award.

Membership Services



Rajesh Panda

Chair Rajesh Panda gave an oral and written report, and in summary our high grade members are declining, while student members are increasing. Overall, many people are not opting for multiple societies any more, possibly due to costs. Our society retention rates are in the 80-82% range each year. Members, Sr. Members and Fellows are much less likely to leave the Society than students. Rajesh highlighted the top needs of members: Internet access to pubs, followed by standards, etc. What can we do to differentiate what our society offers? If we transfer digital archive to Xplore, how will it impact membership? Should we differentiate with, for instance, on-line distinguished lecturer courses? Or short courses? This could help encourage people to join society as well as IEEE.

Sorah Rhee discussed e-mail lists. Since FASS did not have a comprehensive list, they made their own list of people who attended a UFFC conference at some point, with 3200 e-mails. Anyone with e-mailing lists should send info to Sorah. Should we have IMS or FASS develop list further into sublists? John Vig suggested using a student to search paper database for new e-mail addresses at \$10/hr. Ahmad offered to pay for students to work on this out of discretionary funds. Jan and IMS will meet and determine what funds may be needed if IMS takes this task on.

Fellows

No report. Fred Hickernell stated that he does not know how many nominations there are this time, but that soon the nominations will be mailed out to the committee for review and vote. Fred has now been appointed Vice Chair, will take over as chair of Fellows committee at the end of this year (start of next year).

Publicity

Sorah Rhee was appointed Chair last year. For the past few years Ray Brennan worked with designer to develop posters that emphasize benefits of UFFC membership. In Munich the exhibition booth very close to coffee (a good location), and the General Chair of the conference pointed out the presence of booth. The booth was staffed from 8 am to 6 pm, and had posters, fliers, postcards, etc. One issue was that we could not train students to answer questions. For the future, if we give student travel support, can we require them to join UFFC, and make it a requirement for students to give 1 hr to staff booth? Sorah asked for clarification on what the publicity chair of a conference does vs. the society publicity chair. She was told she is doing a great job with or without a job description. John Vig mentioned that a motion had been presented at a board meeting to allow abbreviation FIEEE as fellow, etc., to encourage retention.

History Committee

Fred Hickernell said that on May 6, 1953 our society was formed. The newsletter has more info. Still looking for historical stories and contributions. Still formulating what to be done in Montreal. Want to make it a 50th anniversary celebration.

Long Range Planning

John Vig sent out a revised strategic plan before the meeting. Main revisions – Establishing committees that span areas of technical interest; Instead of establishing a VP conferences, perhaps one of the past presidents should do that (need someone long term in this position); Explore using web teleconferencing instead of in-person TPC meetings – would save money and allow more overseas people to participate; Pros, cons and cost impact be included in any motions – President could rule motions out of order if not included. Additionally, the Achievement award currently includes technical and service accomplishments – should it only be major technical accomplishments? This might make sense since we have a Service Award as well.

Lute Maleki asked if we are going to have a strategic view that looks at the future to generate a vision for the next few years, or are we going to just work within this framework? John has been updating the plan, which was last approved in 1998. A discussion ensued regarding whether the current strategic plan is indeed a strategic plan, or more accurately a framework which would be useful in developing a true strategic plan that would feed back into all the committees. More discussion is needed on this issue at the next meeting.

Frequency Control review

Gerry Blessing reported that we had a very useful meeting. They reviewed committee membership, structure, symposium organization, advertising, publications, and future

plans the committee is heading toward. The purpose of these reviews is to share among everybody the strengths of each technical group. People from other committees can sit in on the meetings and learn what other groups are doing. FC felt like they needed to build up their academic base. The industrial component is eroding a bit, while the government component is relatively stable. Another issue is what the future holds – optical frequency sensors, microwave, MEMS, etc. – these are areas Lute would like to push into before getting too far behind, rather than plying catch-up. Regarding TPC abstract quality – should this be left to the individual groups to define? It seems that the groups have very different views – from accept all abstracts to goals of 50% rejection. Gerry will do a written report with feedback for Lute.

UFFC-S Representatives

Jackie Hines reported for Moises Levy on Superconductivity Council. They had success in establishing and sustaining relationships with The Applied Superconductivity Conference and the Magnet Technology Conference, and with establishing a distinguished lecturer in Superconductivity. They view the opportunity to establish a viable national standards program in superconductivity as a major opportunity, along with the development of several workshops, short courses, and K-12 educational programs.

New Business

1. Fred Hickernell received a request from a Russian conference for young researchers that we have supported in the past. They sent an itemized list of expenses that is \$51k, and ask that we support \$5k. This money would go primarily to support young researchers. The conference fees are roughly \$300 per student inclusive of conference registration, food, lodging, proceedings, etc. In the past we have been able to give about \$8k, but we felt \$5 k would be reasonable.

Fred Hickernell made and Jan Brown seconded a motion that failed: That we support the 6th Int'l conference for young researchers by providing \$5,000 for young researchers.

A discussion of the technical conference topics ensued, concluding that it includes several that are related to our areas. A number of people suggested using the funds to support students and others coming to our own conferences, or requiring award recipients to join IEEE or UFFC. Others mentioned different conferences also asking for similar support. Following further discussion, the vote on the motion was 8 in favor and 10 opposed, so the motion failed.

2. John Kosinski mentioned that AdCom has a number of issues of procedure and governance that are inconsistent with constitution and bylaws. There are conflicting definitions of AdCom in bylaws and constitution, such as – is the president elect a member?, etc. What do we want to do with the strategic planning committee (an Ad-Hoc

committee set up over three years ago, while bylaws call for terms of no more than two years)? What's the role and function of publicity? What is definition of members of AdCom? Committee chairs (according to the bylaws) are not really members of AdCom, but we see them that way. The point is that, if AdCom is evolving in the way we run the society, we need to make decisions about what we are doing that is good, and may need to revise the constitution, bylaws, or both, and establish more depth on our policies and procedures so people understand the normative way we do business.

Seeing depth and range of issues we are dealing with here, John Kosinski made and Jan Brown seconded a motion that passed (16 in favor, 0 opposed, and 3 abstain): That we establish an ad hoc governance committee to spend the next 12-24 months to go through the constitution, bylaws, policies and procedures and make them self consistent and consistent with actual practice of AdCom. Anyone who would like to participate in the committee please let Ahmad know.

3. Conference VP – Ahmad and Gerry to discuss and have e-mail discussion on the need for this person and whether to appoint someone in the meantime.



Gerry Blessing

Lute made and Mike Garvey seconded a motion for adjournment.

The meeting was adjourned at 5:18 pm, 4 May 2003.

THE NEXT UFFC-S ADCOM MEETING will be held on Sunday October 5, 2003 in Hawaii conjunction with and preceding the 2003 Ultrasonics Symposium.

Jacqueline H. Hines
UFFC-S Sec/Treas

events. Specifically, the budget process for year X starts in March of year X-1. In fact, the Transactions page budget and subscription prices for year X are frozen June 30 of year X-1 so that the information can be transmitted in a timely fashion to libraries and subscription services. Also, although changes in budgeted expense can be made until shortly the Fall IEEE Board meetings, in general actual income and expenses of our year X-1 Symposia are not known until well into year X.

There are two main reasons for the large deficit in 2002: Transactions expenses and Symposia deficits. Regarding Transactions, 2002 was the first year of monthly instead of bi-monthly issues. The cost of this change-over was greatly underestimated; instead of a budgeted Editing and Composition expense of \$119K, the actual turned out to be \$171.6K This increase was somewhat offset by a lower UFFC Editor's office expense and a slightly higher All Transactions Package income. But still, the net result was a decrease in Transactions surplus of \$46.7K.

Regarding Symposia, I already mentioned in last year's report that the 2001 International Frequency Control Symposium ended with a deficit of \$26.3K vs. a budgeted surplus of \$35.6K, and the 2001 International Ultrasonics Symposium ended with a deficit of \$41.7K vs. a budgeted surplus of \$91.9K. Thus, the two Symposia taken together ended up with a deficit of \$68K instead of a surplus of \$127.5K, a difference of \$195.5K. Add up the Transactions and Symposia reductions and the result is a \$240K deficit.

Again as I mentioned in last year's report, for this year things are looking up. Both the 2002

IFCS and 2002 IUS have already shown solid surpluses and with the stock market beginning to show an upturn, hopefully the IEEE infrastructure charge to the Societies will be less severe.

Herman van de Vaart
Chair UFFC Finance and Operations Committee
July 1, 2003

Addendum:

Congratulations to Bob Potter and Koray Akdogan for being ratified by the elective AdCom for the following positions, effective immediately:

Bob Potter - Nomination Chair

Koray Akdogan - Education Chair

Finance Report 2002 Final

In my UFFC Financial Report for 2001 in the Fall Newsletter a year ago, I mentioned that the prospects for 2002 looked very dim, and that I expected a deficit of around \$200K. Well, as you can see from the 2002 Financial Report elsewhere on this page, I was a little too optimistic. The actual deficit turned out to be \$239.5K, \$224K below budget.

Before I explain the reasons for the deficit, let me try to explain why the budget numbers and the actuals can be so far apart. Most of it has to do with the timing of certain

UFFC-S Long Range Plan Draft of May 31, 2003

[Subject to AdCom approval]

Annually, the Long Range Plan of the UFFC is reviewed, enhanced, and expanded upon by a committee chaired by the senior past-president and presented to AdCom for approval. If you would like to see additions to the plan or have comments or concerns please email John Vig (j.vig@ieee.org).

1. Goal: Maintain and promote the three technical areas of the society: Ultrasonics, Ferroelectrics, and Frequency Control.

Background: The society's fields of interest include a number of mature but still very important technologies. Examples include bulk and surface acoustic wave tech-

nology, physical acoustics, capacitor and piezoelectric materials, etc. These technologies continue to grow at a moderate rate and continue to require support through technical dissemination of ideas and recruitment of new engineers and scientists into their respective areas through conferences and publications. The society has several areas of significant potential growth of both people and technology. These areas include medical ultrasonics and imaging, sensor and actuator devices, microsystems, and new materials for ferroelectric and piezoelectric applications. The new areas need to be recognized early and promoted in our conferences, tutorials and Transactions. Opportunities for workshops, new conferences and publications need to be identified and promoted. In nearly all its areas of interest, the UFFC-S has competition, from both within and outside the IEEE.

- **Tactic 1:** A UFFC-S Committee chaired by the President-elect shall review each of the three technical areas once every three years for all aspects of the operation and make recommendations to the AdCom and the respective Vice-President.
 - **Tactic 2:** Leadership of the UFFC-S to focus on renewal – of both people and technologies. Appoint students to committees, encourage participation by members from outside the USA, and identify and adopt new technologies early.
 - **Tactic 3:** Insure that every AdCom member contributes to UFFC-S by: 1) defining the duties of AdCom members, including the time commitment, and making sure that potential nominees for AdCom understand what is expected of an AdCom member, and 2) having the president assign to each AdCom member committee positions and tasks.
 - **Tactic 4:** Awards Committee to develop a method for diversifying the Distinguished Lecturers with greater participation from industrial leaders and from outside the USA.
 - **Tactic 5:** Award Committee to periodically review the criteria and selection process for the various UFFC-S awards. For example, before the creation of the Distinguished Service Award, the Achievement Award criteria were written to include both technical achievement and distinguished service to UFFC-S. Now that we have a Distinguished Service Award, should the criteria for the Achievement Award still include distinguished service?
 - **Tactic 6:** Continue to support local chapters and encourage the formation of new chapters where sufficient interest exists.
 - **Tactic 7:** Continue liaisons with other established organizations having similar interests, such as the Industrial Ultrasonics Association, the Piezoelectric Devices Association, ISIF, etc., for the benefit of our members and the promotion of our technical interests.
 - **Tactic 8:** Establish guidelines for standing committee and technical program committee operations, including the membership and scope (e.g., the standing committee scope should include more than just conferences; should include recommendations to the Nomination Committee, Awards Committee, etc.)
- 2. Goal:** Enhance the Society Publications
- Background:** The society currently publishes a monthly transaction, a biannual newsletter, and conference proceedings for each of its three conferences. Decrease in the time from submission to publication has been initiated and continues. Better tracking of papers has been initiated, and education and assistance to associate editors has been provided. Promotion of special issues in various technology areas continues and has been successful.
- **Tactic 1:** Reduce the average time from submission to publication to 4 months or less.
 - **Tactic 2:** Increase number of special issues each year.
 - **Tactic 3:** Start using multimedia in publications.
 - **Tactic 4:** Develop better ways to capture all of UFFC in the Transactions.
- 3. Goal:** Promote Society Membership
- **Tactic 1:** Enhance membership drives at all sponsored or cosponsored conferences. Have an IEEE exhibit booth at all UFFC conferences.
 - **Tactic 2:** Greater promotion of free society membership signup at all UFFC sponsored conferences.
 - **Tactic 3:** Enhance membership Outreach Program at cosponsored conferences outside North America by having a UFFC representative present at these conferences.
 - **Tactic 4:** President's Student Reception at all conferences.
 - **Tactic 5:** Student paper competitions at conferences.
 - **Tactic 6:** Increase student membership by incentives and promotion at the universities.
 - **Tactic 7:** Determine the best ways to promote UFFC membership.
 - **Tactic 8:** Encourage senior member applications and fellow nominations.
 - **Tactic 9:** Encourage members to use IEEE e-mail aliases, and the IEEE membership grades on business cards and in signature blocks (e.g., FIEEEE, SMIEEEE, MIEEEE, or, "Fellow, IEEE," etc.)
 - **Tactic 10:** Improve membership retention by making personal contact with members who fail to renew.
- 4. Goal:** Promote Volunteer Service
- **Tactic 1:** Recruit student members at conferences and through publication.
 - **Tactic 2:** Recruit new society contributors, at all levels, into society service.
 - **Tactic 3:** Recruit greater participation of Region 8, 9, 10 members.
 - **Tactic 4:** Bring "new blood" into society leadership positions. Enforce term limits. Establish balance between "new blood" and maintaining the "corporate memory" and outstanding expertise of senior volunteers.
- 5. Goal:** Conference Initiatives
- **Tactic 1:** Maintain, and improve coordination among, the current three principal conferences. Explore estab-

lishing technical committees that span areas of common interest among the three conferences, e.g., piezoelectric/acoustic materials, SAW and other acoustic devices, and sensors.

- **Tactic 2:** Current president to appoint the a past president to act as a VP, Conferences - to insure that best practices are used throughout UFFC conferences, find exhibitors common to U-F-FC, make sure that there is a properly staffed and supplied IEEE exhibit booth at all three UFFC conferences, be a source of info about IEEE policies and procedures, review hotel agreements, etc.
 - **Tactic 3:** Promote workshops and special sessions in new technology areas
 - **Tactic 4:** Continue to hold conferences in Regions 8,9,10
 - **Tactic 5:** Strengthen and diversify conference Technical Program Committees. Have "corresponding members" from regions 8-10 to increase participation by members outside the USA.
 - **Tactic 6:** Explore web conferencing (or teleconferencing) instead of in-person TPC meetings.
 - **Tactic 7:** Promote workshops and special sessions on emerging technologies.
 - **Tactic 8:** Periodically consider changing ISAF from a biannual to an annual Symposium.
 - **Tactic 9:** Increase/continue cooperation among ISAF and ISIF, FCS and EFTF, FCS and PTTL...
 - **Tactic 10:** Build up the exhibits at our conferences.
- 6. Goal:** Increase Availability and Decrease Development Time of Standards
- **Tactic 1:** Publish drafts in newsletter, transactions and/or WEB in a timely manner, as appropriate.
 - **Tactic 2:** Decrease time in development and publication through drafts
- **Tactic 3:** Coordinate with other international standards organizations to reduce duplication and enhance standards.
- 7. Goal:** Improve UFFC-S Publicity and Marketing activities.
- **Tactic 1:** Establish and continually build e-mailing lists: for the whole UFFC-S, and for each of the three areas – to be used for conference announcements, transactions special issues, and similar activities. Use Manuscript Central, IEEE Xplore, conference attendance lists, etc.
 - **Tactic 2:** Have an IEEE exhibit booth at all UFFC conferences.
- 8. Goal:** Improve the Financial Health of the UFFC-S
- **Tactic 1:** Know the costs of what we do and factor the costs into the prices of UFFC-S products and services. If a product or service is to be subsidized, disclose the amount of the subsidy to AdCom.
 - **Tactic 2:** Require that the cost impact of every motion presented at AdCom meetings be included in the motion.
 - **Tactic 3:** Build up the exhibits at our conferences
 - **Tactic 4:** Rebuild and maintain UFFC-S reserves at 70% of the annual UFFC-S expense budget
 - **Tactic 5:** Assemble and update on a continuous basis e-mailing lists for U, F, and FC. Eliminate printing and mailing costs associated with conferences by using e-mail and the website.
- 9. Goal:** Implement this long range plan
- **Tactic:** AdCom to establish milestones, and assign responsibilities for implementing the goals and tactics of this plan.

John Vig
UFFC Senior Past-President
j.vig@ieee.org

UFFC Awards

Honoring our UFFC Society Members is a privilege.

The UFFC Society has a number of awards, which are given at symposia sponsored by our three groups. Each member can get involved in the process by submitting nominations for awards through the respective Award Chairs and committees. Information can be found on the UFFC Society website. Also the names of past awardees appear on the website.

In addition there are IEEE awards relating to senior professional membership and outstanding contributions through the Fellow award. For a complete listing of UFFC fellows see <http://www.ieee-uffc.org/about/fellows.html>. The qualifications for these awards and the nomination kits for IEEE Fellow may be obtained at <http://www.ieee.org/about/awards/fellows/request.htm>. A Fellow nominee must be a Senior Member of the Institute and have been a member in any grade for at least five years prior to January 1 of the year of election.

The criteria for elevation to Senior Member Grade, is as follows: "... a candidate shall be an engineer, scientist, educator, technical executive or originator in IEEE-designated fields. The candidate shall have been in professional practice for at least ten years and shall have shown significant performance over a period of at least five of those years." If you would like to request an IEEE Senior Member Kit, please send an email to the following address: application.request@ieee.org or visit <http://www.ieee.org/organizations/rab/md/smelev.htm>.

Dr. John Vig, Division IX IEEE Director, reports that at the June 2003 Board Meeting the IEEE Board of Directors passed a motion allowing IEEE members to use their member grade followed by IEEE "in their signature blocks, and on business cards, letterheads, and such", for example, FIEEE designating Fellow in IEEE or SMIEEE designating Senior member in IEEE.

Consider honoring a worthy candidate for a society award or membership upgrade through the nomination

processes available. Note that the Fellow nominations must be received at IEEE headquarters by March 15 of each calendar year and on-line forms are available. It is not too early to get started.

Fred S. Hickernell

UFFC Achievement Award

The Achievement Award is the highest Society-wide award presented to a member in special recognition of outstanding contributions. Selection criteria include significant technical publications in the field of ultrasonics, ferroelectrics, or frequency control, as well as contributions to these technical fields, and service to the Society. The winner is selected by the Officers and the Awards Committee from nominations submitted by the general membership. The award consists of an honorarium of \$2,000, a plaque, and a certificate. Presentation is usually at one of the Society's major symposia. The first award was presented in 1980.

2002 UFFC Achievement Award Recipient



Jack Kusters (center) receiving the 2002 UFFC Achievement Award from John Vig (l) and Ahmad Safari

Dr. John A. Kusters (S'61–M'63–SM'88) is the 23rd recipient of the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society Achievement Award. The award was presented at the 2003 International Frequency Control Symposium and PDA exhibition jointly with the 17th European Frequency Time Forum in Tampa, Florida, in May 2003. Dr. John Vig, former president of the UFFC Society, presented the introductory remarks. Dr. Kusters citation reads: "For his valuable and numerous contributions to the understanding and deep insight into the working mechanisms of frequency control devices and his productive work on many Frequency Control and IEEE committees."

Jack A. Kusters was originally employed at Hewlett Packard in 1965 as a Stanford graduate student working on the development of HP's .rst cesium beam tube. He later became a part of the physical acoustics section of Advanced R&D Physics, concentrating on development of sensors based on crystal physics. Out of this group came the quartz temperature sensor, the quartz pressure transducer, the Acoustically Tuned Optical Filter, SAW etched-rector res-

onators and the SC-cut crystal. During this period, AR&D Physics became one of the founding laboratories of the Hewlett-Packard Laboratories.

His major achievement was the development of the SC-cut. In 1977, Jack transferred to HP's Santa Clara Division (SCD) to introduce the SC-cut into production. He worked as a project leader, and later section manager, of the Device Physics Group, responsible for the quartz crystal development and the physics of the HP10811 quartz oscillator family and the HP10816 rubidium oscillator.

In 1986, he left HP to become Vice President, California Operations, of the Efratom Division of the Ball Corporation. He had the responsibility for the development of a new quartz crystal facility, a new family of quartz oscillators, and introduction of a new family of low-cost rubidium oscillators. He was also responsible for Human Resources, Purchasing, and the physical facility.

He returned to Hewlett-Packard Santa Clara in 1989 to become the project manager for the development and introduction of the HP5071A Primary Frequency Standard. The new cesium standard was successfully introduced in December 1991, and was awarded the R&D 100 Award for 1992. From 1993 through 1998, he was the Principal Scientist for the Santa Clara Division. After the separation of Hewlett-Packard and Agilent Technologies, he became the Business Manager for the Precise Time and Frequency product line of Agilent Technologies, Inc. He retired from Agilent on November 1, 2002.

Since 1965, Dr. Kusters has received 27 US and foreign patents, and published about 100 papers in the disciplines of crystal physics, acousto-optic interactions, and cesium beam tubes. As Co-author he contributed to famous books such as: Bechmann & Ballato, ed., Precision Frequency Control, Academic Press, 1985, C. Coombs, ed., Electronic Instrument Handbook, McGraw-Hill, 1995, C. Coombs, ed., Electronic Instrument Handbook, McGraw-Hill, 1999.

Jack is a member of the Ultrasonics, Ferroelectrics, and Frequency Control Society and Vice President for Frequency Control. In the latter position he was responsible for the continuing management of the IEEE International Frequency Control Symposium and PDA Exhibition until his retirement in 2002.

Among several other honors Dr. Kusters was recipient of the IEEE Walter Guyton Cady award in 1985 for the development of the SC-cut crystal and, recipient of the IEEE C.B. Sawyer award in 1987 for contributions in engineering, technology development, and management relating to quartz crystals and devices. Furthermore, he received the EIA David P. Larsen award in 1997 for dedication and contributions to the quartz crystal industry as well as the EIA Juergen Staudte Memorial Award in 1999 for outstanding leadership, dedication, and contributions to the industry.

Achievement Award Nominations

Nominations may be submitted at any time. Any member may submit a nomination by sending the nominee's name and a description of that person's main contributions, along with the submitter's own name and address to:

Prof. Dr. -Ing. Reinhard Lerch
Chair, UFFC-S Awards Committee
Friedrich-Alexander-University Erlangen-Nuremberg
Department of Sensor Technology
Paul-Gordan-Str. 3/5
91052 Erlangen
Germany
Fon: +49 9131 85 23131
Fax: +49 9131 85 23133
e-Mail: reinhard.lerch@lse.e-technik.uni-erlangen.de

UFFC Distinguished Lecturer Award

The Distinguished Lecturer represents the UFFC Society by giving lectures worldwide to the larger technical community. The subject of the lecture must be of current interest and the lecturer must be a prominent contributor in the field of the lecture. The speaker is selected for speaking style, prominence in the topic, and willingness to commit significant time and energy to preparation, travel and lectures. The Lecturer is selected by the Distinguished Lecturer Subcommittee of the UFFC-S Awards Committee from nominations received from the general membership. Presentation is usually at one of the Society's major symposia.

The award consists of a certificate, and reimbursement for an international lecture tour, which consists of roughly 30 or more lectures during an 18 month period.

You are encouraged to invite the Distinguished Lecturer to your Chapter or institution.

2002 - 2003 Distinguished Lecturer



Dr. K. Kirk Shung
2002-2003 UFFC
Distinguished
Lecturer

Dr. K. Kirk Shung
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Ultrasound: an unexplored tool for blood flow visualization and hemodynamic measurements

Ultrasonic scattering by blood has been studied both theoretically and experimentally for many years for the purpose of a better characterization of the performance of ultrasonic Doppler flow and imaging devices. In the course of these investigations it became clear that ultrasonic scattering from blood or echogenicity of blood is critically related to the hematological and hemodynamic properties of blood. It can be affected by hematocrit, plasma protein concentration, flow rate and flow cycle duration, to name just a few parameters. The experimental efforts have been paralleled by theoretical developments that successfully predict many experimental observations.

An unexpected conclusion from this work is that ultrasound appears to be a totally unexplored and ignored tool for

blood flow visualization and hemodynamic measurements. Two unique hemodynamic phenomena that have never been reported in the hemodynamic literature have been observed: the black hole, a low echogenic zone in the center stream of whole blood flowing in a blood vessel under steady flow and the collapsing ring, an echogenic ring appearing near the periphery of a vessel at the beginning of a flow cycle, converging toward the center, and eventually collapsing during pulsatile flow. They are believed to be resulted from the spatial and temporal variations of the shear rate in the blood stream. With the recent technical advances including standard B-mode, color Doppler, power Doppler, and B-flow imaging, clinical reports of observing similar phenomena in vivo on human patients begin to appear. These are exciting evidences to showcase the viability and effectiveness of ultrasound as a tool for blood flow visualization and quantitative measurements of hemodynamic parameters. Ultrasound is much superior than current technologies such as optical tracing of fluorescent particles in that it can penetrate light opaque structures. However, it must be realized that much effort for advocating the merits of ultrasound is needed before it will be recognized and accepted by the hemodynamics community.

In this talk, a historic discussion of these developments, results from recent studies, and a perspective of the future will be given.

Feel Free to contact Dr. Shung to schedule a visit to your area.

Dr. Shung reports



(l-r) Mrs. de Jong, Dr. Ton van der Steen, Nikki de Jong, Dr. Shung, and Dr. Nico de Jong

Three lectures were given in April, one at University of Illinois at Urbana hosted by Prof. W.D. O'Brien, Jr., one at Marquette University hosted by Prof. Shrinivas G. Joshi of Department of Electrical and Computer Engineering, and one at Arizona State University in Tempe hosted by Dr. David Penunuri of Motorola. At the stop at Urbana-Champaign, I had a memorable dinner with Bill and his colleague Dr. Mike Oelze and their lovely wives. At ASU, I was able to meet Drs. Ben Kim of Electrical Engineering and Bruce Tow of Bioengineering and Dr. Fred Hickernell, a long time member and past president of the Society.

Two lectures were given in the Netherlands in May at the invitation of Dr. Ton van der Steen of Erasmus University at Rotterdam. After the "hard" work of giving a lecture, I was treated one afternoon with a harbor cruise accompanied by Ton, Dr. Nico de Jong and his beautiful wife and lovely daughter, Nikki.

In June, a lecture was given at University of Montreal hosted by Dr. Guy Cloutier, Professor of Radiology. Dr. Cloutier has an impressive laboratory and an impressive group of students and postdocs. Guy was gracious enough to invite my wife and me to his house for dinner in the suburb of Montreal. Dr. Louise Cloutier, Guy's significant other half, prepared a magnificent four course dinner.

2003 – 2004 Distinguished Lecturer



Dr. Steven R. Jefferts
National Institute of Standards & Technology
NIST - Time and Frequency
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Dr. Steve Jefferts
2003-2004 UFFC
Distinguished
Lecturer

Atomic Clocks: Past, Present and Future

Atomic Clocks have become ubiquitous in modern electronic systems. Modern navigation systems, such as the global positioning system (GPS), and wide-bandwidth communication systems are examples of two systems which cannot exist without the long-term frequency-stability offered by atomic clocks. Commercially available atomic clocks range from Rubidium based oscillators, which cost around \$1000 with thousands of units per year produced, to Hydrogen masers costing \$250,000 with a yearly production of a handful. Finally laboratory based atomic clocks using sophisticated laser-cooling techniques have been built in a few laboratories around the world. These premier atomic clocks offer fractional frequency accuracy at the 10-15 level, equivalent to one second in 31 million years.

Laser-cooled atomic clocks are also being developed for flight aboard the International Space Station (eg. the NIST/NASA/JPL PARCS and the ESA/ACES projects) where they promise to deliver frequency accuracy of $df/f=5_{-10-17}$. Even more exotic atomic clocks are being developed in laboratories with potential accuracies at the 10-18 level.

The underlying physical principles which govern all of these clocks will be illustrated. The basic structure of many of these atomic oscillators will be presented along with some discussion of the trade-offs inherent in all of these designs.

In particular, the laser-cooled primary frequency standards such as NIST-F1 and PTB CS-F1 will be the subject of detailed examination. An examination of this type of frequency standard will require a short discussion of laser-cooling. The laser-cooling process used in NIST-F1 allows the temperature of the cesium (caesium) atoms used in the clock to be lowered from room temperature (300K) to 1 mK: a reduction of the thermal energy of almost 9 orders of magnitude! These very low energy cesium atoms obtained through laser-cooling are crucial to the operation of a frequency standard with an accuracy equal to or better than the 10-15 level. The relatively detailed description of NIST-F1, along with the previous presentation of the more traditional atomic clocks, will allow a discussion of the PARCS and ACES atomic clocks scheduled to be flown aboard the ISS in 2005.

Finally, the current state of the art of new standards based on optical transitions will be presented. These optical standards based on transitions with frequencies on the order of 10¹⁵ Hz as opposed to the 10¹⁰ Hz hyperfine transition frequencies typical of existing atomic clocks, are being actively developed in many standards laboratories around the world. They are quickly approaching the accuracy of the very best hyperfine transition atomic clocks and the future promise of the optical clocks is bright.

Steve Jefferts, a native of Seattle, WA, received his BS. in Physics from the University of Washington and his PhD in Atomic Physics/Precision Metrology from JILA/University of Colorado in 1992. He then moved to NIST as an NRC post-doctoral fellow in the Time and Frequency division working on trapped ions for quantum computation devices. In 1994 he joined the Time and Frequency division as a staff scientist where he has worked on primary frequency standards and time transfer. Dr Jefferts' group designed and operates NIST-F1 (the U.S. Primary Frequency Standard) and is currently designing the next generation of terrestrial laser-cooled primary frequency standards for NIST. Dr Jefferts is also a member of the PARCS (Primary Reference Clock in Space) cesium clock project to be flown aboard the International Space Station in 2005. PARCS is a joint NIST, University of Colorado, Jet Propulsion Labs and NASA project.

Please contact Steve Jefferts to schedule a visit to your area during the period from July 2003 – December 2004.

2004 – 2005 Distinguished Lecturer

Dr. Nava Setter
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Down Scaling in Piezoelectrics and Pyroelectrics: Microdevices, Nanofabrication, Nanoscale Features and Size Effects

Piezo- and pyroelectrics materials in the form of thin and thick films are finding new applications in various fast grow-

ing fields such as mobile communications and MEMS. The number of applications that could benefit from availability and implementation of these films is likely to grow.

Size reduction of ferroelectric-based micro-components, both in thickness and lateral dimensions, is required for future applications. This can be achieved by a reductive approach of etching of the sintered continuous layers, or by an additive approach in which a treatment of the substrate results in the creation of patterned structures prior to the annealing step. Novel local techniques, e.g., piezoelectric force microscopy, allow the analysis of properties in such small components.

Various microdevices will be described, issues in fabrication technology will be discussed, and data and interpretation of local measurements will be reviewed. In light of these results, size effects in ferroelectrics and their significance in emerging applications will be discussed.

Nava Setter received B.Sc. and M.Sc. degrees in Civil Engineering from the Technion – Israel Institute of Technology and Ph.D. degree in Solid State Science from the Pennsylvania State University in 1980. She has worked in the area of ferroelectric ceramics and single crystals, microwave dielectric and ferrites at the Pennsylvania State University, USA, at the University of Geneva, Switzerland, and R&D laboratories, Israel. Since 1989 she is heading the Ceramics Laboratory of the Swiss Federal Institute of Technology at Lausanne (EPFL), a professor in Materials Science and Engineering, and an affiliated professor in

Microtechnology Engineering at the EPFL. She was nominated a member of the Swiss Academy of Technical Sciences in 1995. Her scientific interests are in piezoelectric and related bulk ceramics/crystals and ceramic thin and thick films for sensors, actuators, and capacitors. She has authored and co-authored over 200 scientific papers in this area. She was the General Chair for the 1998 ISAF meeting in Montreux.

Please contact Nava Setter to schedule a visit to your area during the period from July 2004 – December 2005.

Nominations for Distinguished Lecturer Award

Nominations may be submitted at any time. Any member may submit a nomination by sending the nominee's name and a description of that person's main contributions, along with the submitter's own name and address. Members are also encouraged to suggest topics which they feel would be of interest. Send nominations and topics to:

Bernhard R. Tittmann – Awards Vice-Chair
Chair, UFFC-S Distinguished Lecturer Subcommittee
Schell Professor
Engineering Science & Engineering
212 Earth & Engineering Science Bldg.
The Pennsylvania State University
University Park PA 16802 USA
brt4@psu.edu
Bernhard.tittmann@ieee.org

UFFC Fellows

Brief History of IEEE Fellow Program

The grade of Fellow first appeared in the AIEE constitution of 1912. In that year, the AIEE revised its membership structure and established the grade of Fellow for those engineers who had demonstrated outstanding proficiency and had achieved distinction in their profession. Potential Fellows had to be at least thirty-two years of age, with a minimum of ten years experience. When the IRE established its Fellow grade in 1914, the requirements were clearly modeled on those of the AIEE. Much of the wording in the relevant sections of the IRE constitution is identical to the corresponding wording in the AIEE constitution.

For the first several years after the establishment of the Fellow grade, both the AIEE and the IRE allowed Members to make direct application for transfer to Fellow. In both cases, applications had to be accompanied by references from five existing Fellows, and required the approval of the Board of Directors. In 1939, the IRE modified its procedure to make admission or transfer to the Fellow grade possible only by direct invitation of the Board of Directors, a policy it maintained until the merger in 1963. In 1938, the AIEE modified its constitution to pro-

vide that 'Applications to the grade of Fellow shall result only from a proposal of five Members or Fellows.' In 1951, the AIEE prohibited applications for Fellow grade altogether, and adopted a policy of direct invitation similar to that of the IRE.

As noted above, numerous electrical engineers were members of both the AIEE and the IRE, and many of these became Fellows of both organizations. When the two institutes merged in 1963, all AIEE and IRE Fellows automatically became Fellows of the IEEE. In 1942, the IRE had begun to issue citations to new Fellows, briefly describing their accomplishments. The AIEE followed suit in 1952, and the IEEE continued the practice after the merger.

Since 1963, the IEEE Grade of Fellow has been conferred by the Board of Directors upon a person with an extraordinary record of accomplishments in any of the IEEE fields of interest. A brief citation is issued to new Fellows describing their accomplishments and the total number selected in any one year does not exceed one-tenth percent of the total voting Institute membership.

UFFC Fellows

The UFFC Society has enjoyed an unusually high number of members who have become IEEE Fellows thanks to the UFFC Fellow Committee under the leadership of Richard M. White, University of California, Berkeley. For a complete listing of UFFC fellows see <http://www.ieee-uffc.org/about/fellows.html>.

2003 IEEE Fellow Awards



(l – r) Tom Parker, John Kosinski, Bill Riley, and Ahmad Safari

Two IEEE Fellow Awards were presented at the Joint Meeting of the 2003 IEEE International Frequency Control Symposium and PDA exhibition and the 17th European Frequency and Time Forum which was held in Tampa Florida 4 – 8 May 2003.

The IEEE Fellow Awards were presented to Dr. John August Kosinski and Mr. William Jefferson Riley, Jr. by UFFC Society President, Ahmad Safari, and the Frequency Control Committee Awards Chair, Tom Parker.

Congratulations to the newly elected UFFC IEEE Fellows:

Dr. John August Kosinski, 2003, "for contributions to piezoelectric substrate materials and resonators."

Mr. William Jefferson Riley, Jr., 2003, "for contributions to high performance rubidium gas cell frequency standards and stability analysis"

Fellow Nominations

Now is the time to begin thinking about nominees for 2005 election. Nominations are due in early spring. Nomination kits for IEEE Fellow may be obtained at <http://www.ieee.org/about/awards/fellows/request.htm>. Fellow nominations may be made via the web now.

Standards

Standards Activities Report



Art Ballato

The IEEE UFFC Standards Committee is looking for proactive volunteers to populate a number of its subcommittees. Subcommittees are responsible for formulating standards in the various technical areas of interest to the UFFC Society. If you wish to volunteer, please contact Art Ballato a.ballato@IEEE.org.

Status Report

The following is a status report on the UFFC standards activities presented to the UFFC AdCom 4 May 2003:

Our society is currently responsible for eleven items: eight standards, one project, and two "start-ups."

1. Ferroelectrics – S. Trolier-McKinstry (180-1986)
The next ferroelectrics standard committee meeting will be summer 2003. The plan is for this to be the last meeting before the standard is submitted for external review.
2. Losses in Electromechanical Materials – S. Sherrit
Work has been progressing on the first draft of the pro-

posed standard "Standards on Characterization of Losses in Electromechanical Materials." The committee is preparing the standard using the internet and will meet next in 2003 at one of the IEEE-UFFC-sponsored symposia.

3. Time and Frequency – E. Ferrè-Pikal (1139-1988 and 1193-1994; J. R. Vig SCC-27 liaison)

The SCC27 has been working on updating IEEE std 1193 (Guide for Measurement of Environmental Sensitivities of Standard Frequency Generators). The draft went through balloting and was approved. We plan to submit the draft for IEEE approval in the next month.

4. Surface Acoustic Wave Devices – P. Dufilie (1037-1992)

A committee website is now operational at <http://pages.cthome.net/saw.standards/>. Proposed additions to the standard definitions are posted thereat.

5. Piezoelectric Crystals – B. K. Sinha (176-1987 and 177-1966)

We are actively soliciting members for the revision of the Piezoelectricity Standard (176-1987). We plan to (a) initiate writing a chapter on nonlinear properties of piezoelectric crystals; (b) enhance existing write-ups on lateral field resonators; and (c) initiate writing a chapter on characterizing losses in piezoelectric crystals.

6. Sensors, Actuators, & Transducers – F. J. Josse (P1182) Subcommittee is in process of formation.
7. Piezomagnetic Technology – R. W. Schwartz (319-1990) Subcommittee is in process of formation.
8. Ultrasonic ID Tags – C. S. Hartmann; L. T. Claiborne Subcommittee is in process of formation.
9. Ultrasonics in Medicine – (790-1989)

Currently inactive. [REVCOM administratively withdrew Standard 790-1989 (R1996) "Guide for Medical Ultrasound Field Parameter Measurements" in December 2001.]

Arthur Ballato
Chair, UFFC Standards Activities

Publications

Publications Committee



The Publications Committee is charged with establishing long-range publications policies in accordance with the plans of the Society, monitor and analyze the current publications of the Society, and to make appropriate recommendations on quality, costs, and schedules of the publications. The Publications Committee chaired by the Vice-President for Publications makes

publication recommendations to the AdCom for discussion and approval.

The members of the Publications Committee include the Vice Chair, the Editor-in-Chief and Associate Editor-in-Chief of the UFFC Transactions, the Editor of the Newsletter, the Web Editor-in-Chief, the UFFC representatives to the IEEE Sensors Journal, Journal of Lightwave Technology, Transactions on Medical Imaging, Transactions on Applied Superconductivity, and the Editors of the Proceedings of the IEEE International Ultrasonics Symposium, Proceedings of the IEEE International Symposium on the Applications of Ferroelectrics, and Proceedings of the IEEE International Frequency Control Symposium. The UFFC Finance Chair is also a member of this committee.

UFFC Transactions

Multimedia Manuscripts

On August 1, 2003, the IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (TUFFC) started to accept submission of multimedia manuscripts via its Manuscript Central website: <http://tuffc-ieee.manuscriptcentral.com>. Detailed information for preparation and submission of multimedia manuscripts is in the "Information for Contributors". An example of PDF multimedia file is at: <http://www.ieee-uffc.org/tr/mexample.pdf>. The multimedia content (color pictures, sound, movies, or animations) can be accessed by clicking on appropriate multimedia icons within the PDF file.

If you don't have a fast internet connection, or you want to avoid difficulties due to complicated layers of internet

security settings, you may download the following zip-compressed file to your computer for a smooth playback of multimedia contents. After unzipping the file, a folder (directory) "mexample" that contains all relevant multimedia files is produced. In this folder, please open the file, mexample.pdf, and then click on the icons in the file for your multimedia experiences. The zip-compressed multimedia example is downloadable from: <http://www.ieee-uffc.org/tr/mexample.zip>. For your convenience, multimedia icons (zip compressed) for production of TUFFC are also available for your use. The file is downloadable from: http://www.ieee-uffc.org/tr/mexample_icons.zip.

Manuscript Central

It has been about a year since the introduction of Manuscript Central. Between June 2002 and May 2003, 278 manuscripts have been submitted. The acceptance rate for the manuscripts is 73%. The vast majority of papers have been from the Ultrasonics community (85%) with only 8% from Frequency Control and 7% from Ferroelectrics. 30% of all the submitted manuscripts are in medical ultrasound.

Timeliness Statistics

The current average time from submission to publication is slightly less than eight months. This is a vast improvement from the over two years that we were experiencing a few years ago. The two major contributing factors for this improvement are the use of Manuscript Central and the move from six to 12 issues per year. We are working to reach a goal of four months from submission to publication. A little more than half of the current eight months is time spent in the review process and the other half is time in the production process. The production staff has committed to reducing the production time to 55 days. To meet the goal of four months from submission to publication will require continued timelines of Associate Editors, reviewers and the authors themselves.

We currently have 45 associate editors and 827 potential reviewers. If you would like to be an associate editor or a reviewer, contact the Editor-in-Chief, Jian-yu Lu (jilu@eng.utoledo.edu).

Future Work

Manuscript Central will continue to be used to identify bottlenecks in the peer-review process. The production process is continually being streamlined.

Special issues are being developed including the 50th Anniversary of the society issue with Jack Kusters as the Special Grand Guest Editor, a special issue on Ultrasonic Transducers for High Temperature Applications with guest editors, Gordon Hayward and Alistair McNab, and a special issue on Coded Waveforms in Ultrasonic Imaging with guest editors Tom Thomas, and Richard Chiao and coordination by John Hassock. If you have other special issues you would like to see contact Jian-yu Lu.

Finally, work on introducing multimedia manuscripts, as described above, will be a focus for the next few months.

Jian-yu Lu
Editor-in-Chief
jilu@eng.utoledo.edu

Jack Kuster
Special Guest Editor
jkusters@ieee.org

Special 50th Anniversary Issue

CALL FOR PAPERS

Special 50th Anniversary Issue

Submission deadline: December 31, 2003

The Ultrasonics, Ferroelectrics and Frequency Control Society of the IEEE celebrates its 50th Anniversary in 2004. To commemorate 50 years of technical excellence, a special memorial edition of the IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control invites the submission of manuscripts devoted to the review of areas that fall within the scope of the UFFC.

Papers solicited may be either a historical review of an area, or provide a forecast of the future. Of interest to the Society are papers addressing the following areas.

- Medical Ultrasonics
- Sensors, NDE or industrial applications
- Physical Acoustics
- Surface Acoustic Waves
- Transducers and Transducer Materials
- Resonator Design and Materials
- Oscillators
- Atomic Standards and Measurements
- Resonant sensors
- Ferroelectrics

All contributions should be submitted to the IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, Manuscript Central at <http://tuffc-ieee.manuscriptcentral.com/>. When submitting, authors should select the Manuscript Type, "Special Issue Papers". In addition, enter the name of this special issue in the field "If the manuscript type is 'Special Issue',

please enter the name of the Special Issue". It is important that your manuscript is distinguished from a regular submission. In the first paragraph of "Comments to Editor-in-Chief", you should state that the submission is intended for the Special 50th Anniversary Issue. Instructions for preparation and submission of your manuscript may be found on the IEEE Transactions on UFFC website: <http://www.ieee-uffc.org/tr/contrib.pdf>

All manuscripts are subject to the normal peer-review process. The submission deadline is December 31, 2003 with an expected publication date of August 2004.

The guest editors will include Jack Kusters (Agilent Technologies, retired), Dr. Lute Maleki (Jet Propulsion Laboratories, California Institute of Technology), and others still to be designated from the Ferroelectrics and Ultrasonics Groups.

Special Issue on Ultrasonic Transducers for High Temperature Applications

CALL FOR PAPERS

Special Issue on Ultrasonic Transducers for High Temperature Applications

Submission deadline: November 30, 2003

Due to the nature of the materials involved in their construction, operation of ultrasonic transducers at elevated temperatures can be problematic. Temperature elevation may be introduced by the particular operating environment, such as in inspection of materials and structures, or in high power applications where the drive energy can cause temperature rises beyond the limitations of the constructional materials.

The requirement to operate at temperatures between 50 0C and 500 0C can be a problem for transducer design engineers, particularly with regard to piezoelectric composites, comprising active piezoelectric and passive viscoelastic materials. Although piezoelectric materials with high Curie temperatures are available, the differences in thermal expansion coefficients with other components in the transducer can lead to catastrophic failure. Moreover, changes in the device characteristics, induced by softening of passive components can lead to dramatic specification failures.

For temperatures in excess of 500 0C waveguide techniques can be used to separate the transduction element from the hot component. Alternatively novel transducer designs capable of operating at these temperatures can be implemented using laser, electromagnetic and piezoelectric transduction.

The IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control invites the submission of manu-

scripts on Ultrasonic Transducers for High Temperature Applications that fall within the scope of the UFFC Transactions. This Special Issue seeks contributions from authors who are engaged in any aspect of high temperature design. Contributions are sought in the following areas:

- New materials for high temperature operation
- High temperature transducers
- Modelling of thermal behaviour in high power transducer applications
- In-situ monitoring at elevated temperatures
- High temperature transducer materials and couplants
- Waveguide techniques in high temperature applications
- Ultrasonic array designs for use at high temperatures
- Ultrasonic systems for very high temperature operation (500-10000C)
- Other relevant topics

All contributions should be submitted to the IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, Manuscript Central at <http://tuffc-ieee.manuscriptcentral.com/>. When submitting, authors should select the Manuscript Type, "Special Issue Papers". In addition, enter the name of this special issue in the field "If the manuscript type is 'Special Issue', please enter the name of the Special Issue". It is important that your manuscript is distinguished from a regular submission. In the first paragraph of "Comments to Editor-in-Chief", you should state that the submission is intended for the Special Issue on Ultrasonic Transducers for High Temperature Applications. Instructions for preparation and submission of your manuscript may be found on the IEEE Transactions on UFFC website: <http://www.ieee-uffc.org/tr/contrib.pdf>

All manuscripts are subject to the normal peer-review process. The submission deadline is November 30, 2003 with an expected publication date of late 2004.

The guest editors will be Professor Gordon Hayward and Professor Alistair McNab

**The Center for Ultrasonic Engineering
The University of Strathclyde
204, George Street
Glasgow, G11 2W
UK
g.hayward@eee.strath.ac.uk**

Special Issue on Coded Waveforms in Ultrasonic Imaging

CALL FOR PAPERS

**Special Issue on Coded Waveforms in Ultrasonic Imaging
Submission deadline: December 31, 2003)**

The IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control invites the submission of manuscripts on Coded Waveforms in Ultrasonic Imaging that fall within the scope of the UFFC Transactions, including, but not limited to:

- Pseudo Random Binary Sequence (PRBS) based coding
- Chirp coding and other non-PRBS coding
- Coding in the context of non-linear, harmonic imaging
- Orthogonal coding for multiple simultaneous lines
- Coding for use with Synthetic Focusing Techniques
- Correlation and inverse filtering issues in the presence of low SNR, phase aberration and non-linearly generated signals
- Coded waveforms optimized for contrast agent imaging
- Coded waveforms for imaging in non-biomedical applications
- Implementation issues and limitations of coded waveforms (transducer / hardware constraints, dynamic receive focusing issues, etc.)
- Transducer designs optimized for coded waveforms
- Coded waveform techniques having their origin in other fields (RADAR, etc.)
- Mathematical analyses of coding techniques and their limitations

All contributions should be submitted to the IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, Manuscript Central at <http://tuffc-ieee.manuscriptcentral.com/>. When submitting, authors should select the Manuscript Type, "Special Issue Papers". In addition, enter the name of this special issue in the field "If the manuscript type is 'Special Issue', please enter the name of the Special Issue". It is important that your manuscript is distinguished from a regular submission. In the first paragraph of "Comments to Editor-in-Chief", you should state that the submission is intended for the Special Issue on Coded Waveforms in Ultrasonic Imaging. Instructions for preparation and submission of your manuscript may be found on the IEEE Transactions on UFFC website: <http://www.ieee-uffc.org/tr/contrib.pdf>

All manuscripts are subject to the normal peer-review process. The submission deadline is December 31, 2003 with an expected publication date of late 2004 or early 2005.

The guest editors will be Dr. Lewis Thomas (Siemens Medical Solutions) and Dr. Richard Chiao (General Electric Medical Systems). Dr. John Hossack (University of Virginia) is coordinating the Special Issue.

Questions may be sent to:

Dr. John Hossack hossack@virginia.edu

Dr. Lewis Thomas Tom.Thomas@siemens.com

Dr. Richard Chiao Richard.Chiao@amermsx.med.ge.com

History

This Day in History

8 July 1900

George Antheil was born in Trenton, New Jersey. He patented, together with the famous actress Hedy Lamarr, a frequency-hopping radio-control system. He died 12 February 1959 in New York City.

9 July 1894

Percy LeBaron Spencer, engineer and inventor of the microwave oven, was born on this day. He died in September of 1970.

14 July 1918

Happy Bastille Day and happy 85th birthday to Jay Wright Forrester, inventor of the random-access magnetic core memory, born in Anselmo, Nebraska.

19 July 1900

The first line of the Paris Metro subway opened in the first year of the 20th century. An engineering and architectural triumph, the Metro became one of the most important electric traction projects in the world.

21 July 1826

Today is the birthday of Mahlon Loomis, born in Oppenheim, New York. Loomis, a dentist with a practice in Washington, D.C. in 1868 invented a system for sending telegraphic messages without wires. Flying two kites several miles apart, Loomis used galvanometers to show how current flowed from the atmosphere to ground via the kite string (a copper wire). Grounding one of the kites affected the current flowing through the other, and so the system could be used to transmit Morse code by observing the movements of the galvanometer. He died on 13 October 1886, in Terra Alta, West Virginia.

28 July 1904

Pavel Alekseyevich Cherenkov was born in Novaya Chigla, Russia (15 July in the Russian calendar of the day). He was investigator and interpreter of what is now called the Cherenkov radiation, for which he was awarded the Nobel Prize for Physics in 1958, but he was also an engineer and designer of particle detectors. He died 6 January 1990 in Moscow.

13 August 1928

Seventy-five years ago, WRNY, a television station in Coytesville, New Jersey, became the first station to transmit a television image, a 1.5 square-inch picture of a woman's face viewed by 500 people. Interestingly, WRNY had been founded by Hugo Gernsback—considered by many the father of modern science fiction—whose early pulp magazines had predicted such devices.

22 August 1860

Paul Julius Gottlieb Nipkow was born on this day in Lauenburg, Germany. The scanning disk he patented in 1884 lay dormant for 40 years, until the development of electronic amplification and of a rapidly variable light source allowed John Logie Baird, Charles Jenkins, and others to invent television. While Nipkow died in Berlin two days after his 80th birthday, he lived to see some important applications of his invention.

28 August 1964

The first weather satellite able to transmit nighttime cloud photos was launched; before its failure the following month, it transmitted nearly 27,000 images of hurricanes and typhoons.

UFFC History Committee

In preparation for the 50th anniversary celebration of the UFFC we would like to contact all past presidents of the UFFC. If you have the contact information for any of our past presidents prior to and including 1981 please contact Fred Hickernell (f.hickernell@ieee.org).

Past Presidents of IEEE-UFFC Society

IRE Professional Group on Ultrasonics Engineering – 1954-1962

Amor L. Lane, 1954-1955

Morton D. Fagen, 1956

Cyril M. Harris, 1957-1958

John E. May, Jr., 1959-1960

Wilfred Roth, 1961

Allen H. Meitzler, 1962

IEEE Group on Sonics and Ultrasonics

J. J. G. McCue, 1963-1964

Thrygve R. Meeker, 1965-1966

John H. Rowen, 1967

Donald L. White, 1968

Erhard. K. Sittig, 1969 (deceased)

William. J. Spencer, 1970-1971
Lawrence W. Kessler, 1972-1973
Norman F. Foster, 1974
Alfred. J. Bahr, 1975
Lewis T. Claiborne, 1976-1977
John de Klerk, 1978-1979 (deceased)
George A. Alers, 1980
Tom W. Bristol, 1981
William D. O'Brien, Jr., 1982-1983

Herman van de Vaart, 1984

Ultrasonics, Ferroelectrics, and Frequency Control Society

Herman van de Vaart, 1985
Bruce McAvoy, 1986-1987
Gerald W. Farnell, 1988-1989
Jan Brown, 1990-1991
James F. Greenleaf, 1992-1993
Harry L. Salvo, Jr., 1994-1995
Donald Malocha, 1996-1997
John Vig, 1998-1999
Fred S. Hickernell, 2000-2001
Ahmad Safari, 2002-2003

Historical Bibliography and Anecdotes

The History Committee of the UFFC Society is developing a bibliography of historical articles on the society and its technology developments which have already appeared in the literature. Also we are soliciting short anecdotal stories and personal remembrances (serious, interesting, and funny) of people and places associated with our society and/or its technologies. We will collect these for later publication and website placement. If you have any please email them to f.hickernell@ieee.org. The bibliography information can be sent in the usual format of author, title, and journal/conference/newsletter information. The anecdotes in a story mode. Thanks.

History Committee Activities

The History Committee of the IEEE UFFC Society is looking for historical articles and information on the major tech-

nologies represented by our society, its members' contributions over the last half-century, and stories about the UFFC Society itself. We will be celebrating the fiftieth anniversary of the society in 2003 and 2004, particularly with the joint conference in Montreal in August 2004. There is a plan to have sessions of a historical nature in the Montreal 2004 Conference from the three different areas that the UFFC Society represents. Society members are encouraged to submit such papers and suggest potential speakers to the respective technical program committees. The History committee continues to collect information from the worldwide membership in the following areas:

1. Bibliographical information on articles already published in worldwide journals, conference proceedings, and newsletters representing the history of technology developments and the society itself.
2. Translations into English of historic papers that appeared in the journals of countries outside the English-speaking world.
3. Anecdotal stories and personal recollections of significant events (factual, invitational, informational, and humorous), which shaped the lives, and careers of our members. This could be just a paragraph or two of some memory you would like to tell about or a major article like the early recollections of the society by Allen Meitzler, the first installment, which appeared in the Fall 2002 Newsletter. We will hope to collect a large number of these for separate publication and/or posting on the website.
4. Promotion of historical sessions and plenary speakers at UFFC-Society sponsored conferences. Not only the Montreal Conference but future conferences as well.
5. A listing of the most significant milestones in the history of the societies' technology of the past century in its major areas of interest
6. Interviews with the pioneers in our technology field or in the IEEE UFFC Society. Interviews have already been published in the Fall Newsletter of 2001 and Spring 2002.
7. Promote the historical significance of the technology of the UFFC Society in the wider engineering, scientific, and educational communities.
8. Support the IEEE History Center with articles and artifacts.

Please send such information to Fred S. Hickernell, Email: f.hickernell@ieee.org or 5012 East Weldon, Phoenix, Arizona 85018-6141, Phone 602-840-1719

**Fred S. Hickernell
Chair, History Committee**

Personal Recollections of the Early History of the UFFC-S – Part 3

by
Allen H. Meitzler
IEEE Life Fellow

This is the third and last installment of a three part series by Dr. Allen H. Meitzler describing his recollections of the beginnings of the UFFC Society. Part 1 appeared in the September 2002 UFFC Newsletter. Part 2 appeared in the Spring 2003 UFFC Newsletter. The entire series may be viewed on the IEEE-UFFC website under History heading. We pick up here with Chapter 7.

7. Memories of Piezoelectric Standards Subcommittee Meetings

Around 1964, after my term of service as Chairman of the AdCom came to an end, I became involved in an activity that was going to consume a significant amount of my time for the next 14 years; that is, I agreed to become the Chair of the Piezoelectric Standards Sub-committee and take on the task of preparing a new standard on piezoelectricity. During the decades of the 1940's and early 1950's, there was a significant IRE activity in the area of the development of standards for piezoelectric materials and devices. After I joined Bell Telephone Laboratories in October 1955, my own research activities were very much involved with the characterization and application of piezoelectric ceramic materials used as transducers for ultrasonic delay lines and for acousto-optic devices. Chairing a committee on the development of piezoelectric standards seemed to me to be very much in accord with my own career interests.

One of my associates, and a close personal friend, in the early 1960's was Harry F. Tiersten. Harry was a theoretician in the area of mechanical wave motions and piezoelectric materials. It was Harry Tiersten, more than anyone else, who



Fig. 11. The author and H. F. Tiersten (on the right). This photograph was taken on the occasion of the IEEE UFFC-S Achievement Award presented to H. F. Tiersten, Nov. 1, 1993.

made me aware of the shortcomings in the existing IRE-IEEE standards on piezoelectric materials and devices and urged me to organize an effort to develop a new standard on piezoelectricity. He volunteered to put a substantial amount of his personal effort into the drafting of a new standard. With the assurance of Tiersten's participation and with the participation of several other colleagues at Bell Telephone Laboratories, I agreed to take on the task of serving as the Chairman.

The IRE-IEEE standards on piezoelectricity that were in force in the early 1960's were the creation of a number of people, mostly located at a few industrial laboratories. Among these people were men like Warren Mason, Walter Bond, Arthur Warner, Roger Sykes and Irving Fair at Bell Telephone Laboratories; Rudolph Bechman and Eduard Gerber at the U.S. Army Signal Corps Laboratory at Ft. Monmouth, NJ; and Hans Jaffe, Don Berlincourt and Hans Baerwald at the Clevite Research Laboratories in Cleveland, OH.

The main objective of the new work that the committee undertook starting around 1964 was a revision of IRE Standard 176, the IRE Standard on Piezoelectricity. Some of the generation who had worked on the standards in the '40's and '50's, particularly Roger Sykes and Eduard Gerber, were not sympathetic to the idea of embarking on the job of creating a new version of the standard on piezoelectricity. Probably, if Harry Tiersten and I had been in Roger Sykes' department at BTL, the revision would never have been undertaken. As it was, we were in an ultrasonic device department with John Rowen as the department head, and John Rowen was supportive of the undertaking. With the support and encouragement of Harry Tiersten and a few others, a PAR (Project Approval Request) was prepared, submitted to the main Standards Governing Board and approved. Among the participants at early meetings of the Piezoelectric Standards Committee, I can remember people like Harry Tiersten, Rudolph Bechman, Art Warner, and Don Berlincourt. Later, the activity was joined by other notable contributors including Jerry Coquin and Fred S. Welsh, III.

Since many of the participants in the meetings of the Piezoelectric Standards Sub-committee were located close to New York city, it was relatively easy to call meetings at times like the main IEEE Convention in March, at the Ultrasonics Symposium, and at other times. The headquarters location of the IEEE, particularly the headquarters location on East 57th St., was frequently the location for the meetings. I do remember that some of the meetings were occasions of ferocious debate between participants who had differing opinions. I always enjoyed these debates; for me, the meetings were more often than not tremendous learning experiences.

8. The 1981 IEEE Awards Ceremony in New York City

I owe the fact that I am presently a Fellow in the IEEE, in large part, to the persistence of my good friend Cecil Land. At one point during his tenure as Chairman of the Ferroelectrics Committee, Cecil noticed that I was not a Fellow of the IEEE. He said, "Al, give me the background

information and I'll take care of doing the work of preparing your nomination to the IEEE Fellow Membership Grade". I was thrilled at the idea of becoming an IEEE Fellow. However, securing the award for me turned out not to be as simple as Cecil had imagined. He submitted the nomination the first time and it was passed over. He submitted the paperwork a second time and the nomination was passed over again. After the second time, I said to Cecil, "Look Cecil, thanks for all your efforts, but you got better ways to spend your time. Let's just give up." "No-sir-ee, Al," he said, "You deserve to be a Fellow and we are not going to give up until you become one." The third time the nomination passed.

Early in 1981 there was a local IEEE Southeast Michigan Section meeting in 1981 where I actually received the Fellow Membership certificate. But there was also a national IEEE Awards Meeting that took place in New York City. Fellow award recipients were invited to participate in this meeting, which took place as part of the Awards ceremony associated with the International Convention. My wife, Joan, and I went to the ceremony. The man who was the President of the Society and officiating at the ceremony was Dick Denton, and old friend and acquaintance from the days when we served on the IEEE GSU-AdCom together. Another friend from my GSU associations was Art Ballato, who also was present and who received a Fellow award at the same time.

A memorable part of the award ceremony was the presence of the two inventors of the point-contact transistor, Walter Brattain and John Bardeen. They were made Honorary Life Members of the IEEE at this ceremony.

At the end of the ceremony Dick Damon came over to me and told me that there was going to be a special reception in honor of Bardeen and Brattain in a nearby hotel and he invited me to join the group. I was pleased to accept the invitation. At the reception I was introduced to Bardeen and Brattain¹ and took advantage of the opportunity to ask both of them to give me their autographs on some 3" x 5" cards that I was carrying in my pocket. They graciously did as I requested²

It is interesting to note that William Shockley was not a participant in the award ceremony and the reception after it. By 1981, Shockley had become such a controversial figure because of his views on the influence of race on intelligence, that he could not participate in a public gathering without drawing a group of protestors that would interfere with the order of any public meeting in which he participated.

9. Closing Comments and Philosophical Reflections

9.1. The Bell Telephone Laboratories Influence

When one looks back over the early history of the IEEE UFFC-S, it is clear that Bell Telephone Laboratories played a very large roll in supplying the talent and support needed to make the organization function and grow. It is also very clear that other people and organizations were involved and played important roles. Indeed, Amor Lane, the initial

organizer, was with the U.S. Navy. The University of Illinois and Columbia University provided key people and so did commercial companies like the Clevite Corporation, and the research laboratory of Zenith Radio Corporation. The Army Signal Corps laboratory at Fort Monmouth was another source of talented, supportive people. I freely acknowledge that my account of the early history of the IEEE UFFC-S is strongly influenced by the fact the many of the people who played key roles in the founding and development of the society were both close personal friends and close professional associates through the common connection of Bell Telephone Laboratories during the years from 1955 to 1972.

9.2. The Nature of the Present-Day (year 2000) UFFC-S AdCom

In January 1996, after I retired from Ford Motor Co., I ran for election to the AdCom and served from 1997 to 2000. The nature of the AdCom had changed completely in the years that had elapsed between when I resigned as Secretary-Treasurer in 1972 and when I rejoined the AdCom as an elected member in 1997. During the three years that I served on the AdCom, there was not a single member of the AdCom who was an employee of Lucent Technologies (formerly AT&T Bell Laboratories). The international nature of the AdCom was strongly evident in the presence of AdCom members from Europe and Asia.

During the early years from 1956 to 1972, AdCom meetings were bastions of male exclusivity. (Julia Herrick was a member of the AdCom during the first few years, but by the time I started to attend AdCom meetings in 1956, she was no longer present.) That has changed. The trend for women to be increasingly present in engineering was evident in the composition of the AdCom meetings from 1997 to 2000. After Julia Herrick, the next woman to be elected to the UFFC-S AdCom was Jan Brown; who was elected to the AdCom in 1984; she was elected Vice-President of the Society in 1988 and President in 1990. She has been a regular presence at AdCom meetings since she was first elected to serve in 1984 and has served both the UFFC-S and the IEEE national organization in various offices. Present day meetings of the AdCom usually have three of four women present serving either as elected members or ex-officio members.

Another aspect in which the present-day UFFC-S is notably different from GSU of the early days is that not a single committee meeting, AdCom, Symposium or any other kind of committee meeting, takes place in New York City. The people who are present at the AdCom meetings are people connected with universities, government research laboratories, industrial organizations, and consulting firms. The distribution seems to be fairly uniform, with no one dominant group the way in which Bell Telephone Laboratories employees dominated some of the early AdCom meetings. During the last AdCom meeting I attended as an elected member of the AdCom (held in the month of October 2000 and at the exotic location of San Juan, Puerto Rico), I looked around the room at 40 or so members sitting in the meeting. Not a single person at the

meeting was, at the time of the meeting, an employee of AT&T or its subsidiaries. There was one other person there who at one time was connected to AT&T as I was. That person was Tom Cutchen, who during 2000 and 2001 serves as the Chair of the Ferroelectrics Committee and who is employed by the Sandia Corporation. Sandia is now a government laboratory; but when I first met Tom back in the 60s, while I was an employee of Bell Telephone Laboratories, Sandia Laboratories was also a part of the Bell System.

9.3 Whose UFFC-S Is It, Anyway?

When I left graduate school as a freshly minted Ph.D. in Physics in the fall of 1955 and took a position of Member of Technical Staff with Bell Telephone Laboratories, I also joined within the next year several professional societies including the IRE, the American Institute of Physics (AIP), and the Acoustical Society of America (ASA). After I was at Bell Labs for a year or so, I noticed that not all of my contemporaries on the technical staff, who were young Ph.D.s in Physics, were active in the IRE. Broadly speaking, the young Ph.D.s could be divided into three groups. There were (1) those who were members of the AIP or Sigma Xi or other scientific societies but not the IRE, (2) those who belonged to the IRE and one or more scientific societies, and (3) those who did not belong to any professional societies at all. The members of the first group appeared to be individuals who did not want to compromise their status as "scientists" by being involved with an engineering society. The third group had a different set of reasons for not being in the IRE. Once I asked a friend of mine who was in the third group why he didn't join the IRE. "Why should I?" he replied. "Well", I said, "you can subscribe to the journals and get home delivery, you can attend meetings usually at a lower registration fee, and you can publish papers in the Institute's journals." "Yeah", he said, "But as a non-member, I can see the journals in the library, the company pays whatever the registration fee is when I go to a meeting, and the IRE journals are only too happy to accept whatever papers I submit, whether or not I am a member. So I get all the benefits without paying the dues." I must admit, at the time, I was taken aback by his arguments and had no good rebuttal to offer. Now, 45 years later, I think I could give him a good rebuttal. I firmly believe that the major rewards of membership lie in the association with other scientists and engineers, in the friendships that are made over the years, in the experiences shared, and in the stimulation that comes from interacting with some of the most intelligent, capable, and productive individuals in one's field of professional activity.

When I look back on my early association with the IRE, I think I was unusually fortunate to have opportunities that probably are not available to new members of the present-day IEEE UFFC-S. I joined the Bell Telephone Laboratories in an area of

professional activity where my closest professional associates and management supervisors were active in the IRE and supportive of its activities. Most of the important technical meetings and committee meetings were in New York City, only about 25 miles or an hour's commute from where I lived and worked in New Jersey. There was never any problem about getting the approval to attend a meeting. I don't think a similar situation exists for present-day, young engineers. Nowadays, the UFFC-S AdCom meetings and the major technical meetings take place in many different countries. Many of them are held in semi-resort or holiday locations, so that management is likely to regard the trip as a boondoggle, an expense that is hard to justify to higher management. For example, in my own case, it might be noted that during the 17 years that I was employed at Bell Telephone Laboratories, I never received approval to make a trip to Europe or to Asia. Approval for that kind of trip was reserved for those who were expected to move into management and develop into department heads or directors. It was very rare for a supervisor or ordinary engineer to attend a technical meeting in a foreign country (Canada was, of course, the notable exception to this rule.).

Over the years that I have known the organization, now called the IEEE UFFC-S, there have been a number of profound changes, both in the nature of the organization and in the nature of its meetings. What started as a group of ultrasonics engineers mostly located in states clustered around New York City has become a large, multi-national professional organization with a membership that includes professionals from many countries. The meetings have changed in a manner that reflects this geographical diversity. Instead of being concentrated in the U.S., they now occasionally take place in the US, but frequently are located in attractive locations outside the U.S. This practice has resulted in meetings that not only are well attended, but in addition, are financially successful, frequently producing budget surpluses in the tens of thousands of dollars. One result of this strategy is that the UFFC-S is financially strong with financial reserves around a million dollars. The strategy of holding meetings in expensive resort hotels in attractive locations produces a large attendance of senior engineers and management types. To some extent, the potential discrimination against student engineers is lessened by providing travel support for students and for engineers from "poorer" countries. But in spite of the good intentions of the AdCom, there are two groups that are disadvantaged. One group is the group of older, retired engineers who are interested and would like to attend but who find the high registration fees, the travel costs, and the living costs prohibitively expensive. The other group is the group of young engineers, recently hired into large companies or research organizations and without the seniority that enables them to qualify for travel support.

One thing that has disappointed me, as an older person attending present-day UFFC-S meetings, is that very few of the people I knew from the '60s and the '70s are present at

¹ Actually, I had met Walter Brattain once before, 24 years earlier. On April 22, 1954, Walter Brattain gave a talk on Semiconductor Physics to a meeting of the Physics Club of the Lehigh Valley. The talk was given in the evening in a lecture room of the Physics Building of Lehigh University. I was a graduate student at the time. I sat attentively through the talk and took four pages of notes in cramped handwriting. I still have among my prized possessions the four pages of notes that I took that evening.

² I took the two autographed cards home and carefully put them away in a file. Several years later, I looked for the cards and could not find them. I can't believe I threw them away, but I have not been able to find them, and I keep hoping that some day they will turn up.

these meetings. I hoped that I would be able to see these people and renew old friendships. Clearly, this hope was unrealistic. But the present-day Ultrasonics Symposiums, Frequency Control Symposiums, and Symposiums on Applications of Ferroelectricity are not intended to function as high-school or college class reunions, nor should they. The meeting strategy that has evolved satisfies successfully the primary mission of the society; that is to promote education and research in the fields of Ultrasonics, Ferroelectrics, and Frequency Control and to do this on a basis that allows the meetings to be self-supporting and ongoing. The Proceedings of the meetings and the IEEE Trans. UFFC provide media for the publication of research papers and the distribution of knowledge; the quality of the publications and the total number of papers published per year continue to increase as of the time of this writing.

9.4. Conclusion

I will close this history with an expression of my deep personal thanks to the IRE PGUE and the IEEE UFFC-S. The meetings, the associations, the camaraderie have provided me with friendships, memorable experiences, and opportunities for intellectual growth. The organization has all my good wishes for a prosperous continuation into the future of its basic missions to promote the profession of engineering, to educate, and to disseminate knowledge.

10. Acknowledgements

The author is pleased to acknowledge the helpful comments and corrections from several individuals including Arthur Ballato, John Vig, and Fred S. Hickernell. Fred Hickernell is the author of "From PGUE to G-SU to UFFC-S, 1953 to 1997: A Historical Perspective".³ The preparation of this history was aided immensely by the wealth of detailed information on the early days of the UFFC-S contained within the UFFC Digital Archive. The early PGUE and G-SU Newsletters, edited by John E. May, Jr. and others, are accessible through the UFFC Digital Archive. Another helpful source of information is the article that was published in 1984 entitled "Brief History of the Group on Sonics and Ultrasonics", written by Stephen Wanuga, John E. May, Jr., and Thrygve R. Meeker. This article was prepared to celebrate the centennial year (1884-1984) of the IEEE and the 30th year (1954-1984) of publication of the IEEE Transactions on Sonics and Ultrasonics⁴. Finally, Robert D. Colburn, Research Coordinator of the IEEE History Center, Rutgers University, was very helpful in supplying miscellaneous information and photographs of the IRE Headquarters, of the IEEE United Engineering Center, and Dr. Emberson.

Meet Allen H. Meitzler

Dr. Allen H. Meitzler was born Dec. 16, 1928 in Allentown, PA. He obtained a B.S. degree in Physics from



Allen H. Meitzler

Muhlenberg College in Allentown and M.S and Ph.D. degrees in Physics from Lehigh University in Bethlehem, PA. He joined Bell Telephone Laboratories (now called Lucent Technologies) in October 1955 and was there as a Member of the Technical Staff of Bell Telephone Laboratories until September 1972, when he joined the Research Laboratory of the Ford Motor Co. in Dearborn, MI.

He retired from Ford on January 1, 1996.

Over the course of his career in industrial research laboratories, Dr. Meitzler has had two main areas of interest, ultrasonic devices and ferroelectric materials and devices. He has a number of patents on ultrasonic delay lines and transducers and is the inventor of the shear-mode strip delay line. His interest in ferroelectric materials and devices developed during his years at Bell, working first with the piezoelectric behavior of BaTiO₃ single-crystal plates and then developing measuring techniques for high-frequency transducers made of a variety of different ferroelectric ceramic materials. Later he was the supervisor of a group working on the application of ferroelectric materials to electro-optic image storage and display devices. He was a co-inventor of the strain-biased, ferroelectric picture device, the first device using transparent PLZT ceramics that achieved a gray-scale, image-storage capability.

Over the years, Dr. Meitzler has had a strong interest in the development of standards for the Institute of Electrical and Electronics Engineers (IEEE). He chaired the Piezoelectric Standards Sub-committee over the 14-year period taken to develop IEEE Std 176-1987, "IEEE Standard on Piezoelectricity". He was active in the preparation of the IEEE Std 180-1986 and chaired the Ferroelectric Standards Sub-committee when the work on that standard was brought to completion. He continues to be active on both Sub-committees and, at present, is Vice-Chair of the Ferroelectric Standards Sub-committee working on the development of a revised version of IEEE Std 180.

Dr. Meitzler has served the UFFC-S in a variety of positions since joining the IRE (predecessor of the IEEE) in 1955. He was the Vice-Chair (1962) and Chair (1963) of the Professional Group on Ultrasonics Engineering (the PGUE was the predecessor of the UFFC-S) and served as Secretary-Treasurer from 1965 to 1970. From 1997 to 2000, he again served as an elected member of the UFFC-S Administrative Committee and, in addition, he served as an Associate Editor of the IEEE Transactions on UFFC. He is a Life Fellow of the IEEE and a Fellow of the Acoustical Society of America.

Since retiring from Ford, Dr. Meitzler has continued to be professionally active, engaging in a small consulting business and in teaching undergraduate electrical engineering courses at the University of Michigan – Dearborn as an Adjunct Professor.

³This document is available on the IEEE-UFFC website under the History heading.

⁴IEEE Transactions on Sonics and Ultrasonics, Vol SU-31, No. 6, November 1984, p. 536.

Around IEEE

Elections

While we all receive ballots from IEEE about this time of year, we seldom know the individuals who are running for office. One of the offices you will have the opportunity to vote for is TAB Vice President Elect. TAB – Technical Activities Board – is composed of the president from each of the 40 or so IEEE technical societies and councils, as well as, a number of committee chairs ranging from finance to publications. TAB is a large board charged with setting policy and overseeing activities for the societies. The Vice President of Technical Activities leads this body, as well as, represents it on the IEEE Board of Directors and the IEEE Executive Committee.

John Vig, who has worked tirelessly for the UFFC in many capacities for many years, will be running against Cecelia Desmond for the honor of being the TAB Vice President Elect in 2004 and serving as TAB Vice President in 2005. The following biographical information is being provided to better help you make a more informed decision.

John Vig



John Vig

Position Statement

The IEEE is a volunteer organization that does an excellent job in its technical operations, but is less successful in its business practices. With \$240M in revenues, and competitors who have much greater resources, the IEEE must become a well-run business and eliminate its recent financial deficits.

If elected, I shall work vigorously towards:

- increasing revenues from non-members so that dues and member subscription prices can remain affordable. Some societies produce large surpluses from their conferences, exhibits and non-member subscriptions. Others should too. (TAB produces most of IEEE's revenues.)
- expanding services to members outside the USA – who are approaching 40% of IEEE membership.
- improving our competitiveness. Commercial publishers start journals in new technologies faster than we do. They hire our editors, solicit papers at our conferences, and charge authors no page charges. We must respond to this competition.

To create focus in an area where commercial publishers were dominant, in 1998 I founded the Sensors Council. Today, the Council's IEEE Sensors Journal and the IEEE SENSORS conference are both successful examples of new

initiatives of the type IEEE should foster.

I ask that you allow me to continue to make a difference, as Technical Activities VP.

Biography

JOHN R. VIG (VP-elect, TAB)

Researcher and Program Manager

U.S. Army Communications-Electronics Command
Fort Monmouth, New Jersey, USA

John Vig was born in Hungary. He immigrated to the USA in 1957, received the B.S. degree from the City College of New York in 1964, and the Ph.D. in Physics from Rutgers - The State University, 1969. Since 1969 he has been employed as a researcher and program manager, working primarily on the experimental aspects of frequency control and sensor devices. He has published 100+ papers, nine book chapters, and has been awarded 54 patents. In addition to his IEEE honors, he received the Piezoelectric Devices "Man of the Year" Award from the Electronic Industries Association, Piezoelectric Devices Division, in 1997, and he was elected an Army Research Laboratory Fellow in 1993. In his home town, Colts Neck, NJ, he has served as an Environmental Commissioner, since 1973, is a trustee of the Friends of the Library, and he initiated, and is web-editor of the town's website. In his spare time he enjoys ballroom dancing and hiking.

IEEE Activities -- (M'72-S'84-F'89) COMMITTEES/BOARDS: **Board of Directors (Director, Div. IX)**, 2002-2003; BoD rep. on Investment Comm., 2002-03; Trust & Communications Working Group, 2003. **Technical Activities Board (TAB)**, 1998-03; Chair, Investment Advisory Ad Hoc Committee, 2003; Nominations & Appointments Comm., 2002-2003; Finance Committee, 2001; Electronic Products & Services Comm., 2002; Business Simplification Team, 2002-03; New Technology Directions Committee, 1998-02; Ad Hoc Committee on Globalization, 1999; Focus Group on Public Image of Engineers, 1999; Branding, 1999; New Financial Model, 1999; RAB Membership Development, 1999; Chair, Ad-hoc Comm. on Sensors, 1998-99. **Standards Coordinating Committee 27 on Time and Frequency**, Chair, 1995-99, Vice-chair, 2000-03

SOCIETIES/COUNCILS: Sensors Council: Main proponent, 1998-99; Founding President, 2000-01; VP, Conferences, 2002; Publicity Chair, 2001-03; Exhibits Chair, 2002-03; Associate Editor, Sensors Journal, 2003. **Ultrasonics, Ferroelectrics, and Frequency Control Society (UFFC-S):** President, 1998-99; Founding Web Editor in Chief, 1996-03; Nominating Committee, 1986-92;

Administrative Committee (elected twice), 1986-89, 1995-98; Publications Committee, 1997-03; Transactions on UFFC, Associate Editor, 2002-03; Guest Editor, 1987-88, 1998; Frequency Control Standing Committee, 1983-03; Standards Comm. Vice-chair, 1998-03; Time and Frequency Standards Subcommittee, Chair, 1988-99. **Instrumentation & Measurement:** Committee on Time and Frequency (TC-3) vice-chair, 1979-99; Chair, 1999-2001. **CONFERENCES:** Int'l Frequency Control Symposium, General Chair, 1983-88, 1996-97; Technical Program Committee (TPC), 1972-2003; TPC Chair, 2002; Editorial, Chair, 1989-03; Ultrasonics Symposium, Technical Program Committee, 1986-03; Sensors Council VP for Conferences, 2002; IEEE SENSORS 2003 TPC, 2003 and Publicity Chair; IEEE-NANO TPC 2001-02.

IEEE REPRESENTATIVE on Hoover Medal Board of Award, 1991-03.

UFFC-S AWARDS: Achievement Award, 2000; Cady Award, 1990; Distinguished Lecturer, 1992-93, Fellow, 1989

Celia Desmond



Celia Desmond

Position Statement

TAB, an organization of Society Presidents and Division Directors, creates the environment in which each Society can be particularly effective as possible at supporting the processes that develop and deliver the intellectual property that is the core of IEEE's reputation and mission.

Having served TAB as a previous President of a large and vibrant Society, a member of the IEEE

Board of Directors as President of IEEE Canada, a Division III Director, and as Chair of the IEEE Audit Committee, I understand and am committed to addressing our critical needs.

Today TAB needs a unifying, cooperative atmosphere to maintain the highest quality products and foster progressive member services. As VP TAB, I will apply my background in organizational culture to maintain and improve the professional, collegial atmosphere within TAB, and also amongst other IEEE operational units. I will build a culture of inter-working to strengthen the processes for sustaining, developing, and distributing TAB products and services.

Outside North America, IEEE membership is growing quickly, aided largely by Society efforts. I encourage a truly global culture, which will allow IEEE to expand our vision to identify and fulfill the needs of our members throughout the world.

I am committed to supporting IEEE's positive financial trend, and improving service to our members. TAB needs dedicated members to determine and create the most effective structure to meet the goals of this large, complex body. I offer you understanding of the organization, knowledge of the processes, experience with governance, energy, commit-

ment to TAB and IEEE, and vision for improved Society effectiveness.

Biography

CELIA L. DESMOND (VP-Elect, TAB)

President

World Class Telecommunications

Mississauga, Ontario, Canada

Celia Desmond is President of World Class - Telecommunications. Celia provides training in telecommunications engineering and management skills. With University of Toronto she created a Masters Program and a Certificate Program. At Stentor she developed and implemented service development and project governance processes. As Director - Industry Liaison, she was the Stentor external technical linkage. In Bell Canada, Celia provided strategic direction to corporate planners, ran technology and service trials, standardized equipment, performed traffic analysis, and provided technical support to large business clients. IEEE she is active in numerous TAB, RAB, IEEE and Society committees. Besides IEEE awards, she received the Engineering Institute of Canada John B. Sterling Medal in May 2000. Celia holds a M.Eng from Carleton University, a B. Sc. from Queens University, an Ontario Teaching Certificate and a Project Management Professional (PMP) certification. Celia has taught kindergarten, high school, and graduate courses at University of Toronto, Stevens Institute of Technology, and Ryerson.

IEEE Activities – (M'76-SM'93) OFFICES: Board of Directors, 2000-01; 1996-97; Region 7 Director, 2000-01; Division III Director, 1996-97. **COMMITTEES/BOARDS:** Audit Committee, 1997-99; 2000-02; Chair, 1998; Transnational Committee, 2000-01; Meetings & Services, 2000-02. **REGIONS:** Region 7: IEEE Canada, President, 2000-01. **SECTIONS:** Ottawa: Chair, 1986. **SOCIETIES:** Communications: President, 2002-03; Membership, Vice President, 1997-98; Meetings & Conferences, Director, 2000-01; Chapters, Director, 1996-97; Board of Governors, 1993-96; Engineering Management Chapter: Toronto Section, Chair, 1995; Ottawa Section, Chair, 1983-84. **CONFERENCES:** ICC, Organizing Chair, 1997; ICUPC, Organizing Chair, 1993. **REPRESENTATIVE:** Engineering Institute of Canada, 2000-01. **AWARDS:** Millennium Medal, 2000; Donald J. McLellan, 1991.

IEEE-USA

Rising Stars

Help Put a Face with a Name: 2004 IEEE EWeek "New Faces of Engineering"

Nominations Requested

WASHINGTON (29 July 2003) -- Young rising stars in the engineering profession will be featured prominently during National Engineers Week (EWeek) 2004, 22-28

February. The EWeek "New Faces of Engineering" program spotlights the vitality, diversity and contributions of the profession's youngest engineers. The IEEE and IEEE-USA are currently seeking nominations from among the Institute's worldwide membership.

Sponsored by more than 100 engineering, scientific and education societies, as well as major corporations dedicated to increasing public awareness and appreciation of engineering, National Engineers Week is celebrated annually by tens of thousands of engineers, engineering students, teachers and leaders in government and business. IEEE/IEEE-USA and Fluor Corporation of Aliso Viejo, Calif., are co-chairs of EWeek 2004.

"Participating and supporting National Engineers Week isn't just the right thing to do, it makes good business sense," said Joseph V. Lillie, chair of National Engineers Week 2004 and the IEEE's lead EWeek volunteer. According to Lillie, "Ensuring the vitality and prosperity of our profession is important to each of us, and it is incumbent on us to give back to our profession."

For the first time, since ASHRAE and the EWeek Committee launched "New Faces" in 2003, the IEEE and Fluor are seeking to expand the program to include engineers outside of the United States. The top candidates will participate in a Fluor-sponsored global e-mail and/or online question and answer discussion forum with engineering

undergraduates. Each IEEE regional director, IEEE section chair, and IEEE GOLD chair will have an opportunity to nominate one individual for this first-ever global EWeek engineering recognition program.

All IEEE nominees will be included on the IEEE and/or EWeek and IEEE-USA web sites. An article featuring the IEEE "New Faces" will appear in THE INSTITUTE and/or IEEE-USA NEWS & VIEWS.

Nominees must hold an engineering degree, be employed as an engineer from two to five years, and have been involved in projects that significantly affect public welfare or further professional development and growth. Candidates are also asked to list languages in which they are fluent.

IEEE nominations can be submitted through the regional directors, section and GOLD chairs, or independently, and should be directed to Kelly Cunningham at klcpr@bellatlantic.net. The deadline for all IEEE/IEEE-USA nominations is Friday, 5 September 2003.

Through the selection of an ad hoc "New Faces" volunteer committee, the IEEE will submit five outstanding nominations to the National Engineers Week "New Faces" program. The top individual from each engineering society will be featured in USA TODAY during National Engineers Week. For a "New Faces" nomination form, or for more information about National Engineers Week, go to <http://www.ieeeusa.org/eweek/> or www.eweek.org.

Editor's Comments



New Look

The look of the newsletter has been evolving during the past two years to update the format and to make it easier and more enjoyable to read. Special thanks are due to Andrea Watson (IEEE magazine and newsletter staff) for starting the process and to Paul Doto (Andrea's replacement) for the dramatic changes you see in this issue. Please let us know what you like and what you would like to see improved or added. (jan.brown@ieee.org)

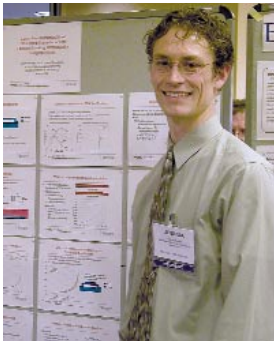
Opportunity to Volunteer

In this issue you will notice that a number of articles and reports are asking for volunteers. There are over 392 volunteer positions in the Society plus the roughly 827 potential reviewers of the Transactions registered with Manuscript Central. Given that our Society has a little over 2300 members, this means that roughly 53% of our membership is serving in some volunteer capacity. It is the efforts of all the

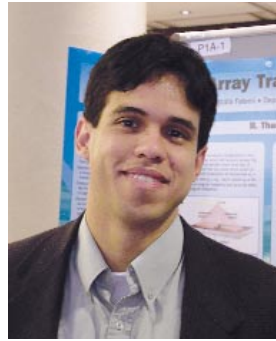
volunteers that keep our society technically strong and vibrant. There are more opportunities to serve. There are vacant positions on the various committees of AdCom and especially Standards. Please let any Society officer know of your desire to serve. In the next issue of the newsletter we will present a focus on our Standards Activities and the people who are working on the standards.

50th Anniversary

May 6, 2003 marked the 50th anniversary of the Society. The celebration of this milestone will take place at the Joint Conference of all three of our technical communities in Montreal on 23 – 27 August 2004. Fred Hickernell, on behalf of the UFFC History Committee, is asking you for short anecdotal stories and personal remembrances (serious, interesting, or funny) of people and places associated with our society and/or its technologies. Now is your opportunity to contribute to the historical archive of UFFC. Please take this opportunity to answer Fred's solicitation for contributions. We would also like to have a pictorial history exhibit at the Joint Symposium. If you have any photographs you have taken at the various society events, please contact Jan Brown (jan.brown@ieee.org)



Joshua G. Knight,
Georgia Institute of
Technology



Glauber T. Silva,
Mayo Clinic and
Foundation

photos. The following students have been identified.

Thank you

Thank all of you who sent articles and photos in for this issue. The photos capture what words cannot and provide a way for us to see each other. Thanks to the photographers and photo contributors of this issue Fred Hickernell, Mike Garvey, Sorah Rhee, John Vig, Steve Jefferts, Kirk Shung, Ewald Benes, Ken-ya Hashimoto, Jan Brown, and Al Meitzler. Special appreciation to Paul Doto and his colleagues at IEEE headquarters for the production work and for their patience as we diligently missed deadlines.

Please continue to send me (jan.brown@ieee.org) information and photos as events occur so that we may post them on the Web and include them in the Fall Newsletter.

Jan Brown
UFFC-S Newsletter Editor

Student Photos

In the Spring UFFC Newsletter, we published photos of all the student finalists in the Student Paper Contest at the Munich Ultrasonics Symposium. Your editor misplaced the list of the names of the students. We asked that the students identify themselves for us so we could properly put the names with the

Future UFFC Symposia

2004 IEEE International Ultrasonics, Ferroelectrics, and Frequency Control 50th Anniversary Joint Conference 24-27 August, 2004, Montréal, Canada



**Dr. R. Michael
Garvey**

An invitation from the General Chair Dr. R. Michael Garvey

It is my great pleasure to announce the 50th anniversary of the IEEE-UFFC society. In recognition of this occasion, we will convene a Joint Conference of Ultrasonics, Ferroelectrics and Frequency Control. The Joint Conference will be held in the historic city of Montréal, at the Palais de Congrès, August 23-27, 2004.

As Canada's second largest city, the island of Montréal has a history which goes back to its origins in the North American fur trade of the 17th century. Today, Montréal offers unparalleled hospitality in its restaurants and sidewalk cafes, in its entertainment and in its galleries and museums.

The Joint Conference will offer every participant the unique opportunity to explore advanced science and up-to-date technology in the fields of Ultrasonics,

Frequency Control, and Ferroelectrics. The conference will begin, on Monday August 23, with short courses and tutorials in all three technical fields given by well-recognized experts. The technical program will include special sessions for Ultrasonics, Ferroelectrics and Frequency Control, and as well as joint sessions. The Technical Program Committee Chairs have a mission to integrate contributions from the three fields into a stimulating and interesting program.

Planned highlights include plenary talks encompassing all three technological areas, a gathering of UFFC past-presidents, an exhibition about the history of the UFFC Society and, of course, receptions and a banquet with music and dance.

Important Dates

Here are some important dates for the Joint Conference; mark your calendar now.

Deadline for abstract submission: February 24, 2004

Visit Your UFFC Web Site! <http://www.ieee-uffc.org>

Short Courses and Tutorials: August 23, 2004
Joint Conference: August 24-27, 2004

We are working on a web site for the Conference; please check the UFFC website <http://www.ieee-uffc.org/> for further details as we get closer to the Conference.

I look forward to seeing you in Montréal to take advantage of this stimulating Conference as well as the attractions of our host city.

Dr. R. Michael Garvey
General Chair Joint UFFC Conference

Symposia beyond 2004

Visit the UFFC website at www.ieee-uffc.org for specific details.

Ferroelectrics

2006 North Carolina, USA – General Chair to be determined

Frequency Control

2005 Vancouver, British Columbia, Canada – General Chair
Mike Driscoll

Ultrasonics

2005 Rotterdam, The Netherlands – General Chair Ton van der Steen

2006 Vancouver, British Columbia, Canada – General Chair
Stuart Foster

Ferroelectrics

The ferroelectric committee is in the process of planning for both the gala 2004 UFFC meeting, and the 2006 ISAF meeting, to be held in Raleigh, NC. Jon-Paul Maria will be the general chair of the 2006 meeting. We are currently considering holding this as a joint meeting between ISAF and ISIF (International Symposium on Integrated Ferroelectrics). Comment is invited (STMcKinstry@psu.edu) on whether the joint meeting should be pursued.

In other news, the "IEEE Standard Definitions of Terms Associated with Ferroelectric and Related Materials" is nearly completed. The most recent meeting was held August 25, 2003. Particular thanks go to John Ballato, as the standards "artist in residence" (and electro-optic expert) and Steve Pilgrim, who re-drafted the section on polymers. Eric Cross, Bob Newnham, Ruyan Guo, Amar Bhalla and Error! Bookmark not defined. also attended the meeting. It is projected that over the next few months, the draft standard will be distributed to the community at large for comments/revisions. Anyone panting after the opportunity to peruse a draft early is encouraged to follow links through the Ferroelectrics section of the UFFC web site. Again, we welcome your comments.

On a sad note, the ferroelectrics community mourns the passing of Dr. Seung-Eek "Eagle" Park. His untimely death marks the loss of a wonderful human being, and a great scientist. At the most recent ferroelectrics committee meeting, Eagle was chosen as the 2003 recipient of the IEEE UFFC Ferroelectrics Achievement Award. The award will be presented at the 2004 ISAF meeting.

Susan Trolhier-McKinstry,
Vice President –Ferroelectrics



In Memoriam: Seung-Eek Park
Feb 27, 1965 - April 11, 2003

Minutes of the Ferroelectrics Committee

IEEE UFFC-S Ferroelectrics Committee Meeting Minutes

April 27, 2003, Nashville, TN

Thirteen members of the Ferroelectrics Committee were present for the Ferroelectrics Committee meeting held in Nashville

in conjunction with the 105th Annual Meeting of the American Ceramic Society. Committee members who attended the meeting included: Tadashi Takenaka, Art Ballato, Dwight Viehland, Stephen Pilgrim, Susan Trolier-McKinstry, R. K. Pandey, Eric Cross, Robert Pohanka, Marija Kosec, Ruyan Guo, Amar Bhalla, David Payne and Bruce Tuttle. The meeting was called to order by Chair Susan Trolier-McKinstry. Bruce Tuttle, secretary, noted that the minutes for the December 2002 Boston meeting were approved electronically by the FE committee members roughly one month after the meeting.

International Symposium on Applications for Ferroelectrics (ISAF) Reports

ISAF 2002:

Tadashi Takenaka announced that all of the ISAF 2002 Technical Proceedings for the meeting held in Nara, Japan have been published and shipped to those that ordered them. All agreed that the ISAF 2002 meeting was superb from technical, programmatic and social contexts. The committee gratefully noted the efforts of Tadashi and David Payne as organizers of ISAF 2002. Special reference was given to the entire team of Japanese organizers that executed a successful joint meeting with the Ferroelectric Material Applications (FMA) organization and the International Symposium on Integrated Ferroelectrics (ISIF). The marvelous dinner parties that were put on by the Japanese hosts will be remembered by all participants for many, many years. Additionally the efforts of Takaaki Tsurumi and Grady White, for their excellent work regarding the publication of the ISAF 2002 Proceedings, were gratefully acknowledged by all members of the Ferroelectrics committee,

ISAF 2004:

Steven Pilgrim, one of the chief organizers of the ISAF 2004 Meeting, answered a series of questions from the FE committee members. ISAF 2004 will be held in Montreal, Canada on August 24-28, 2004. Tutorials for the conference will be held on August 23rd.

The professional management company FASS (Federation of Animal Science Societies) that is used by Ultrasonics to run their meetings will be used for this meeting by UFFC. Steven noted that the Frequency Control and Ultrasonics Sections prefer all electronic copies of proceedings. In contrast, Dr. Takenaka of the Ferroelectrics Committee noted that there is roughly a 50/50 split of Japanese technical attendees that prefer paper to Electronic copies. While the IEEE UFFC Ad-COM committee wants hard copies done away with and would like to save money by using electronic copies, an informal straw vote of the Ferroelectrics Committee showed that 8 members wanted both hard and electronic copies, 4 members wanted only electronic copies, and 1 member wanted just hard copies

A lengthy discussion of financial planning for ISAF 2004 ensued. There will be budget for students and speakers, but it is not known at this time the exact amount of the budget for this activity. Further, Steven is looking to obtain funding for the conference from outside agencies and has a proposal in for these finances. While presently 3 students are initially planned

to be given financial support, support of 15 students may be possible if there is very good overall meeting attendance.

ISAF 2006:

Jon-Paul Maria, chief organizer of ISAF 2006 and professor at North Carolina State University, sent an email report of ISAF 2006 planning to all members of the Ferroelectrics Committee before the FE committee meeting. David Cann of Iowa State and Hiroshi Funakobu of the Tokyo Institute of Technology will be the technical chairs for the meeting. Angus Kingon will be the Finance Chair while Susan Trolier-McKinstry will be the Publicity Chair. A Publications Chair has not yet been decided upon.

A great strength of this meeting is that it will be very accessible to students as lodging costs will only be \$80 per night. The Raleigh Conference Center is very flexible with the capability to provide facilities for meetings that range in size between 300 and 1400 attendees. The approximate size of the meeting needs to be known a substantial time in advance to obtain the lowest rates and most appropriate venue size.

David Payne noted that for ISAF 2006 to be a joint meeting between ISAF and ISIF that IEEE and ISIF need to have a signed MOU in order to hold a joint ISIF-ISAF meeting.

Ferroelectric Awards

The committee unanimously voted to present the Ferroelectric Achievement Award to Dr. Seung-Eek "Eagle" Park, who sadly passed away at the age of 38. Dr. Park made many outstanding contributions to the technical field of ferroelectrics. Among the most notable were his efforts in the development of single crystal ferroelectrics and characterization of field enforced phase transitions in PZT based anti-ferroelectric materials. It was decided to award Dr. Eagle Park at the ISAF 2004 meeting in Montreal.

Recognition awards were given to seven members of the committee who have served the committee honorably for many years, but are no longer active. These certificates signed by the UFFC President Ahmad Safari were presented to Al Meitzler, Tom Cutchen, Wally Smith, Steven Winzer, Wayne Huebner, Phil Bloomfield, and Grady White. All of these gentlemen will be sorely missed by the Ferroelectrics Committee.

Standards

Susan reported that the Ferroelectric Standard was coming along very well. Susan and Al Meitzler hope to have the Standard ready for external review later this summer. The present rendition of the Ferroelectrics Standard is available on Susan's Website and all committee members were encouraged to review the Standard and give their comments to Susan. This multi-year, very important work was greatly appreciated by the committee.

Next Meeting:

The next meeting is tentatively scheduled for late November or early December to be held in conjunction with the Materials Research Society Meeting in Boston, MA.

Bruce Tuttle
Secretary of the Ferroelectrics Committee

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