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FREQUENCY
CONTROL SOCIETY NEWSLETTER



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**2002 IEEE International Ultrasonics Symposium
and Short Courses**

October 8–11, 2002



**Forum Hotel
Munich, Germany**

**A Conference of the IEEE Ultrasonics, Ferroelectrics, and
Frequency Control Society (UFFC-S)**



President's Message

I would like to share with you some of the developments and activities of our Society over the past six months.

As most of you know, the UFFC along with all other IEEE societies has been experiencing financial hardship. Over the past several years, the UFFC's reserved budget has diminished due primarily to the IEEE's high infrastructure charges to our Society, and to a lesser extent, to the implementation costs of the digital archives of UFFC publications on the Internet. On a positive note however, we have been aggressively controlling the spending in the budget by eliminating activities with less priority. We also have been working towards creating new revenues by, for instance, decoupling the hardcopy and softcopy of the UFFC publications. We will continue to be stringent in budgetary and financial matters in the immediate future until the economic difficulties are relieved. Towards that goal, the Technical Activity Board (TAB) and the Board of Directors (BOD) of IEEE have passed several resolutions to reduce the burden of the infrastructure cost considerably. The financial pressure we have been experiencing will be relieved to some extent, which makes me quite optimistic about the near future.



On another positive note, with the implementation of the digital archives of all UFFC publications, our Society now has a well-deserved state-of-the-art system through which our members can access top quality publications in the field of their interest in an efficient manner. I believe that this most valuable archive could also be used to attract new members, since accessing privileges to the online archives are included with membership to UFFC. As I have been mentioning in my previous communications, promotion of our Society and technical interests should be the modus operandi of every member of the UFFC.

As part of the Society's Strategic Plan (SP), it was foreseen to review the activities of each section of the UFFC so as to increase

the quality of symposia and workshops as well as other services. Recently, I charged President-elect Gerry Blessing to institute a guideline for reviewing and evaluating the Sections, and to form a review committee. The plan is to review the activities of the Ferroelectrics this year, the Ultrasonics next year, and the Frequency Control in year 2004. We will welcome your comments on this process.

So far this year we had two outstanding symposia; i.e. the Frequency Control Symposium in New Orleans (May 2002), and the Joint meeting of ISAF, FMA and ISIF in Nara-Japan (May 2002). These meetings were very well attended, their programs were very rich in variety of topics, and the quality of the papers presented was remarkable. We are now looking forward to the International Ultrasonics Symposium, which will be held in October 2002 in Munich- Germany, and hope to see you there.

Also, in October, I will be leading a sizeable delegation on ultrasonics, ferroelectrics, frequency control & optoelectronic materials and devices to China within the framework of the People to People Ambassadors Program. This delegation will meet with representatives of the Chinese Institute of Electronics, Beijing section of the IEEE, Tsinghua University, State Key Laboratory of New Ceramics and Fine Processing, Shanghai Institute of Metallurgy of the Chinese Academy of Sciences, South China University of Technology, Matsushita Electronics Company in Guangzhou, as well as representatives of other pertinent industries. The purpose of this visit is to develop bilateral relations with government laboratories, academia and private industries in areas of interest to the UFFC. There are still some openings left on the delegation to be filled. If you are interested in joining this exciting program contact me as soon as possible.

I wish you all a productive and pleasant summer.

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ULTRASONICS

2002 IEEE International Ultrasonics Symposium In cooperation with the Association for Electrical, Electronic & Information Technologies (VDE), Germany

October 8-11, 2002

<http://www.ieee-uffc.org/2002/>.
Forum Hotel, Munich, Germany

Special notes:

- Cutoff date for hotel room reservations is August 8, 2002 for the Forum Hotel. Please make early reservations. For the Hotel Prinz and the Max Emanuel Hotel the cutoff date is September 7, 2002 and August 27, 2002, respectively.
- If you wish to come to Munich for attending the famous October Fest, we recommend to make reservations immediately.

Invitation from the General Co-Chairs

On behalf of the Symposium Organizing Committee and the Administrative Committee of the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society, we would like to invite you to join us in Munich, Germany and participate in the 2002 IEEE International Ultrasonics Symposium that will be held October 8-11, 2002, at the Forum Hotel in Munich, Germany. This is the third time the Symposium has crossed major oceans, having been convened in Cannes, France in 1994 and Sendai, Japan in 1998. The site of the symposium is close to the beautiful downtown Munich, which preserves much of the medieval character of the city, while combining it with elegant modern stores. The Culture Center including the Philharmonic Hall and the remarkable Deutsches Museum are next door. Many points of interest, such as fountains, churches and traditional restaurants are within walking distance. Other sites such as the spectacular Royal Palace are easily accessible because Munich has an excellent public transportation system and our conference hotel is located on top of a subway station.

This year's Technical Program Committee, chaired by Robert Weigel and Reinhard Lerch, is working hard to put together another outstanding technical program. As before, there will be a mix of invited and contributed papers. Student paper awards will be given this year, the second time in the history of our Symposia.

The Social Committee has prepared an exciting program for participants and guests, which will allow attendees to explore the rich history of the city of Munich and surroundings. Munich was also the hosting city of the 1972 Olympic Game



Clemens Ruppel



Bernhard
Tittmann

and the site is open for viewing. Thursday night we hold the banquet at the Hofbräu Keller, which is located on right the bank of the river Isar between the Bavarian parliament and the Deutsches Museum. Entertainment will be provided by the Original Hofbräuhaus Show. Friday night is another opportunity for gathering at a charming Micro-Brewery.

We are looking forward to an excellent program, and to the opportunity of greeting you in Munich.

Clemens Ruppel and Bernhard Tittmann
General Co-Chairs

Message From The Technical Co-Chairs

Ultrasonics is on the Move! We look forward to an increasing impact of Ultrasonics in numerous emerging technical disciplines. The research community, the industry, and the universities are challenged to invent and develop improved and innovative concepts to efficiently address and solve the many new problems associated with a growing number of novel applications.

We welcome you to the 2002 IEEE International Ultrasonics Symposium which will be held in Munich, Germany, October 8-11, 2002 to bring together experts in theory and techniques of Medical Ultrasonics, Sensors, NDE & Industrial Applications, Physical Acoustics, Surface Acoustic Waves, and Transducers & Transducer Materials from all over the world.

The IEEE International Ultrasonics Symposium has a tradition of fostering direct, personal contact among the attendees thanks to its unique format with educational short courses, a plenary opening session, open forum presentations, focused sessions, and five sets of parallel sessions. A special student paper competition will be held. The Technical Pro-



Reinhard Lerch



Robert Weigel

gram Committee will choose about fifteen student paper finalists to join the final competition at the Symposium and to receive special accommodation during the Symposium at the Deutsches Museum. Five winners (one from each area of the Technical Program Committee) will be chosen to receive a cash award.

A social and guest program will allow attendees to explore the rich history and culture of the city of Munich which is located in one of the worldwide nicest areas, in Bavaria north of the Alps, not far away from Austria and Switzerland. The Forum hotel is located in central Munich, and the Symposium will be held right after the well-known Oktoberfest.

We hope you are as excited as we are and join us to attend this important international event of the Ultrasonics community. Enjoy every minute of the symposium and of Munich!

Reinhard Lerch and Robert Weigel
Technical Program Co-Chairs

Hotel Information

A block of rooms has been reserved at the hotels for attendees. Please use the group name of "IUS 2002".

Forum Hotel

Hochstrasse 3
81669 Munich, Germany
Tel: +49 89 4803 0
Fax: +49 89 4488 277
E-mail: munich@interconti.com
<http://forum-munich.interconti.com>
Reservation...

Munich, the cosmopolitan city with a heart, offers visitors the best in culture, business and entertainment all year round. Our 580 rooms, including 12 suites and our FORUM plus floors which have been especially designed to meet the every need of today's business traveler, make the Forum Hotel the ideal place to stay.

Our 2100 square meters Conference Center is designed to meet the needs of up to 2000 guests. Whether for a banquet or meeting, the 16 conference rooms provide great flexibility, with the largest room able to accommodate up to 700 guests. Furthermore, our Conference Center boasts the latest in technology with most rooms featuring daylight.

The direct access within the same building complex to Munich's underground system at the "Rosenheimer Platz" station guarantees rapid and direct transit to the Munich International Airport and the new Trade Fair Grounds.

Room rates & Reservation

The price for a single room will be 151 € and for a double room 169 €.

City Hilton

Rosenheimer Strasse 15, DE 81667
Munich, Germany
Tel: 49-89-48040 Fax: 49-89-48044804
<http://www.hilton.com>
Reservation...

The 481-room Munich City Hilton features nine meeting rooms that can cater for up to 550 guests, two restaurants serving fine German & regional specialties and a fully-equipped business centre. The hotel is perched above the riverbanks of the Isar in the new artists' quarter Haidhausen, next to the Gasteig Cultural Centre and a 10 minute walk from the city centre. Franz Josef Strauss Airport is just 35 minutes via a subway connection beneath the hotel.

Location

The City Hilton is just across the street from our conference hotel.

Room rates & Reservation

The price for a single room will be 220 € and for a double room 260 €.

Hotel Prinz

Hochstr. 45
81541 München, Germany
Phone: +49 89 441408 0 Fax +49 89 441408 333
e-mail: contact@hotel-prinz.de
<http://www.hotel-prinz.de>
Reservation...

Location

The Hotel Prinz is a small hotel (41 rooms) which is less than half a mile away from our conference hotel.

An individual touch and personal attention are best provided in the private atmosphere of the Hotel Prinz. And of course you will find all the service and comfort you are accustomed to. Our main purpose is to provide you the best service. At anytime and with all the details you need when you are travelling. This makes your stay with us so enjoyable. Good taste shapes the surroundings in which you feel at home. Our interiors have been designed to provide you with this atmosphere of well-being. Our guests enjoy the stimulation of artistic experience while having breakfast or simply sitting in the lobby area. In our rooms contemporary artists exhibit over one hundred paintings, sculptures and other works.

Room rates & Reservation

The room rates for single rooms are 105 € and 115€, for double rooms 135 €. Breakfast is available for 9.50 €.

Hotel Max Emanuel

Rablstr. 10
81669 München, Germany
Phone: +49 (0)89-4 58 30-0 FAX: +49 (0)89-4 58 30-112
e-mail: maxemanuel@deraghotels.de

<http://www.deraghotels.de/english/muc/max.htm>
Reservation...

Custom Concepts for Living

Whether for a day, two weeks or months — whether for guests, employees or yourself — the Derag Hotel Max Emanuel can offer you a tailor-made concept for your stay. Choose a hotel room, or for stays of 4 nights and more, an apartment. We have single, double or studio apartments, as well as suites with a variety of amenities.

Location

You'll find us on a quiet street parallel to Rosenheimerstrasse, a five-minute walk from the Rosenheimer Platz subway station. In the immediate neighbourhood are Munich's best public swimming pool (the Müller'sche Volksbad), the "Gasteig" convention centre, and any number of pubs and restaurants.

Apartment & Hotel Room Features

Our fully furnished apartments, whether a single or a studio apartment with roof terrace, all include private bath with shower, direct-dial phone, cable TV, kitchen or kitchenette. Many also have microwaves or conventional ovens. Every room has a spacious closet, generous work space and a dining table, so you can feel right at home during your stay in Munich. Some apartments also include a stereo system and CD player.

Room rates & Reservation

The price for a single room will be approximately 90-100 €.

Travel Information

The metropolitan area of Munich has an excellent public transportation system. Therefore, we recommend using public transportation for commuting in Munich. Please proceed in the Munich Airport to "Zentralbereich" and follow the signs with an "S" on a green background. Two different trains (S-Bahn) connect the airport and downtown Munich. Both trains (S-Bahn) bring you directly to the station (Rosenheimer Platz), which is located underneath the Forum Hotel. The preferred train has the number S-8 and brings you in approximately 30 minutes from the airport to the hotel. S-1 takes approximately 15 minutes longer. Both trains run every 20 minutes. The one-way fair is 8.00 €. At Rosenheimer Platz simply follow the signs for "Forum Hotel" or "Munich City Hilton".

Depending on your needs there are different options for the train tickets: e.g., a ticket (Isarkarte - Wochenkarte) valid for a complete week (Monday through Sunday) for the city of Munich is available for 30.7 €.

Information about public transportation

MVV-Infotelefon 089/41424344 or 089/MVVINFO.

<http://www.mvv-muenchen.de>

<http://wap.mvv-muenchen.de>

Travel Assistance

IEEE Travel Services

Travel arrangements using the designated air carriers, or the carriers of your choice, can be made through IEEE Travel Services by calling (800) TRY-IEEE, (800-879-4333) within the US and Canada. Outside of the US and Canada, call (732) 562-5387 between the hours of 8:30 a.m. and 5:30 p.m. EST Monday through Friday. Or, you may visit the new online travel service web site at www.ieetraveionline.org. This secure site offers simple and convenient service through which you can search, reserve, and ticket your travel anytime, anywhere.

You may also fax requirements to the IEEE Travel Service at (732) 562-8815. When faxing, please be sure to include your travel dates, departure, and return times, and phone and fax numbers. A Travel Counselor will contact you promptly. Please note these airfares are good for outside the US and Canada.

Registration Information

Registration Desk for the Symposium

The registration desk will be located in the Foyer Grosser Saal.

Monday, October 7:	6:00 p.m.-9:00 p.m.
Tuesday, October 8:	7:00 a.m.-7:00 p.m.
Wednesday, October 9:	7:00 a.m.-6:00 p.m.
Thursday, October 10:	7:00 a.m.-5:30 p.m.
Friday, October 11:	7:00 a.m.-1:00 p.m.

Registration and Fees

All Symposium participants and guests must register and are required to wear badges. The Symposium fee includes admittance to all technical sessions, and a copy of the CD-ROM of the Symposium Proceedings will be mailed to all participants (except for one-day and guest registrants). Details of evening and social events are provided in the Social Program section.

Registration Fees Munich 2002	Advance	On-Site
Members ^a	\$375	\$450
Non-members ^a	\$475	\$550
Students/Retirees ^a	\$65	
Life Members ^a	\$0	
One day Registration ^b	\$200	
Guests ^b	\$35	
Short Courses	\$130	
Short Courses Students/Retirees	\$50	

Additional CD-ROM Proceedings	\$50
Soft Cover Proceedings	\$100
Additional Pages (beyond 4)	\$125
Overseas Postage Soft Cover Proceedings ^c	\$55
Reprints (200 copies)	\$50/page
Overseas Postage Reprints ^c	\$40

^cOverseas means outside U.S.A., Canada, and Mexico.

The reduced rates for advance registration are available only by completing the advance registration form (located at

the center of the Advance Program) or by registering on-line by September 6, 2002.

Payment is easy! You may do any of the following options:

- Register and pay on-line at <http://www.ieee-uffc.org/2002/>
- Mail the registration form to
2002 IEEE International Ultrasonics Symposium
c/o FASS
1111 N. Dunlap Avenue
Savoy, IL 61874 USA
- Fax the completed form and credit card information to 217/398-4119
- No telephone registrations will be accepted.

If you have already registered and would like to add additional events, you may do so by contacting the symposium headquarters at FASS: (217) 356-3192, FAX (217) 398-4119. You may also add events on-site at the registration desk (all additional events will be added as space is available).

The Advance Registration form must be received by FASS by September 6, 2002. **Postmarks do not apply.** Each registrant must complete a separate Advance Registration Form. The remittance is payable, in US Dollars only, by personal or company check drawn on a US Bank, money order, VISA, MasterCard, or American Express. Bank drafts, foreign currency, and purchase orders will not be accepted.

On-site registration must be made in U.S. Dollars or in Euros at the then prevailing exchange rate.

Refund Policy

There will be a \$25.00 service charge to process refunds for those who have pre-registered but who are unable, for whatever reason, to attend the Symposium. A letter requesting the refund should state the registrant's name and to whom the refund check should be made payable. No refunds will be given for requests received after October 1, 2002.

IEEE and UFFC-S Enrollment

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

If you are a current IEEE member and wish to become a first-time member of the UFFC-S, free membership is offered at the time of registration. You will receive the UFFC-S Transactions and all UFFC-S Newsletters published in 2003.

IEEE/UFFC-S enrollment forms will be available at the registration desk.

Social Gatherings

Wednesday, October 9, 2002

On behalf of the Bavarian Minister-President, Dr. Edmund Stoiber, the Bavarian State Minister of Sciences, Research and the Arts, Hans Zehetmair, will invite you to a State Reception in a historic place, the Residence, in downtown Munich. Drinks and hors d'oeuvres will be served. A shuttle bus will be

available starting at 18:30 in front of the Forum Hotel. All attendees and companions should wear their badges to gain entrance to the social gathering.

Description: The Munich Residence, located in the center of the city, is a magnificent complex of buildings constructed by the powerful Wittelsbach family who ruled Bavaria for about 800 years. Although originally dating from the 14th century, subsequent additions and alterations gave the Residence a variety of architectural styles, right up until the fall of the Wittelsbach dynasty in 1918. Renaissance features predominate but one of the most impressive rooms in the complex is the Baroque Golden Hall. The Antiquarium, built in 1571, is the oldest part of the palace and houses the family's collection of antiquities, whilst the Schatzkammer (treasury) holds an exquisite array of diamonds, rubies and other precious stones. Other rooms display porcelain, Italian portraits and vistas, and even Egyptian art. The Rococo Cuvilliés Theatre was once the private theatre of the Wittelsbach court. Both the theatre and the Residence were destroyed during World War II but have been rebuilt in their original style.

Thursday, October 10, 2002

Banquet on Thursday Evening

This year the banquet will be held at the Hofbräukeller, which is an excellent place for traditional Bavarian food. A typical Bavarian dinner will be served. Entertainment will be provided by the Original Hofbräuhaus Show.

History of the Hofbräukeller

At the end of the 18th century the breweries of Munich decided to relocate their beer deposits beyond the city walls. The new position would make it easier for them to supply the surrounding villages and to enlarge their depots. With its natural caverns, the bank on the right side of the Isar River was an ideal place to build cellars in which the ice, and consequently the beer, had a longer durability. New imported chestnut trees with big leaves gave shade to the beer cellars and cooled them in the summer. The brewers — who weren't innkeepers — sold the fresh beer on the spot. The king tolerated the sale and the world-famous Munich beer garden culture developed in a short time.

The Hofbräukeller at Wiener Platz was built in the years 1892-1894. It belongs to the historically remarkable buildings of the New Renaissance. In the 1930s the Hofbräukeller was very popular as a restaurant. In the war it was used as a field hospital; the American forces used it as their headquarters after the war. In spite of two big conflagrations, the Hofbräukeller has maintained its original designation as a refuge of Bavarian sociability. After the large-scale renovation of 1987, the Hofbräukeller was recognized by the city of Munich for its outstanding architectural with the Façade Prize.

Margot and Günter Steinberg offer their charming hospitality — for young and old alike — in the tradition of the Munich beer garden.

Show Program by the Authentic Festival Band from Munich's Hofbräuhaus

For more than 12 years, ever true to the motto "Only the authentic is original", the Hofbräuhaus Festival Band has thrilled a delighted public which throngs daily to Munich's world fa-

mous Hofbräuhaus with its fantastic repertoire of traditional melodies and jolly Bavarian dance music.

With frequent performances throughout Germany, Austria and Switzerland and many guest appearances in Japan, Spain, the USA and China, the band presents its diversity in a captivating spirit, bringing Bavarian culture to spellbound audiences and making the musical ballads and folk dances of Bavaria an unforgettable experience for every visitor.



The professional show package is an exciting program of

the authentic Hofbräuhaus Band, a female yodeller, schuhplattler (thigh slapping) dancers in original Dirndl costume, whip crackers, bell ringers and alpine horn players. Highlights of the show include regional dances (e.g. the Austrian Steierer dance, the timberjack dance, the bench dance), spoon percussion playing, whip cracking and last not least the delightful medleys of the band. Classical Bavarian musical “spectacles” are presented in a convincing, professionally arranged program.

Impeccable references are provided by numerous leading hotels, for example, Intercontinental, Hyatt, Marriott, Hilton, Sheraton, Steigenberger, MS Europa, Kempinski, Hotel Peking and, it goes without saying really, the one and only Munich Oktoberfest. A bit folksy, a bit modern, from dance music to brass band music.

The success portfolio of these competent musicians is not only testified by performances in the Hofbräuhaus and at diverse events, but also by appearances in folk music shows of leading radio and TV stations, e.g. BR, ZDF, ARD, RTL and SAT 1.

Recordings of the original Hofbräuhaus Band and its yodellers, alpine horn players and bell ringers are available on numerous sound carriers for enjoyment at home.

All musicians bring experience, commitment and routine with them on stage - factors indispensable for a smooth and polished performance. Absolute command of their instruments and singing voices are natural attributes of the group and the solo performers. Audiences are always given a convincing performance by the musicians in all variations.

Guest Program

A varied program is being planned to entertain those who register for the Symposium as guests. Registration permits you to enjoy our continental breakfast each morning, as well as the evening Social Reception. Three guest tours, individually priced, will also be arranged for the enjoyment of the guests.

PLEASE NOTE: Only registered GUESTS may attend the Guest Breakfast. Check at Registration for the time and location of the morning Guest Breakfast

GUEST TOURS

Tour A: Wednesday, October 9, 2002

Munich's OLD TOWN and NYMPHENBURG CASTLE
10:00 a.m. to 5:00 p.m.

Price: US \$50 per person (lunch included)

The Walking Tour of Munich's OLD TOWN captures the character of Bavaria's capital. This part of town bears the traces of the city's history. See the MARIENPLATZ, this vast square with its MARIEN SAEULE (Mary-Column), the old and new city hall, and with its shops, it is the great popular hub of Munich life. A short walk takes us to the lively and colorful open-air market VIKTUALIENMARKT. Anything and everything connected to food can be found here. Visit the ASAM church, a masterpiece of Bavarian Rococo. The Asam brothers, the famously talented architects, painters and sculptors, built this church for themselves. Its opulent and expressive frescoes and stucco work are woven into a harmonious unit. You'll see the FRAUENKIRCHE, Munich's hallmark church that has watched over the city since the late 15th century. For lunch, a bus will bring us to the historic BAMBERGER HAUS, with its restaurant, brewery hall and delightful Italian terrace set in LUITPOLD PARK. This is the right place to celebrate. During the afternoon we'll visit NYMPHENBURG CASTLE, summer residence of the rulers of Bavaria. This elegant Palace set in a wonderful park, landscaped in the English style, is a must see. In addition to the palace and the park we can admire the important collection of NYMPHENBURG porcelain.

Tour B: Thursday, October 10, 2002

Fraueninsel and KING LUDWIG's CASTLE
HERRENCHEMSEE.

Full day by bus!

9:00 a.m. to 5:00 p.m.

Price: US \$55 per person (lunch included)

We'll explore one of the local lakes southeast of Munich, CHIEMSEE. A paddlewheel boat will bring us first to the little island of FRAUEN CHIEM SEE, a Benedictine convent founded in the 8th century. We will go for a walk, eat lunch, and then take a boat to the next island, HERRENCHEMSEE, one of King Ludwig's II fabled royal castles. Herrenchiemsee Palace, the Bavarian Versailles, (although unfinished), is a fairytale dream. The beauty of the scenery and the royal splendor make this an unforgettable experience.

Tour C: Friday, October 11, 2002

NEUSCHWANSTEINCASTLE

“The fairytale castle”

Full day by bus!

9:00 a.m. to 6:00 p.m.

Price: US \$55 per person (lunch included)

Before visiting the “fairytale” castle of NEUSCHWANSTEIN it's a must to stop at Germany's most beautiful Rococo church WIESKIRCHE (1754) - Church of the FLOTTED SAVIOUR. The pilgrimage church rises out of the surrounding flower-covered fields as if it had always been

there. After a short time of contemplation the bus will bring us to our next destination.

The dream castle of King Ludwig II - built 1868-86 in New Romanesque design - NEUSCHWANSTEIN, a magical and theatrical creation in white with its numerous towers and battlements, is perched on the rock high above a crystal clear Alpine lake south-east of FÜSSEN - ALLGÄU. It was inspired by his visions of knightly deeds and WAGNER OPERAS and is of unimaginable splendor, especially in the most breathtaking rooms, the THRONEROOM and the SINGERS' HALL.

Fortunately, the castle was not destroyed, as Ludwig II had ordered it should be after his death, so we can share his fantasies and enjoy the castle today.

Technical Program

Plenary Session

Wednesday, October 9, 2002

8:00 a.m. - 10:00 a.m. Grosser Saal

WELCOME

Clemens Ruppel and Bernhard Tittman, General Co-Chairs

TECHNICAL PROGRAM

Reinhard Lerch and Robert Weigel, Technical Program Co-Chairs

AWARDS AND RECOGNITIONS

Achievement Award

Distinguished Service Award

Outstanding Paper Award

Fellow Awards

Distinguished Lecturer Award

Rayleigh Award

Ahmad Safari, UFFC-S President

Reinhard Lerch, UFFC-S Awards Committee Chair

2002 UFFC-S PLENARY SPEAKER

The Far Side of Surface Acoustic Waves

Achim Wixforth, University of Augsburg, Augsburg, Germany

Surface waves have been first described in combination with earthquakes. Meanwhile, reduced to the significantly smaller nano scale, they found their way into much friendlier fields: SAW devices are widely used for RF signal processing and filter applications and became a huge industry in mobile communication. However, SAW also live a second life in basic research, where they are employed either for spectroscopic purposes or as active "nanoquakes on a chip" to deliberately alter some fundamental properties of semiconductor quantum structures.

In this talk some recent highlights of SAW based research in the wide area of semiconductor nanotechnology will be presented: on semiconductor heterostructures, the dynamic lateral potential landscape of a surface acoustic wave can for instance act as an escalator for electrons, light, and matter. This way, a "photon conveyor belt" is demonstrated, the approach towards a DRAM for photonic signals in a quantum well. Single electron shuttles are aiming towards the current standard for

metrological purposes. A SAW-based camera employing tomographic techniques visualizes photogenerated charge distributions on a chip. Semiconductor-piezoelectric hybrids open a wide field for novel sensor applications. Finally, SAW can also be used for a unconventional implementation of a microfluidic "lab-on-a-chip" for biological applications on the nanoliter scale.

1984 diploma in physics from the University of Hamburg (Minigaps on high index surfaces on semiconductor MOS systems). 1987 PhD in physics from University of Hamburg (Interaction of surface acoustic waves and low-dimensional electron systems in semiconductor nano structures). 1989/1990 research assistant engineer at the University of California, Santa Barbara (molecular beam epitaxy of graded index semiconductors). 1992 fellowship award (IBM Japan) for significant contributions to the physics of phonons. 1994 habilitation in experimental physics from the Ludwig-Maximilians-University of Munich (Nonparabolicity in real- and k-space). Since then lecturer and member of the Center for NanoScience (CeNS) at the LMU 1998 Walter-Schottky-Prize for solid state physics from the German Physical Society. 2002 chair for experimental physics at the University of Augsburg.

Invited Speakers

Group 1: Medical Ultrasonics

"Perspectives on Starting and Running a Medical Ultrasound Business," *S. H. Maslak*

"Applications of Ultrasound Contrast Agents and Cardiology," *H. Becher, J. Timperly, D. Dawson, and A. Kardos*

"Ultra-high Speed Imaging of Elasticity," *M. Fink, L. Sandlin, M. Tanter, S. Catheline, S. Chaffai, J. Bercoff, and J. Gennisson*

"Acoustic Radiation Force Impulse Imaging: Remote Palpation of the Mechanical Properties of Tissue," *K. A. Nightingale, R. C. Bentley, M. S. Soo, R. W. Nightingale, and G E. Trahey*

"Equipment and Methods for Synthetic Aperture Atomic and Flow Imaging," *J. A. Jensen, S. I. Nikolov, T. Missaridis, and K. L. Gammelmark*

"Two Dimensional Arrays for 3-D Ultrasound Imaging," *S. W. Smith, I.W. Lee, E. D. Light, and J. T. Yen*

Group 2: Sensors, NDE & Industrial Applications

"Ultrasonic NDE of Concrete," *M. Schickert*

"The Use of Modem Simulation for Industrial Applications of High Power Ultrasonics," *M. Kaltenbacher, H. Landes, J. Hoffelner, and R. Simkovic*

"SAW Sensors for Direct and Remote Sensing," *W. Buff*

"A New Generation of Ultrasonic In-Line Inspection Tools for Detecting, Sizing, and Locating Metal Loss and Cracks in Transmission Pipelines," *O. A. Barbian, M. M. Beller, K. Reber, and H. Willems*

Group 3: Physical Acoustics

“Coupled Resonator Filters,” *K. M. Lakin*

“Nonlinear Equations of Motions for Fluids,” *J. H. Cantrell*

“Recent Developments in Low Loss Materials for Microwave Frequency Acoustic Devices,” *S. N. Ivanov*

“The Development of a New Class of BAW Microwave Acoustic Devices for Ecological Monitoring,” *G. D. Mansfeld and I. M. Kotelyansky*

Group 4: Surface Acoustic Waves

“Flip-Chip STW Filters in the Range of 0.4 to 5 GHz,” *H. Yatsuda, H. Iijima, K. Yabe, and O. Iijima*

“Ceramics: The Platform for Duplexers and Frontend-Modules,” *P. Hagn*

“SAW Signal Processing: Extendable by Si-ASICs?” *F. Seifert and C. C. W. Ruppel*

Group 5: Transducers and Transducer Materials

“Intravascular Ultrasound Probes and Their Clinical Applications,” *A. F. W. van der Steen, C. L. de Korte, F. Mastik, F. A. Lupotti, J. A. Schaar, E. I. Céspedes, C. J. Slager, C. T. Lancée, P. W. Serruys, and N. Bom*

“Layered Manufacturing for Prototyping of Novel Transducers,” *A. Safari, M. Allahverdi, M. Ebrahimi, R. Brennen, S. Turuc, A. Hall and N. M. Haghi*

“High Frequency Ultrasonic Imaging Using Optoacoustic Arrays,” *T. Buma, M. Spisar, and M. O’Donnell*

Focused Sessions

Group 1 - High Frequency Imaging of Living Cells

- “High Frequency Ultrasound Imaging of Changes in Cell Structure Including Apoptosis,” *M.D. Sherar, G.C. Czarnota, J.W. Hunt, R. Baddour, L. Taggart, A. Giles, N.R. Farnoud, and M.C. Kolios*
- “In-Vivo Imaging of Thermally Induced Changes of Single Skin Cells by GHz Acoustic Microscopy During Cell Changes,” *C. Miyasaka and B. Tittmann*
- “Anisotropy of Ultrasonic Backscatter by Blood in Shear Flow: Monte Carlo Simulations,” *D. Savery and G. Cloutier*
- “Associations Between Parameters of Ultrasound Transmission, and Structural Parameters of Cortical Bone,” *R. Barkmann, R. Schffczyk, W. Timm, and C. Glueer*
- “Detection of the Process of Blood Coagulation and Clot Formation Using Quantitative Ultrasonic Parameters,” *S.-H. Wang, T.-W. Chung, C.-S. Huang, C.-T. Chuang, and P.S. Tsui*

Group 2 - Advanced Ultrasonic Methods for Evaluation of Concrete Structures

- “Ultrasonic NDE of Concrete,” *M. Schickert*
- “Ultrasonic Low-Frequency Transducers with Dry Dot Contact and Their Applications for Evaluation

of Concrete Structures,” *V.G. Shevaldykin, A.A. Samokrutov, and V.N. Kozlov*

- “Evaluation of Ultrasonic Imaging Algorithms for Concrete Testing Applying Numerical Techniques for Test Specimen Validation,” *K.-J. Langenberg, K. Mayer, R. Marklein, P. Ampha, and M. Krause*
- “Subsurface Imaging of Concrete Using Rayleigh Waves,” *J.S. Popovics, and J. Zhu*
- “Numerical Computation of Ultrasonic Wave Propagation in Concrete Using the Elastodynamic Finite Integration Technique (EFIT),” *F. Schubert, and R. Marklein*

Group 3 - Geophysical Prospecting Using Sonics and Ultrasonics

- “Acoustic Waves in Pressurized Boreholes in Formations with Triaxial Stresses,” *B.K. Sinha and Q.-H. Liu*
- “New Expressions for Cylindrical Waves in a Transversely Isotropic Solid and Cuspidal Borehole Modes and Dual Arrivals,” *C.-Y. Wang*
- “Nonlinear Equations of Motion for Fluids,” *J.H. Cantrell*
- “Integrated Use of Ultrasonic and Sonic Measurements in Assessing the Presence of Cement in Oil Wells,” *M. Loizzo and M. Allouche*
- “Ultrasonic Measurements of Molecular Relaxation in Methane, Ethane, Carbon Monoxide, and Carbon Dioxide,” *P.E. Martinsson*

Group 4 - SAW Modules and Duplexers

- “Ceramics: The Platform for Duplexers and Frontend-Modules,” *P. Hagn*
- “High Frequency SAW Duplexer with Low-Loss and Steep Cut-Off Characteristics,” *T. Matsuda, J. Tsutsumi, S. Inoue, Y. Iwamoto, Y. Satoh, M. Ueda, and O. Ikata*
- “Multi-Band SAW Front-End Module Considering Impedance Matching between FEM and Direct-Conversion RF-IC,” *M. Hikita, N. Shibagaki, N. Matsuda, K. Yokoyama, S. Matsuda, and O. Hikino*
- “Passive Integration with SAW Filters Using LTCC (Low Temperature Co-fired Ceramics) and Multilayer Technology,” *H. Mandai, N. Nakajima, and K. Tonegawa*

Group 5 - Ultrasound MEMS

- “Broadband Capacitive Micromachined Ultrasonic Transducers Ranging from 10kHz to 60 MHz for Imaging Arrays and More,” *A.S. Ergun, Y. Huang, C.-H. Cheng, O. Oralkan, J. Johnson, H. Jagannathan, U. Demirci, GG Yaralioglu, M. Karaman, and B. T. Khuri-Yakub*
- “Low-Temperature Micromachined cMUTs with Fully-Integrated Analogue Front-End Electronics,” *R.A. Noble, R.R. Davies, D.O. King, M.M. Day, A.R.D. Jones, J.S. McIntosh, and D.A. Hutchins*
- “Piezoelectric Micromachined Transducers (PMUT’s) Based on PZT Thin Films,” *P. Murali, J. Baborowski, and N. Ledermann*

Student Paper Awards

This is the second year we are providing student paper awards. The awards consist of a certificate which is a prestigious addition to the students CV. Students who were submitting abstracts for presentation were also invited to participate in this special student paper competition.

Abstracts submitted by students for the Student Paper Competition were reviewed as usual by the Technical Program Committee (TPC). At that time the TPC selected 20 finalists in the Student Paper Competition. The finalists were notified and asked to produce a poster of their papers to be displayed during a special student poster session. The poster is required independent of whether the student's paper has been selected as an oral presentation. On the first day of the meeting, October 8, 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 meeting.

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 and 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.

Finalist posters are to be placed in the Room "Berlin" by 8:30 a.m. Wednesday Oct. 9 and can be taken down on Friday Oct. 11 at 5:00 p.m. Students must be at the posters for 90 minutes beginning at 9:00 a.m. on Wednesday to present their work to the judges.

Short Courses

Tuesday, October 8, 2002 8:00 a.m. - noon

Course 1: *Fundamentals of Ultrasonic Waves*, David Cheeke

Course 2: *Medical Ultrasound Transducers*, Douglas Wildes

Course 3: *Elasticity Imaging*, Stanislav Emelianov

Tuesday, October 8, 2002 1:00 p.m. - 5:00 p.m.

Course 4: *Nonlinear Acoustics and Harmonic Imaging*, Victor Humphrey

Course 5: *Medical Beamforming*, Kai Thomenius

Course 6: *Flow Measurements*, Hans Torp

Tuesday, October 8, 2002 6:00 p.m. - 10:00 p.m.

Course 7: *Wavelets and Other Multiresolution Transforms in Acoustics*, Ali R. Baghai-Wadji

Course 8: *Micromachined Ultrasonic Sensors and Actuators*, Amit Lal and Richard M. White

Course 9: *Ultrasound Contrast Agents: Theory and Experimental Methods*, Nico de long

Course 1: Fundamentals of Ultrasonic Waves

Instructor: Dr. David Cheeke

Concordia University

Montreal, Quebec, Canada

Time: Tuesday morning, October 8, 2002

8:00 a.m. - 12:00 noon

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 a 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: Tuesday Morning, October 8, 2002

8:00 a.m. - 12:00 noon

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 30 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: Elasticity Imaging

Instructor: Stanislav Emelianov

*University of Michigan
Ann Arbor, MI 48109 USA*

Current address: University of Texas at Austin
Austin, TX USA

Time: Tuesday Morning, October 8, 2002
8:00 a.m. - 12:00 noon

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 diagnostic ultrasound, medical imaging systems, tissue biomechanics and nondestructive material testing.

Course 4: Non-linear Acoustics and Harmonic Imaging

Instructor: Victor F. Humphrey

*University of Bath
Claverton Down
Bath, UK*

Time: Tuesday Afternoon, October 8, 2002
1:00 p.m. - 5:00 p.m.

Abstract: This course will provide a broad overview of non-linear propagation in ultrasonic fields and its consequences for medical ultrasound systems, both diagnostic and therapeutic. It will start with a basic description of the origins of non-linear propagation and discuss the consequences in terms of waveform distortion, shock generation and enhanced attenuation for plane waves. This will be followed by a discussion of the behaviour of finite amplitude fields produced by real transducers, indicating the effects of diffraction, focusing and tissue attenuation. Finite Difference techniques for modelling non-linear propagation will then be discussed and used to illustrate the behaviour for a wide range of geometries. The practical problems associated with measuring such fields will also be considered. Finally the consequences for medical ultrasound will be discussed. This will concentrate on the development of harmonic imaging and its performance. The influence on measurement and safety standards, such as Mechanical Index (MI) and Thermal Index (TI), will also be discussed.

Victor R Humphrey earned his B.Sc. Degree in Physics in 1975 and his PhD in 1981, both from the University of Bristol. He is currently a Senior Lecturer in the Department of Physics at the University Bath where he has worked since 1978. In 1988 he was awarded the Institute of Acoustics A.B. Wood Medal for his work on applications of parametric arrays. His current research interests are in non-linear propagation and its applications in medical ultrasound; ultrasonic heating in tissue, acoustic transmission through anisotropic materials and acoustic scattering from irregular bodies. He is a Fellow of the Institute of Acoustics.

Course 5: Beamformation in Medical Ultrasound

Instructor: Kai E. Thomenius
*GE Global Research Center
Niskayuna, NY USA*

Time: Tuesday Afternoon, October 8, 2002
1:00 p.m. - 5:00 p.m.

Abstract: The goal of this short course is to review the design of ultrasound beamformers with special focus on the analytical methods used in their design. 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 associated trade-offs involved are reviewed. The techniques developed for such analysis will be applied to current topics involving beamformation such as elevation focusing, 2D arrays, miniaturization techniques, and phase aberration correction. Heavy use of graphical techniques will be made to illustrate the concepts.

Kai E. Thomenius is the Chief Technologist for Ultrasound and Biomedical at the Imaging Technologies Center in General Electric's Global Research 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 such as tissue, the potential of bioeffects due to those acoustic beams, and retrieval of additional diagnostic information from the echoes that arise from such beams.

Course 6: Flow Measurements

Instructor: Hans Torp
*Norwegian University of Science and
Technology Trondheim,
Norway*

Time: Tuesday Afternoon, October 8, 2002
1:00 p.m. - 5:00 p.m.

Abstract: This course provides basic understanding of physical principles and signal processing methods for flow measurements and visualization; with emphasis on Doppler methods and blood flow applications. The course starts with an overview of currently used techniques for velocity estimation in pulsed and continuous wave Doppler and color flow imaging. Statistical models for the received signal, as well as commonly used velocity and flow estimators are developed. Efficient simulation tools to explore estimator properties are derived, and examples on implementation in Matlab will be shown. Methods to suppress clutter signals from slowly moving targets, including regression filter will be discussed. Elements from classical estimation theory will be applied to develop minimum variance velocity estimators in the presence of clutter noise. The performance will be compared with commonly used approaches for clutter rejection and velocity estimation, and practical implementations will be discussed.

Hans Torp received the MS degree in mathematics in 1978, and the Dr. Techn. degree in electrical engineering in 1992; both from the University of Trondheim, Norway. Since 1980 he has been working with ultrasound technology applied to blood flow measurements and imaging at the university of Trondheim, in cooperation with GE-Vingmed Ultrasound. He is currently professor of medical technology at the Norwegian University of Science and Technology, and has since 1987 given courses on ultrasound imaging and blood flow measurements for students in electrical engineering and biophysics. His research interests include statistical signal- and image processing with applications in medical ultrasound imaging.

Course 7: Wavelets and Other Multiresolution Transforms in Acoustics

Instructor: Ali R. Baghai-Wadji
*Vienna University of Technology
Vienna, Austria*

Time: Tuesday Evening, October 8, 2002
6:00 p.m. - 10:00 p.m.

Abstract: In eight, largely independent sessions, each carefully designed for a 30-minute presentation, the basics for accelerated computational techniques will be discussed. Thereby, various computationally powerful techniques such as domain decomposition methods, multi grid approaches, and conservative finite difference methods on general grids will be sketched. Furthermore, general constructive approaches e.g. the finite volume or integral-interpolation method, multipole-, fast multipole and the finite integral method will briefly be outlined. The main emphasize, though, will be on the theory and applications of the wavelets, the multiresolution analysis and multi scale methods. To achieve this ambitious goal, we start with Fourier-type expansion techniques and the theory of mono-, and bivariate orthonormal functions, and continue with a number of joint time-frequency transforms, including the Wigner-Ville distribution and the family of Gabor transforms. We then proceed to our core topic, i.e. the ideas and techniques underlying the multiresolution and multiscale methods. All known types of wavelets relevant to the approximation, modeling and simulation will be introduced and their properties in terms of the support length, convergence rate, vanishing moments, and the smoothness will be classified and compared. Finally it will be explained how to construct wavelets which are customized to particular applications. A theory will be presented for the construction of a set of orthonormal functions which derive from impulse responses of linear time-invariant systems. Each individual session will start with a historical note and several illustrating examples, followed by a core theoretical part, and concludes with applications. Great care is taken in the preparation of a comprehensive manuscript in order to lucidly and effectively communicate deep results and the challenging topics in the device modeling and simulation. Merely a graduate-level background in the Fourier analysis is required to conveniently follow the lecture. All the remaining models and mathematical tools will be developed in the classroom.

Ali R. Baghai-Wadji has been with EE Department at Vienna University of Technology (VUT) since 1979. From 1979

to 1984 he was an associate researcher in Applied Electronics Group, where he developed computer models for microacoustic and microelectronic devices. He earned his M.Sc. and Ph.D. in 1984 and 1987, respectively, and obtained his *venia docendi* in physical electronics in 1994, all from VUT. Since 1997 he has been an associate professor at VUT. Three times he was awarded the Kurt Godel research scholarship from Austria, allowing him to spend a total of 10 months at UCI during the years 1990, 1991, and 1992. From 1987 to 1993 he conducted five Ph.D. and nine Master's theses. From 1994 to 1999 he was, on leave of absence from VUT, a principal engineer consultant for Motorola Inc. in the United States. In the years 1999 and 2000 he was honored (15 months) a visiting professorship at Materials Physics Laboratory, Helsinki University of Technology (HUT). In the Fall 2000 he was awarded a Nokia Visiting Fellowship.

He has been honored a *venia docendi* to teach Advanced Quantum Mechanics and Computational Engineering at HUT. Since 1995 he has been affiliated with Arizona State University as an adjunct professor at the Department of Mathematics and Statistics. He has more than 100 publications in reviewed journals and conference proceedings, and one patent. His current research interest includes the development of accelerated computational modeling tools for SAW and BAW, wavelets, frames, coherent states, quantum mechanics, photonic crystals, and molecular electronics. He is a senior member of the IEEE, an IEEE-UFFC associate editor, and an IEEE-UFFC TPC member. He served as the guest editor for a special issue on *Modeling, Optimization, and Design of Surface and Bulk Acoustic Wave Devices* in IEEE-UFFC Transactions (Sep. 2001, Vol. 48, No.5).

Course 8: Micromachined Acoustic Sensors and Actuators

Instructors: Amit Lal

Cornell University

Ithaca, NY USA

and Richard M. White

University of California-Berkeley

Berkeley, CA, USA

Time: Tuesday Evening, October 8, 2002

6:00 p.m. - 10:00 p.m.

Abstract: The ability to fabricate silicon-based structures with at least one dimension in the micron range permits making a number of promising micromachined acoustic and ultrasonic sources and receivers. Transduction can be accomplished by electrostatic, piezoelectric and magnetic means. Applications of these devices include generation and reception of airborne acoustic signals, distance ranging and flaw detection where a gas or liquid is used as the coupling medium, quantitative detection of chemical vapors and biochemical molecules, acoustic pumping and fluid mixing, and surgery employing an ultrasonically driven etched silicon needle. We will present microscale sensing and actuation principles, and discuss advantages resulting from micromachining. We will describe techniques for making small cantilevers, membranes, tubes, and the integration of piezoelectric thin films. Consequences of the inherently small device sizes will be considered in the context of acoustic system packaging. We

will present applications of ultrasound to MEMS, in addition to the application of MEMS to ultrasound.

Amit Lal is an assistant professor in the School of Electrical and Computer Engineering Department at the Cornell University. He received his bachelor's degree from the California Institute of Technology in 1990, and a doctorate from University of California at Berkeley in 1996, both in Electrical Engineering. His current interests are in exploring ways to use micromachined structures for high-intensity ultrasonic applications such as ultrasonic surgery and atomization, and actuating surface micromachines using substrate resonance modes. His areas of expertise are micromachining, MEMS, solid-state devices and circuits, ultrasonics, and biomedical applications of high-intensity ultrasound. He is a member of IEEE, ASA, and AAAS. He is also the recipient of the NSF CAREER award.

Richard M. White is a faculty member in the Department of Electrical Engineering and Computer Science and a founding Co-Director of the Berkeley Sensor & Actuator Center at the University of California at Berkeley. After completing his doctorate in Applied Physics at Harvard, he worked on microwave component R & D at the former General Electric Microwave Laboratory in Palo Alto. He then moved to Berkeley where he has been concerned primarily with solid-state electronics, ultrasonics and micromachined sensors and actuators. He has contributed to research on SAW devices, thermo elastic acoustic wave generation, and silicon-based flexural plate wave sensors and micropumps for both liquids and gases. He is a co-author of *Acoustic Wave Sensors* (1997), the introductory text *Electrical Engineering Uncovered* (1997), and *Solar Cells: From Basics to Advanced Systems* (1984). He is a member of the National Academy of Engineering, and a Fellow of the IEEE and the AAAS.

Course 9: Ultrasound Contrast Agents: Theory and Experimental Results

Instructor: Nico de Jong

Thoraxcenter

Erasmus University Medical Center

Rotterdam, The Netherlands

Time: Sunday Evening, October 8, 2002

6:00 p.m. - 10:00 p.m.

The course consist 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 describing 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 will be presented, in addition to vibrations of contrast bubbles irradiated with high acoustic pressures.

c) Experimental ultrasound methods will be presented to characterize ultrasound contrast agents. These include methods for harmonic and sub harmonic scattering, absorption and attenuation measurements. The influence of ambient pressure, temperature and gas concentration will be discussed.

d) Experimental optical methods for characterizing individual bubbles performed with a fast framing camera will be shown.

e) Imaging methods for contrast agents, like fundamental, harmonic, sub harmonic and superharmonic modes and multi-pulse methods like pulse inversion, power modulation etc. and new methods like chirp excitation.

f) The last topic involves ultrasound mediated drug delivery: The 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.

Exhibits

GEROTRON Communication GmbH is managing the exhibition (www.gerotron.com).

The Exhibit Displays will be in the Forum 5-7 Ballrooms and Foyer Grosser Saal. Companies will display their products, and representatives will be there to meet Symposium attendees. The 2002 IEEE International Ultrasonics Symposium Exhibitors will be in place from 8 a.m. to 5 p.m. October 9 and 10 and until noon October 11. Companies with space reserved as of June 2002 include:

Valpey Fisher
Panametrics, Inc.
Stavely NDT Technologies
JSR Ultrasonics
EPCOSAG
W.L. Gore & Associates, Inc.
Sawyer Research
Sound Technology, Inc.
TRS Ceramics
Smart Material Corp.
IEEE - UFFC Society

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Jian-yu Lu	The University of Toledo, Ohio, USA
Leonardo Masotti	University 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 Medical Systems/ATL Ultrasound, USA
Lewis Thomas	Siemens/Acuson, USA
Kai Thomenius	GE CRD, USA
Piero Tortoli	University of Florence, Italy
Ton van der Steen	Erasmus University Rotterdam, The Netherlands
Sadayuki Ueha	Tokyo Institute of Technology, Japan
Keith Wear	Food and Drug Administration, USA

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

NAME	ORGANIZATION
Robert C. Addison	Rockwell Science Center, USA
W. Arnold Fraunhofer	Institute for Nondestructive Testing, Germany
Narendra K. Batra	Naval Research Lab/Code 6380, USA
Gerald V. Blessing	NIST, USA
David Cheeke	Concordia University, Canada
Eric S. Furgason	Purdue University, USA

Donna Hurley	National Institute of Standards and Technology, USA
Bernhard Jakoby	Vienna University of Technology, Austria
Lawrence W. Kessler	Sonoscan, Inc.
Pierre T. Khuri-Yakub	Stanford University, USA
Jun-ichi Kushibiki	Tohoku University, Japan
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
Michael J. Vellekoop	Delft University of Technology, The Netherlands
Donald E. Yuhas	Industrial Measurement Systems, Inc, USA
John F. Vetelino	University of Maine, Maine, USA

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

NAME	ORGANIZATION
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	Xerox Corporation, 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
Dennis R. Pape	Photonic Systems, Inc., USA
Valeri Proklov	Inst. of Radio Engineering & Electricity, Russia
Susan C. Schneider	Marquette University, USA
Bikash K Sinha	Schlumberger-Doll Research, USA
Jan G. Smits	Boston University, 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)

NAME	ORGANIZATION
Benjamin P. Abbott	Sawtek Inc., USA
Ali Bagi- Wadji	Technical University, Vienna, Austria
Kushal Bhattacharjee	CTS Wireless Components, USA
Sergei Biryukov	Solid State and Materials Research, Germany

Yasuo Cho	Tohoku University, Japan	LeventDegertekin	Georgia Institute of Technology, USA
Thomas W. Grudkowski	Emerson Electric Company, USA	Jean-Francois Gelly	Thales Microsonics, France
Ken-ya Hashimoto	Chiba University, Japan	Hal Kunkel	Philips Ultrasound, USA
Daniel Hauden	CNRS-LPMO, France	Reinhard Lerch	University of Erlangen, Germany
Mitsutaka Hikita	Hitachi, Ltd., Japan	Geoff Lockwood	Queen's University, Canada
William D. Hunt	Georgia Institute of Technology, USA	Clyde Oakley	Tetrad Corporation, USA
Shen Jen	Crystal Photonics, Inc., USA	Mark E. Schafer	Sonic Tech Inc., USA
John A. Kosinski	US Army Communications Electronics Command, USA	K. Kirk Shung	University of Southern California, USA
Don C. Malocha	University of Central Florida, USA	Scott Smith	GE Global Research, USA
Gary K. Montress	Raytheon Company, USA	Stephen W. Smith	Duke University, USA
Mauricio Pereira da Cunha	University of Maine, USA	Wallace A. Smith	Office of Naval Research, USA
Viktor Plesski	Thales Microsonics, Switzerland	Yasuhito Takeuchi	Kagoshima University, Japan
Bob R. Potter	Vectron International, USA	Roger H. Tancrell	Airmar Technology Corp., USA
Arne Ronnekleiv	Norwegian Institute of Technology, Norway	QimingZhang	Pennsylvania State University, USA
Clemens C. W. Ruppel	EPCOS AG, Germany		
Yoshio Satoh	Fujitsu Laboratories Ltd., Japan		
Peter M. Smith	McMaster University, Canada		
Daniel F. Thompson	Vectron International, USA		
Robert Weigel	University of Erlanger-Nuremberg, Germany		
Peter V. Wright	Triquint Semiconductor, USA		

Group 5 (Vice Chair: Scott Smith - Transducers)

NAME	ORGANIZATION
Lewis F. Brown	South Dakota State University, USA

UFFC CD Archive

The UFFC Digital Archive that you have been enjoying on line at <http://www.ieee-uffc.org> is now available in a CD ROM version for the low price of \$30 for UFFC members only. Please see the registration form for ordering information.

The CD Archive contains the full text of all papers ever published by the UFFC Society from 1954 to the present including all Transactions, Ultrasonics Symposium Proceedings, Frequency Control Symposium Proceedings, International Symposium on Ferroelectrics Proceedings, Newsletters, and nine books. The set consists of 24 CDs in an embossed leather carrying case.

Ferroelectrics

The International Joint Conference on the Applications of FERROELECTRICS 2002 (IFFF)

May 28 – June 1, 2002
NARA, JAPAN

This meeting was a joint meeting of **ISAF XIII**, the eighth International Symposium on the Applications of Ferroelectrics, **ISIF XIV**, the ninth International Symposium on Integrated Ferroelectrics and **FMA XIX**, the nineteenth meeting on Ferroelectric Materials and their Applications. The ISAF XIII was chaired by **D. Payne** and **T. Takenaka**, the ISIF XIV was chaired by **C.A. Auraujo** and **R. Panholzer**, and the FMA XIX was chaired by **T. Shiosaki** and **M. Okuyama**. The general chair for the IFFF was **Tadashi Shiosaki**.

As stated in the greetings this meeting was a memorable occasion in which the most important international symposia on ferroelectrics were joined and held together. The conference was located in the Public Hall of Nara, an ancient capital of Japan, and surrounded by temples including the Todai Ji Temple and the Kasugataisya Shrine in the Nara National Park. This

park is famous for the more than 1000 tame deer living in it and conference participants had plenty of opportunity to pet and feed them.

With more than 700 abstracts and more than 600 participants the chairs of all three sub-conferences considered the meeting as very successful and scientifically rewarding. The creation of this new joint forum enabled a focusing of technical interests not possible with the three conferences meeting separately. Though the more than 250 Japanese attendees outnumbered the rest, the meeting was truly international. Participants from three continents represented 24 countries including Austria, Belgium, Czech, Germany, Latvia, Slovenia, Portugal, Thailand and the USA.

Also included in the number of participants were more than 150 student participants. The conference created a plat-



Todai Ji Temple in Nara.

form for young researchers among well established researchers and scientists.

20 companies and organizations contributed to the exhibitions and the social events, namely the Welcome Party at the Japanese Garden sponsored by Shoen Chemical Inc. and the hospitality suite by Aixtron Inc. These were welcome additions to the social events that were lavishly setup on the Japan Night at Nara-ken Public Hall, the “Boh-Shibara” at the Noh-Theatre, the Banquet and also the farewell party on Friday concluding the conference.

The conference started out with tutorials covering three different themes:

- Piezoelectric Films for Microdevices: Processing, Technology, Properties, and Applications
- Ferroelectric Domains in Thin Films
- Ferroelectricity – The Fundamental, Materials and Applications

The plenary lectures given on Wednesday, Thursday and Friday were given by:

- N. Setter entitled “The down scaling of piezoelectric and pyroelectric ceramics: microdevices, nanofabrication, and size effects”
- N. Nishi “ Does memory of dram come true? (market prospects and technical hurdle from FRAM)”
- A. Safari “Solid freeform fabrication: an intelligent CAD-based system for fabrication of novel functional electroceramics”.

Four parallel sessions covered the topics thin films, piezoelectrics, characterization, fundamental, FeRAM & devices, relaxors, domain & switching, optics, and dielectrics. Thanks to the session chairs, the time schedules were followed closely by the session chairs though the usual technical problems with high-tech PowerPoint presentations occurred. The poster sessions bridging the time between the oral sessions and the evening events were lively with scientists and engineers in discussion and interaction.

Ferroelectrics Recognition Awards

The Ferroelectrics Recognition Awards were presented to:



Morning Dawn at the five story pagoda in Nara National Park.



Prof. Cross (Penn State University) giving a greeting address at the Conference Banquet.



S. Rhee, A. Safari, P. Mural, S. Troler-McKinstry, D. Damjanovic at the Japan Night (from left to right).



T. Shrou, T. Tsurumi and T. Takenaka enjoying drinks at Japan Night.

Prof. Yao Xi, Tonji University and Xian Jiaotong University, China, for the technical innovation in the ferroelectric field, educational leadership in electronic ceramics in China, and outstanding service to the ferroelectric community both domestically and internationally.

Dr. Yukio Sakabe, Murata Manufacturing Co. Ltd., Japan, for outstanding research and development of ceramic dielectrics for use with base metals and for technological innovation in multilayer ceramic capacitors.

General co-chair of the ISAF XIII 2002, Tadashi Takenaka, as a farewell said, "I would like to express my thanks to all members of the Organizing Committee, all sponsor's companies and all authors & participants. We will see you at Montreal, Canada in 2004."

S. Rhee
IEEE-UFFC Publicity Chair



A. Safari, unknown, M. Kosic, T. Shiosaki enjoying drinks at Japan Night.

Photographs: S. Rhee, S. Turcu

11th International Symposium on Electrets (ISE11)

1-3 October 2002
Melbourne, Australia

The 11th International Symposium on Electrets (ISE11) will be held in Melbourne, Australia 1-3 October 2002, with a workshop following on 4 October. The ISE is held once every 2-3 years, and this is only the second time since its inception in 1967 that it is being hosted in the Southern Hemisphere. It is sponsored by the IEEE Dielectrics and Electrical Insulation Society, and in 2002 it is also technically co-sponsored by the UFFC Society. In order to emphasize this broadening of the scope of the Symposium, two of the invited speakers (Professor Susan Troler-McKinstry and Professor Ahmad Safari) are distinguished active researchers in the UFFC area. UFFC members are therefore cordially invited to attend the Symposium. Further information, and copies of the Registration Form, will be found at <http://ise11.spme.monash.edu.au>.

Topics:

Scientists from industry, research institutes and universities are invited to attend the Symposium. In addition to the established electret topics discussed at previous meetings in the ISE series, topics of interest to members of the IEEE Ultrasonics Ferroelectrics and Frequency Control Society will also be included in the program, reflecting the technical co-sponsorship of ISE11 by the UFFC Society. The program will include sessions on

- Injection, transport and trapping of charge, polarization
- Thermally stimulated processes, radiation and field effects
- Non-linear optics and electrooptical effects
- Piezo-, pyro- and ferroelectric phenomena
- Ferroelectric ceramics and thin films

- Thin film ferroelectric memories
- Bioelectrets and photoelectrets
- Molecular electrets, especially those involving composite or novel materials
- Applications

Venue

The Symposium will be held 1-3 October 2002 in the Novotel Hotel, Glen Waverley. Glen Waverley is a suburb of Melbourne, about 20 km from its centre. Melbourne has a population around 3 million and is Australia's second largest city.

Workshop

A workshop entitled "Space charge profile measurements - practice, problems and potential" will be held on Friday 4th October at the same venue.

Invited Lectures

Invited lectures at the Symposium will include the following:

- C. Lacabanne, Universite Paul Sabatier, France - "Polymers with various chemical structures and chain architectures studied by TSC and broadband dynamic dielectric spectroscopy"
- J. vanTurnhout, Technical University of Delft, The Netherlands - "New developments in the TSD-analysis of electrets"
- R. Gerhard-Multhaupt, University of Potsdam, Germany - "Porous polymer electrets ; new materials, new challenges, new chances"
- S. Trolier-McKinstry, Pennsylvania State University, USA - "Piezoelectric films for MEMS applications"
- A. Safari, Rutgers State University of New Jersey, USA - "Trends in multi-layer capacitors"

Robert Fleming
Chairperson ISE11

IEEE-UFFC Ferroelectrics Committee Meeting Minutes Nara, Japan, May 28, 2002

Meeting Call to Order and Past Minutes

Seventeen members of the Ferroelectrics Committee were present for the Nara, Japan meeting. Ferroelectrics Committee members in attendance were Dwight Viehland, Dr. R.K. Pandey, Yao Xi, Angus Kingon, Helen Chan, Marija Kosec, Walter Schulze, Rainer Waser, Nava Setter, Steve Pilgrim, David Payne, Stephen Streiffer, Susan Trolier-McKinstry, Tom Cutchen, Ahmad Safari, Tadashi Takenaka and Bruce Tuttle. Dr. Shiosaki, General Chair of the IFFF 2002 joint meeting, Dr. Takaaki Tsurumi, IFFF 2002 Publications Co-chair, and Dr. Soichiro Okamura, IFFF 2002 organizer and Registration Committee Chair also attended the Ferroelectrics Committee Meeting. The IFFF 2002 meeting is a first-ever joint meeting of three different organizations: ISAF (International Symposium on the Applications of Ferroelectrics, sponsored by the IEEE Ferroelectrics Committee), ISIF (International Symposium on Integrated Ferroelectrics) and FMA (Ferroelectric Materials and Applications, Japan domestic meeting on applications of ferroelectrics). Tom Cutchen, Chair of the Ferroelectrics Committee, called the meeting to order and outlined a 15 item agenda. Bruce Tuttle, Secretary, presented the minutes from the last meeting held in April 2002 in St. Louis. The minutes had previously been approved by the committee membership via email.

Report on the Plans and Budget for the IFFF2002 and ISAF 2002 Meeting

Dr. Okamura gave both a written and an oral report on the IFFF 2002 meeting being held in Nara. He announced that as of May 21, 2002, there were 610 attendees for the IFFF 2002

joint meeting. This figure was later revised to 633 attendees at the end of the meeting. The 610 number included 419 regular attendees, 169 students and 22 others. Composition included 344 foreign and 266 Japanese attendees. A total of 19 companies and one organization signed up for the exhibitions. He then reviewed the technical and social activities that were being planned for the meeting.

Dr. Okamura next presented the latest projected budgets for both the overall IFFF 2002 meeting and for the ISAF 2002 share. For the projected budget, an income of \$102,092 was estimated for the ISAF 2002 share, representing one third of the total budget by prior agreement and the Memorandum of Understanding. The ISAF 2002 share of total projected expenses for IFFF 2002 was predicted to be \$94,422, resulting in a projected \$6,742 surplus for ISAF 2002 (see table below). The above included the amount ISAF would pay back to IFFF 2002 for the reduction in registration fees for IEEE members. Specifically, 61 members each received a discount of \$72 each, which multiplied by 2/3 gives the \$2,928 cost that IEEE would provide. Dr. Shiosaki, lead organizer and General Chair for IFFF 2002, noted the tremendous fiscal support from Japanese companies for the meeting. This support was mainly for the marvelous dinners and activities that occurred each evening throughout the meeting.

A brief summary of the Income and Expenses for ISAF 2002 and for IFFF 2002 is shown below in tabular form.

	ISAF 2002	IFFF 2002
Income:	\$102,092	\$306,280
Expenses:	\$92,422	\$277,272
Inc - Exp:	\$9,670	\$29,008
IEEE Support:	-\$2,928 (\$72 X 61 X 2/3)	
	Total Surplus to ISAF: \$6,742	

Report on the Publications Plans for ISAF 2002

Dr. Tsurumi announced that students would receive only CD copies of the ISAF Proceedings, no printed copies. Soubon-sha, in Japan, will be the publisher. Three estimates were provided for the publication costs; these were based on 650- (1 volume), 750- (2 volumes) and 850-page (2 volumes) Proceedings, respectively. The cost estimates were \$13,000, \$14,900 and \$17,000, respectively. The total cost for the shipping costs of the ISAF Proceedings is presently projected to be \$11,620. Sending bulk mailings of multiple copies of the Proceedings to distributors in selected countries for distribution by them may reduce the cost. Grady White of NIST has volunteered to distribute to U.S. conference attendees. Nava Setter thought that a similar distribution could be done for Europe, and that using India as the center for European distribution might be most cost effective. Nava agreed to determine what the best approach would be for European distribution. Dr. Yao Xi agreed to look into the costs of distributing the proceedings in China for which he would serve as the distributor. Using the present distribution system, Dr Tsurumi estimated that there could be a \$4,000 total loss, ($\$30,120 - \$34,120 = -\$4,000$), for publication based on current projections, if the 850-page 2-volume issue is required. Based on the number of abstracts anticipated, however, the lower printing cost of \$13,000 appears likely, which would offset the \$4000 differential.

ISAF 2004

Steve Pilgrim and Walter Schulze, co-organizers of ISAF 2004 to be held in Montreal, made their report. They are populating their committees and have partly filled these positions. They hope to populate all meeting positions by the end of the IFFF 2002 Meeting. Ahmad Safari asked about the tutorials for ISAF 2004. Steve Pilgrim noted that there are two general types of tutorials being presented. There will be general information types of tutorials for Ultrasonics and Frequency Control members and more technically detailed tutorials for those more familiar with ferroelectric materials and devices.

ISAF 2006

Angus Kingon provided a written and an oral proposal for the Raleigh, North Carolina Conference Center as a site for the ISAF 2006 meeting. For this proposal, Jon-Paul Maria of North Carolina State is the General Chair with Angus serving as Finance Chair, and Susan Trolier-McKinstry serving as Publicity Chair. Technical Program Chairs will be David Cann of Iowa State and Hiroshi Funakobu of the Tokyo Institute of Technology. Angus provided details of the attractions near Raleigh that will likely improve conference attendance.

The question of whether there were going to be any other proposals submitted to the Ferroelectrics Committee for the ISAF 2006 Meeting was presented. There were no responses

from the committee. In response to the question of whether Penn State was going to submit a proposal for the 2006 Meeting, Susan Trolier-McKinstry stated that Penn State would not submit a proposal. Penn State was very pleased with the North Carolina location for the meeting and they deferred to NC State for organizing the ISAF 2006 Meeting.

Dwight Viehland noted that there was an initial plan for ISIF and ISAF to hold their meetings together on a semi-regular basis. Susan stated that she would approach ISIF at the ISIF Advisory Board Meeting to be held in Nara on May 31, 2002 to discuss future joint meetings. David Payne noted that the arrangements between ISAF and ISIF should be a fair split between the two organizations for all future meetings.

Ahmad noted that the IEEE wants 25% surplus from Society technical meetings and requested that this be discussed at the next Ferroelectric Committee Meeting. David Payne commented that this meeting generated a surplus because of generous donations from Japanese Industry and that this must be considered in future budget planning.

Tom Cutchen made a motion for Jon-Paul Maria of North Carolina State to organize the ISAF 2006 Meeting that would be held in Raleigh, North Carolina. The Ferroelectrics committee passed this motion.

Awards

Steve Pilgrim announced that two Ferroelectric Recognition Awards would be awarded on Wednesday, May 29, at the IFFF 2002 meeting. The two awardees were Dr. Yao Xi and Dr. Yukio Sakabe. In addition, Steve also presented a plaque for the prestigious IEEE Fellow Award to Dr. Shiosaki later in the Nara meeting.

New Chair of the Ferroelectrics Committee

At this point in the meeting, Tom Cutchen formally announced the transfer of Committee Chairmanship to Susan Trolier-McKinstry. Susan requested nominations for vice chair, with the caveat that there would be no vote during this meeting. There were no nominations provided at the meeting, but Susan noted that she would gladly receive nominations by email.

Next Ferroelectrics Meeting

Susan announced that the next Ferroelectrics Committee meeting will be held in conjunction with the Materials Research Society Meeting in Boston in December. The preferred date of the meeting would be on Monday evening December 2, 2002 with a dinner afterwards.

The meeting was then adjourned.

Bruce Tuttle
Secretary of the Ferroelectrics Committee
June 4, 2002

Frequency Control

2002 IEEE International Frequency Control Symposium & PDA Exhibition – 29-31 May 2002 and Tutorials – 1 June 2002 New Orleans, Louisiana, USA

Errol EerNisse, General Chair of the **2002 IEEE International Frequency Control Symposium & PDA Exhibition**, reports that the symposium was a success technically, professionally, financially and socially. Special thanks to the Program committee:

General Chair

Errol P. EerNisse, Quartzdyne, Inc.,

Technical Program Chair

John R. Vig, US Army CECOM

Tutorial Chair

John D. Prestage, Jet Propulsion Laboratory

Exhibits Chair

Jack Kay, Kay, Inc.

Finance Chair

Raymond L. Filler, U.S. Army CECOM RDEC

Editorial-Chair

John R. Vig, U.S. Army CECOM

Awards Co-Chairs

Thomas E. Parker, NIST

Jack Kay, Kay, Inc.

Exhibition Sponsored by:

Piezoelectric Devices Association, Inc.

There were 152 Papers presented including 100 Oral presentations and 52 Posters presentations. The papers were from 25 countries with 59% being from outside the United States. The largest contributing countries after the US were Japan (23), Russia (19), P. R. China (15), France (10), Australia (8), and Germany (8).

A total of 378 attendees registered. 59 people attended the tutorials that were held following the conference. Attendees

came from 22 countries. The largest contingents were from Japan (22), Germany (11), and France (10).

Frequency Control Awards

A highlight of the symposium was the awards ceremony. This year the Awards recipients included:

IEEE UFFC Frequency Control Awards

Cady Award: Eugene N. Ivanov, “for the development of ultra-low noise microwave oscillators and pioneering research in the field of microwave circuit interferometry”.



Eugene Ivanov receiving the Cady Award from Mike Driscoll.



Bill Riley presenting the C.B. Sawyer Award to Michael Garvey.



John H. Shirley receiving the I.I. Rabi Award from Bob Drullinger.



The awardees and the presenters from left Bill Riley, Mike Garvey, Jon Shirley, Bob Drullinger, Eugene Ivanov, and Mike Driscoll.

I.I. Rabi Award: Jon H. Shirley, “for profound and continuing contributions to the understanding and advancement of the science of accuracy evaluation in primary frequency standards”.

C.B. Sawyer Award: R. Michael Garvey, “for exceptional leadership and technical contributions in the successful development of commercial atomic frequency standards and other time and frequency products”.

PDA Awards

Juergen Staudte Memorial Award: Gary Johnson, “for many years of outstanding leadership, dedication and contributions to the industry”.

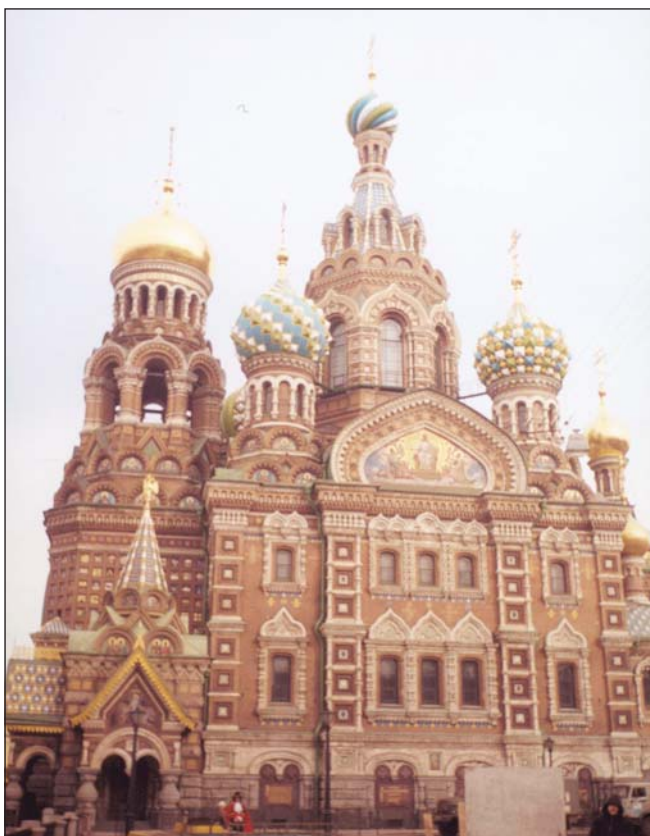
David P. Larsen Award: Bill Hanson, “for many years of dedication and engineering contributions to the industry”.

European Frequency and Time Forum

St. Petersburg Russia

12-14 March 2002

Mike Garvey reports in photos from the European Frequency and Time Forum that was held in St. Petersburg Russia 12-14 March 2002.



Church on Spilled Blood in St. Petersburg, Russia.

Church on Spilled Blood

A church by any other name... The multi-domed Church on Spilled Blood (☒ 315 16 36, *Konyushennaya pi*; adult/student \$8.50/3.60; open 11am-6pm Thur-Tues) is also known as the Church of the Resurrection of Christ, and various combinations of both of these names are also often heard. It sits on the Griboedova Canal north of Nevsky pr and was built between 1883 and 1907 on the spot where Alexander II, despite his reforms, was blown up by the People's Will terrorist group in 1881 (that explains the gruesome name).

It's now most commonly known as the church that took 24 years to build and 27 to restore. In August 1997, with much fanfare, it finally opened its doors after painstaking work on the 7000 sq metres of mosaics by over 30 artists which line the walls inside. On the very spot of the assassination is a marble bust *Shatrovy Cen* of Alexander (some tourists have mistaken this for a bust of Stalin!). However, the exterior is endlessly more impressive than the interior (especially considering the hefty price of admission). If your budget's tight, stick to gawking at the candy-cake Russian Revival style marvel, the only one of its kind in the city.

A few facts: There are 20 granite plaques on the facade which record, in gold letters, the main events of Alexander's reign; the steeple is 81m high; the mosaic panels about half-way up detail scenes from the New Testament; and the 144 mosaic coats of arms each represent the provinces, regions and towns of the Russian Empire of Alexander's time, which all joined in mourning the death of the tsar.



Mike Garvey in St. Petersburg.



John Vig in St. Petersburg.

Joint Meeting
2003 IEEE International Frequency Control Symposium
and PDA Exhibition
and
17th European Frequency and Time Forum
Tutorials on 4 May, Symposium 5-8 May, 2003 at the Marriott
Waterside Hotel, Tampa Florida, USA

The Symposium is sponsored by the IEEE Ultrasonics, Ferroelectrics & Frequency Control Society and the European Frequency and Time Forum; and the Exhibition is sponsored by the Piezoelectric Devices Association

The first joint meeting in the United States of the IEEE International Frequency Control Symposium, the European Frequency and Time Forum and the Piezoelectric Devices Association is scheduled for 5-8 June, 2003 at the Marriott Waterside in Tampa Bay, Florida. This unique meeting will combine the technical sessions of the leading conferences in Europe and the United States with the industry's largest com-

mercial exhibition organized by the Piezoelectric Devices Association.

The latest technical developments related to materials, components, and systems will be presented in technical sessions suitable for commercial and academic research scientists, applications engineers, and time keeping specialists that benefit from knowledge of frequency control technology at current state of the art standards. Those involved directly or indirectly with manufacturing, specifying, measuring, or otherwise using time and frequency control technology will benefit from attendance.

The latest in materials, manufacturing equipment, and frequency control products will be on exhibit in over 50 booths throughout the conference.

Tutorial sessions broadly covering the existing knowledge base of frequency control technology will be offered on 4 June. These tutorials are presented by the most experienced experts in the community and are suitable for new comers and

experienced members of technical staffs seeking to upgrade and broaden their knowledge.

This conference will attract over 500 participants from more than 25 countries, providing a special opportunity to attend an especially large number of technical presentations of the highest quality, remain current on commercial developments, and to make new acquaintances in the frequency control community or renew old friendships with colleagues from around the world.

Gary R. Johnson
Sawyer Research Products, Inc.

PRELIMINARY CALL FOR PAPERS

**Deadline for Submission:
December 1, 2002**

The 57th consecutive meeting of the Frequency Control Symposium will be held jointly with the European Frequency and Time Forum at the Marriott Waterside Hotel, Tampa, Florida USA. These are the leading international technical conferences for research and development directed towards frequency control, precision timekeeping, and resonant sensors.

Authors are invited to submit papers (send abstracts to the fcs-group email address below) dealing with recent and original work of interest to the frequency control and timing communities in the following subject categories:

Group 1 — fcs-group1@ieee.org

- A. Fundamental Properties of Materials
- B. Theory and Design of Resonators and Filters

Group 2 — fcs-group2@ieee.org

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

Group 3 — fcs-group3@ieee.org

- A. Atomic Frequency Standards
- B. Atomic Clocks for Space Applications
- C. Frequency and Time Coordination
- D. Measurements and Specifications
- E. Applications of Frequency Control
- F. Optical Frequency Standards

Group 4 — fcs-group4@ieee.org

- A. Resonant Chemical Sensors
- B. Resonant Physical Sensors
- C. BAW, SAW Sensors
- D. Transducers

Group 5 — fcs-group5@ieee.org

- A. Manufacturing Technology

Additional information can be found at the following websites <http://www.ieee-uffc.org/fc> and <http://www.eftf.org/>

Local Environment

Tampa is a city of 300,000 people located at the top of Tampa Bay on the western (Gulf) coast of Florida. Tampa enjoys an average May temperature of 78 F (25 C) and more than 300 sunny days per year. Tampa was first a home to Native Americans; the first white settlement in Tampa was in 1823. In the 19th century rapid growth was stimulated by the fishing industry, phosphate mining, construction of railroads and the introduction of cigar making. Tampa today is home to vibrant industry and entertainment and some of the most succulent seafood in the U.S.

The Tampa Marriott Waterside Hotel will host the Symposium in 2003; the Waterside hotel is located directly on the Tampa waterfront, close to downtown and the famous Ybor City. The conference hotel rates extend through the weekend, so plan to extend you stay and enjoy the attractions of Tampa.

Tampa's attractions include:

Tampa is the home of **Ybor City**, the former "Cigar Capital of the World" and location of 200 cigar factories. Demonstrations by master tabaqueros (cigar makers) illustrate the traditional techniques of hand rolled cigars. Ybor City, Tampa's Latin Quarter, has exciting entertainment and restaurants where the Cuban sandwiches are hot and crisp. Visit the legendary **Columbia Restaurant** for traditional Spanish bean soup, paella and exotic Flamenco dancing. Visit the **Henry Plant Museum** and experience a quintessential Victorian palace built in the unique Moorish revival style to reflect the Gilded Age of railroads in the U.S. Visit the **Florida Aquarium** to see Florida's spectacular wildlife in natural settings. The Aquarium provides a boat tour of Tampa Bay where you can expect to see bottlenose dolphins and the docile (and endangered) manatees. At the **Museum of Science and Industry**, experience the winds of a Gulf coast hurricane or enjoy a film in the OMNI dome theater. Tampa is also home to Busch Gardens, a theme park famous for its large exhibit of African animals and its tropical gardens.

Symposium attendees should make their own hotel reservations. Information regarding hotel accommodations will be available in the Advance Program, which will be mailed in early March, 2003.

Tampa has convenient flight connections from within the U.S. and from Europe including direct flights from London, Atlanta, Washington D.C. (Dulles), New York and Chicago.

Award Nominations

Formal nominations and suggestions of deserving nominees for the EFTF Award and the Young Scientist Award (both awards sponsored by Société Chronométrique de France) should be sent to the EFTF Awards Chairman Raymond Besson, rbesson@ens2m.fr. Formal nominations and suggestions of deserving nominees for the IEEE/UFFC Cady, Rabi and Sawyer Awards should be sent to the IEEE/UFFC Awards Chairman, Thomas E. Parker, tparker@boulder.nist.gov. (See "Awards" at <http://www.ieee-uffc.org/fc>.) Formal nominations and suggestions of deserving nominees for the PDA Larsen and Staudte Memorial Awards should be sent to the Piezoelectric Devices Association Awards Chairman, Jack Kay, kayinc@accessus.net.

Exhibits

For information on arranging for exhibit space, please contact:

Jack R. Kay

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Overland Park, KS 66213
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Tom Jones

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The deadline for arrangements is April 4, 2003

Tutorial Information

On Sunday, 4 May 2003, there will be a series of tutorials covering a wide range of related topics. The tutorials include both the fundamental topics of frequency and timing at a level suitable for practitioners new to the field, and more advanced and specialized topics related to specific areas. As such, the tutorials aim to provide useful knowledge to the beginners in the community, as well as those with extensive experience. Additional information will follow in the Advance Program. Previously presented tutorials may be seen at <http://www.ieee-uffc.org/fc>

NOTICE

Because of increasing postage costs and improved efficiencies of electronic transmission, future Meeting Announcement and First Call for Papers will be sent to our mailing lists electronically. If you wish to remain on, or be added to, our mailing list please send your e-mail address to: Mcgivneyb2@aol.com

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Establishment of the Quartz Industries Association of Taiwan

After two decades of continuous growth, Taiwan is now one of Asia most important manufacturing bases of desktop computers, notebooks, TFT-LCD monitors, mobile phones, cable modems, wireless peripherals like WLAN cards, etc. All these products need quartz crystals and oscillators for frequency generation and control. The output of the quartz industries in Taiwan is now ranked number 5 in the world. In addition, with Taiwan recently achieving more than 100% mobile subscriber penetration rate (each person in Taiwan has more than one mobile phone number) and the ever increasing contract manufacturing of brand name mobile phones in Taiwan, SAW filter companies are also sprouting up.

The Quartz Industries Association of Taiwan (QIAT) was formally established on May 20th of this year in Taipei, the capital city of Taiwan. The purpose of QIAT is to:

1. Provide forums to bring together the industries, government agencies, universities and research organizations so to promote the importance of the technologies
2. Link up with the international research institutes, universities, professional societies and associations of the related technologies so to enhance information and technical exchanges
3. To bring together the manufacturers of crystal and SAW products in Taiwan to better serve the domestic and international customers.

QIAT sponsored its first seminars on June 20th. The invited speakers were Dr. Jun Yamada of Hitachi and Dr. Sakichi Ashida formerly of Samsung and LG. They covered the sub-

jects "Technology and Standardization of Mobile Telecommunications" and "Growth and Characterization of AlN, ZnO and PZT Thin Film for FBAR Devices", respectively. QIAT welcomes researchers from all over the world to come to Taiwan to exchange ideas. One of QIAT's goals is to invite the IEEE-UFFC Society to consider holding its Ultrasonics Symposium and/or the Frequency Control Symposium in Taiwan in the next few years. For more information, please contact:

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C.S. Lam, Ph.D.
VP and CTO
TXC Corporation

Chapter Activities

Japan Chapter

The Japan Chapter held 5 technical meetings during the first half of 2002, in conjunction with the Technical Group on Ultrasonics of the Institute of Electronics, Information and Communication Engineers of Japan and the Acoustical Society of Japan:

Date	Papers	Venue
1) January 24-25	24	Kyoto
2) February 26	8	Chiba
3) April 22	7	Tokyo
4) May 20	8	Tokyo
5) June 28	9	Tokyo

31st Symposium on Electromechanical Functional Devices

The 31st Symposium on Electromechanical Functional Devices (EM Symposium) was held at Tokyo Metropolitan University in Hachioji, Tokyo, on May 15-16, cosponsored by the UFFC-S Japan Chapter. The number of participants was 146, and 18 contributed papers, 3 tutorials and one special lecture were presented.

Special Issue of JJAP on Ultrasonic Electronics

Most of the papers presented at the 22nd Symposium on Ultrasonic Electronics (USE2001) held on November 7-9, 2001, have been published in the special issue of Japanese Journal of Applied Physics, Vol.41, No.5B (2002). The special issue contains 86 regular papers and 24 short notes. The articles in the issue may be browsed by accessing the JJAP Online at "<http://www.jjap.or.jp/online/>".

UFFC-S 2002-2003 Distinguished Lecturer Program

The Japan Chapter is planning to invite Professor K. Kirk Shung of the Pennsylvania State University, the UFFC-S 2002-2003 Distinguished Lecturer, to Japan in November. He will be asked to give an invited talk at the 23rd Symposium on Ultrasonic Electronics (USE 2002) in Kanazawa and lectures at some other technical meetings.

Ken Yamada
Vice Chair
UFFC-S Japan Chapter

UFFC-Society AdCom Meeting Notes of 7 June 2002

[Subject to AdCom Approval for the “Minutes”]

The Administrative Committee (AdCom) meeting of the **Ultrasonics, Ferroelectrics, and Frequency Control Society** (UFFC-S) was called to order at 8:23 am, 7 June 2002, by Society President, Ahmad Safari. The meeting was held in conjunction with 2002 IUS Technical Program Committee meeting in Chicago, Illinois.

Fred Hickernell made and Lute Malecki seconded a motion that passed **To approve the 7 October 2001 (Atlanta, Georgia) AdCom minutes as corrected.**

President’s Report

Ahmad Safari discussed how the UFFC Society along with all other IEEE societies is going through financial hardship as a result of IEEE infrastructure charge allotment among societies.

Susan Trolier-McKinstry asked if the infrastructure charge is ever going to go down. John Vig and Jan Brown both answered this question. John Vig said probably yes, but when it comes down to specifics, it’s very difficult. Last year, HQ got over 250k inquiries relating to a wide range of things. Everybody agrees we should cut infrastructure charges, but it is difficult to find what to cut. John reminded us that we need to remember that IEEE is a \$225M business today, run by volunteers who are part-timers. Jan Brown indicated that regardless of whether total infrastructure costs go down, TAB voted to move from taxes based on reserves to taxes based on number of members. In the long run this will be a fairer distribution of costs especially for the small societies with healthy reserves.

Ahmad stated that we need to be conservative on spending, and we also need to raise revenues wherever we can – symposia, transactions, etc. He is confident we will overcome this problem in a few years. John Vig is Director of Division 9 and is on the IEEE Board of Directors. He will be making several motions at the next board meeting. Ahmad says he and Jan and John will attend the upcoming TAB meeting and will report on these issues at the next AdCom meeting.

Finance Report

Chair Herman van de Vaart provided written and oral reports of the Society’s finances. Budgeted surpluses for 2001 and projected for 2002 have or will end up being large deficits, resulting in the Society reserves being reduced to slightly over \$160k at the end of 2002. The drastic reduction in reserves is why we have to be careful in how we spend the money. Herman presented the proposed 2003 budget (first pass) and described proposed changes which would reduce the printing and mailing costs, and also provide additional income from people who buy the hardcopy.

Herman van de Vaart made and Jan Brown seconded a motion that *passed* (16 in favor, 2 opposed) **To increase the**

UFFC membership dues to \$20 (an increase of \$5), to set the price for hard copy Transactions at \$40 (only electronic access is included in membership), and to increase the non-member subscription price to \$475. Herman indicated that these changes should save us about \$105k. Prior to passage of this motion, there was a significant amount of discussion related to the proposed changes. A substantial discussion occurred regarding providing a CD version of Transactions, either included in the membership fee or for an additional fee. Jan Brown said the publications committee would look into these ideas and get quotes to produce a CD with the Transactions only at the end of the year, as well as other options discussed.

Reinhard Lerch made and Jan Brown seconded a motion that *passed* (17 in favor, 0 opposed) **To have AdCom provide each member of the Awards Committee with a free copy of the print Transactions (hardcopy).** This motion was in response to concern that members of the Awards committee, who are asked to review all of the papers, might have to pay \$40 for a hard copy.

Herman van de Vaart made and Jan Brown seconded a motion that *passed* (18 in favor, 0 opposed) **To have a 2003 Transaction budget of 1872 editorial pages and 12 issues.** Prior to the vote on this motion there was a brief discussion of whether or not to reconsider having 12 issues. Jan Brown predicted that within 3-4 years we probably will not have print Transactions at all, and that it would not be worthwhile to change the number of issues now.

Herman van de Vaart made and Jan Brown seconded a motion that *passed* (13 in favor, 3 opposed) **That AdCom approve the proposed overall budget for 2003.**

Susan Trolier-McKinstry made and Jackie Hines seconded a motion that *passed* (13 in favor, 3 opposed) **That AdCom change the planned numbers for the 2002 Ferroelectrics Conference in the recently approved overall budget for 2003 to an income of \$102.092k and a surplus of \$6.742 K, with the balance being expenses.** This motion was made to more accurately reflect numbers we know already to be wrong in the budget.

Publications

Jan Brown, Publications VP, provided a report noting that TAB passed motions last year that conferences held in 2003 will be submitted in electronic format. The IEL accesses data through IEEE EXPLORE – so everything needs to be compatible with this from 2003 on. We will need to be full explore pdf compatible, or provide a scanned image with ability to search.

The other main item was that UFFC now has Jian-yu Lu as Editor-in Chief and Marjorie Yuhas as Associate Editor-in

Chief of the Transactions. They provided an oral and written report of their activities since last December. A great deal has been done in this short time frame. Highlights include: finished the transition from the previous editorial office (Bill O'Brien at U. of Illinois), changed to electronic submission & peer review, and established Manuscript Central (MC). Eventually we hope to have a multimedia (interactive) and color transaction.

Jian-yu showed data on the number of papers and the AE activity rate. Marj Yugas talked about shortcomings in current system in its inability to produce reports that show the aging process of manuscripts in the system. MC should really improve the visibility into the process and timeline for each AE. MC will also allow tracking, and Marj can focus on old manuscripts. All in-progress manuscripts (170+) were submitted in the old system. Starting June 1, manuscripts will go through MC. Paper-based peer-review system will phase out. John Kosinski indicated he had already successfully processed one paper through MC in only a few days, so MC should drastically cut the time required for the review process. A substantial discussion of the old and new systems ensued.

Gerry Blessing gave recognition to Jian-yu Lu and Marjorie Yugas for the tremendous amount of effort they have expended during this transition process. Gerry also commented on Jan Brown's tutelage in this effort and stated that "this whole group is just tremendous". Ahmad Safari also stated that he wants to recognize Bill O'Brien's past 16 years of service as transactions editor and the high quality of our transactions. Jan Brown reminded the AdCom that Jian-yu and Marj have been appointed for a term of three years, and are putting in place a lot of mechanisms to make things easier for others who may follow them.

John Vig said that the Web site is doing nicely, and the digital archive on the web is responsible for increase in membership. Quite a few people are joining, apparently to use the archive. We are one of the few societies gaining membership – and archive is one of the few things we offer that other societies do not offer. If anyone has recommendations on things we should make available to others on the web – let John know. Jan Brown mentioned that HQ has said that society web pages should look similar to the HQ IEEE site. John and Jan will be working with FASS to do this. Anyone else on AdCom who cares and wants to be involved in this process should contact Jan Brown.

Ferroelectrics Committee

Susan Trolier-McKinstry, Ferroelectrics VP, provided an oral and written report on the committee's symposia accomplishments and plans for 2006. The 2002 meeting held in Nara Japan was very successful, and should result in a surplus (exact amount TBD). Sorah Rhee will be leading the efforts to update the Ferroelectrics portion of the UFFC web site. Two nominations for vice-chair of Ferroelectrics have been received, and a vote will be taken in Dec. 2002. Herman van de Vaart pointed out that the President of the Society officially appoints vice-VPs.

David Payne, General Co-chair for *ISAF 2002* (May 29-June 1) in Nara, Japan, provided a detailed post-conference report for the recently completed successful joint meeting of ISAF 2002

with both the International Symposium on Integrated Ferroelectrics (ISIF) and Ferroelectric Materials and Applications (FMA). The joint meeting of the three societies was called *IFFF 2002*. The next possible joint meeting combining UFFC ISAF and ISIF would be 2006, although there are concerns about surplus guarantees and unequal sharing of risk.

Frequency Control Committee

Lute Maleki, Frequency Control VP, provided an oral report on *FCS 2002* (29 May – 1 June) in New Orleans, Louisiana, which was very successful, having 378 attendees and 152 papers presented. It was truly an international conference, with a majority of the papers from outside the US. Financially the meeting met goals and made about 15-16% surplus, slightly over the budget goal. John Vig put together an outstanding program which was very well received including the plenary talk on the physics of the violin.

The financial report for *FCS 2001* in Seattle revealed a loss of \$33K due to several factors including low attendance, high meal costs, and high printing costs.

Mike Garvey, General Co-chair with R. Besson for *FCS 2003* (4-9 May) in Tampa, Florida, provided a written and oral status report for the Symposium that will be held jointly with the 17th European Frequency and Time Forum. A discussion of member/non-member fees led to the conclusion to have a small (\$25) differential.

John Vig made and Lute Malecki seconded a motion that *passed* (18 in favor, 0 opposed) **That AdCom approve the budget for FCS 2003 as modified.**

Mike mentioned a new method for abstract submission via e-mail lists. TPC meetings are set up for Boston, Paris and Boston.

Lute Malecki made and Susan Trolier-McKinstry seconded a motion that *passed* (16 in favor, 1 opposed) **That AdCom approve the Cady Award description as submitted by Tom Parker.** The approved version reads: "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."

Mike Garvey stated that we still need a tutorial chair for the 2004 joint conference in Montreal. He submitted a written and oral report for the conference. Lute Malecki said that the 2005 chair designee has resigned. UFFC has been approached by PTI (Precision Time and Time Interval) as they are interested in a joint meeting. Lute is happy about possibility, but there are a lot of issues to resolve. We currently have a straw MOU for review. Mike Driscoll said he wanted to thank and commend Mike Garvey for the amount of detail he has gone into for his conferences.

Lute Malecki made and John Kosinski seconded a motion that *passed* (18 in favor, 0 opposed) **That AdCom approve Mike Driscoll as General Chair for the 2005 and 2006 Frequency Control Symposia.**

Ultrasonics Committee

Jim Greenleaf, Ultrasonics VP, submitted a written and oral report on Ultrasonics activities.

Herman van de Vaart, provided a financial report for *IUS 2001* (7-10 October) in Atlanta, Georgia, which was held jointly with the World Congress on Ultrasonics. The conference lost \$41,670.09. This was primarily due to lower registration and higher costs for social functions (such as coffee breaks, etc.).

Reinhard Lerch gave an oral Report on the IUS to be held Oct 8-11 2002 in Munich Germany. We have 750 abstracts submitted, which is a high number. These will be reduced to about 570 papers in five oral sessions. The conference has blocked 500 hotel rooms, and can organize 200 more rooms if needed. The hotel room price \$120 including tax and breakfast. Clemens Ruppel and Robert Weigel, Bernie Tittman, Helmut Emert, and Reinhard are organizers. For social programs, there is a reception hosted by the Bavarian government – we have allowance to bring 500 people in, if we want to bring more we would pay \$25pp. A reception will be held on Wed October 9th, and a banquet on the 10th for 380 attendees. Spouses program is organized – tour Munich and a number of castles including Neuschwanstein Castle, and there are some suggestions for Saturday as well. Herman van de Vaart stated that AdCom approved the budget half a year ago. Registration fee ranges from \$400 for member advanced to \$600 for non-member on site. Print copies of proceedings will be \$100, and we have no idea how this will work out but Herman assumed 200 people would take the hard copy proceedings.

Jim Greenleaf told AdCom the IUS in 2003 will be in the Hilton Hawaiian Village, and positions for local arrangements and publicity are open. The 2004 conference is joint in Montreal (heard from Mike Garvey about this already). The 2005 conference will be in Rotterdam, Netherlands. The 2006 conference location is still open, but the west coast of U.S. or Vancouver are likely. Then in 2007 we should go somewhere in pacific rim/Asia, and then back to the U.S. for two years.

Awards

Awards Chair Reinhard Lerch provided a short oral report, stating that all three UFFC awards are on the way, with the awards committee members (for election). He will go over the results at the next ADCOM meeting. Please inform Reinhard if you have any nominations.

Bernie Tittman submitted an oral and written report on distinguished lecturers (David Payne 2001-2002; Kirk Shung 2002-2003, and Stephen Jefferts 2003-2004), along with information on available awards and the Awards Board activities and schedule. Steve Jefferts, National Institute of Standards & Technology, will start next year as the 2003-2004 UFFC-S Distinguished Lecturer for “Atomic Clocks: Past, Present and Future.”

Bernie is also working with two candidates (nominees) for the Siemens award (Medal in Engineering Excellence). He is finding out this is a very difficult, competitive issue. All three technical area VPs please review awards descriptions and see if there are nominees.

John Vig – represents IEEE on the Hoover Medal Board – given to engineers for non-technical achievement (civic/humanitarian). This is a multi-society award (including American Society of Chem. Engineers, ASME, and others). Please let John know if you have someone in mind for this.

Membership Services

Chair Rajesh Panda attended the membership development meeting at HQ and presented a written and oral report noting that Society membership numbered 2261 as of April 2002. The disturbing fact is that we are losing 5 to 9% of our members to non-renewal. It is difficult to get new members compared to retaining – how do we retain current members? What is the advantage to being a member? As John Vig mentioned, the digital archive is a unique feature and we should promote it. Lute Malecki asked if we have contacted those who left to see why. Rajesh indicated he had just gotten the data last week and will try to go back and look into why.

Senior Student Representative Ray Brennan spoke about working on information to improve student recruitment. A discussion ensued about the motivation of current professionals and what makes them join professional societies, and potential ways to increase membership. Herman van de Vaart indicated that we are still the fifth fastest growing society, even if we do lose some members to non-renewal.

Standards

Chair Art Ballato provided an e-mail report to Ahmad (he was unable to attend for personal reasons). Things are moving in the direction expected.

Fellows

Chair Richard White did not provide a report. John Vig mentioned things are moving along well. A discussion ensued regarding the bylaws and how long individuals serve as committee chairs. Ahmad and Jackie are to look into this for the next meeting.

Nominations

Chair Stuart Foster provided a written report announcing the slate of candidates for this fall’s ADCOM election. E-mail voting was mentioned as something that might improve voting levels. A discussion of web based voting opportunities, costs, and participations levels when compared to conventional mail-based voting ensued. No decision was made to change the current voting process.

Stuart Foster made a motion and Lew Brown seconded that *passed* (for 17, opposed 0) **To approve the submitted slate of candidates for election to ADCOM in the fall of 2002.**

Education

Robert Schwartz, Chair of this newly formed committee (two weeks ago) stated that he needs to determine what the mission of the committee is and what the educational mission of the UFFC should be. Issues like distance learning/electronic learning, notifying people what IEEE standards exist, offering professional short courses, etc. might be appropriate. Robert would like to get input from others in AdCom about what the mission should be. A discussion clarified that Education and Publicity are new ad hoc committees with two-year terms, and that the Chairs of these committees are without voting rights.

Sue Trolier-McKinstry made and John Vig amended and then seconded a motion that *failed* (8 in favor, 5 opposed, 6 abstentions – according to the Bylaws a majority of voting members

(11) is needed to pass motion, so motion fails.) **That the Education and Publicity ad-hoc committee chairs, along with newsletter, transactions, proceedings, and fellows chairs be given up to \$1,250 each in financial support to attend at least one ADCOM meeting per year.** The motion was intended to treat all non-voting committee chairs equally. Jim Greenleaf mentioned that the President has a budget and perhaps he should pay for half of their travel out of his discretionary funds.

Long Range Planning

John Vig provided a discussion of what's going on at IEEE financially. IEEE is a volunteer driven organization. Made up of membership, board of directors, staff. Facilities in Piscataway and DC (IEEE USA). The Computer Society also has a building in California, and the Communication Society rents a very expensive space in NYC. IEEE *Xplore*TM is the most important initiative. In April more than 750k articles were on line, and about 2 million full-text articles are reviewed on line. IT cost to run this is about \$15 million per year.

Budget: IEEE is a \$225M a year business. Societies and Councils bring in most of this. Net is about \$0.8M surplus, but this requires \$21.5M taken from societies and councils.

The Executive Director of IEEE has been instructed to cut \$7M out of the \$21.5M billed to societies and councils. A business simplification team is looking at reducing complexity to cut costs. John is submitting five motions to help reduce the \$21.5M allocated to societies.

Other ongoing efforts:

- Review UFC every three years. This year is Ferroelectrics turn. Ahmad will organize the review.
- Chapter support – not much going on
- Liaisons with other organizations – this is ongoing in all three components

- Enhance transactions – Jian-yu and Marge doing
- Promote membership – working on this, but can do more (also promoting to Sr. Member level)
- Promote new blood
- Promote new technology workshops
- Promote standards
- Promote education – have new chair
- Promote exhibits – example of other conference with \$3M in exhibit revenue
- Promote publicity – have new chair, should do more in the way of publicizing our conferences

UFFC-S Representatives

Ahmad - Only one report from Dragan Damjanovic, the Sensor Council Representative, which indicated that the Council has voted to make the Sensors Conference an annual event.

New Business

Fred Hickernell informed ADCOM that we are forming a historical committee in order to have some sessions at 2004 joint meeting, make special issues of transactions, make items available on the web, etc. Let Fred know if you know of anyone wanting to be involved with this initiative. Herman van de Vaart said we should invite to the 2004 meeting all the living past presidents of the society.

The meeting was adjourned at 4:50 pm, 7 June 2002.

THE NEXT UFFC-S ADCOM MEETING will be held Tuesday October 8, 2002 in Munich in conjunction with and preceding the 2002 IUS in Munich, Germany.

Jacqueline H. Hines
UFFC-S Sec/Treas



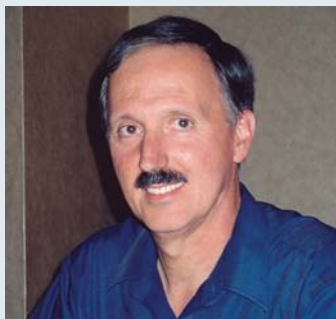
Ahmed Amin



Gerald Blessing



Raymond Brennan



Lewis Brown



Mauricio P. daCunha



Mike Driscoll



John Hossack



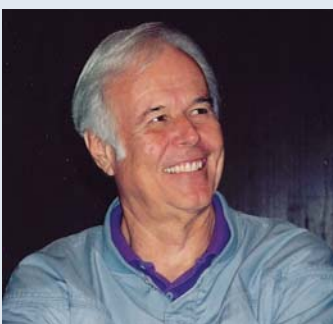
Lisa Edge



Michael Garvey



James Greenleaf



Fred Hickernell



Jacqueline Hines



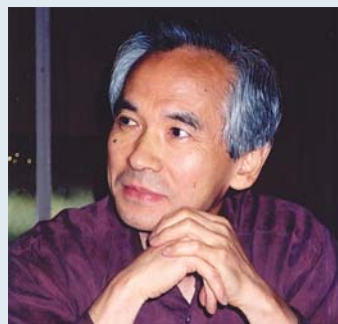
John Kosinski



Reinhard Lerch



Lute Maleki



Kiyoshi Nakamura



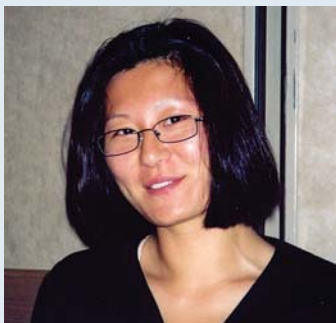
Rajesh Panda



Thomas Parker



David Payne



Sorah Rhee



Ahmad Safari



Walter Schulze



Robert Schwartz



Bernie Tittman



Susan Trolier-McKinstry



Bruce Tuttle



Herman van de Vaart



John Vig

UFFC FINANCIAL REPORT FOR 2001

The accompanying report shows, somewhat belatedly, the Financial Statement of the Society for the year 2001. As you can see, it was not a good year. We budgeted for a surplus of \$83.5K, but instead ended the year with an operating deficit of \$214.8K.

The reasons were several. First and foremost, the archive project suffered an overrun of \$95K, and in addition we had a late invoice related to this project of \$25K. Both of these were not in the budget, and the result was that the item "Periodical Related" originally budgeted for -\$11.5K ended up at -\$131.8K.

Second, as you might expect, our investment returns were less than stellar in 2001; instead of a \$16.3K return we suffered a loss of \$37.4K.

Finally, our Symposia income was less than budgeted. The 2000 IUS did have a surplus of \$15.6K but this was \$25.1K below budget. The 2000 ISAF also had a surplus of \$9.9K but again this was \$13.4K below budget. The 2000 IFCS did have a surplus of \$69.7K and did meet its budget. However, the fact that the surplus was to be split with the Electronic Industries Association was inadvertently ignored in the budget, with the result that the recorded \$25.0K surplus was \$44.7K below budget (see footnote at the bottom of the spreadsheet). On a more positive note, the Transactions did okay, and the Symposia Related and AdCom Expenses taken together were close to budget.

Unfortunately, this is not the whole story. In my report in the April 2001 Newsletter I pointed out that the IEEE is charging

the Societies for a larger share of the so-called Infrastructure expense (a sort of Overhead or G&A expense). For 2001, UFFC's part of this Infrastructure Charge was \$168.6K which was taken out of our reserves. Thus, as you can see at the bottom right of the spreadsheet, UFFC's reserves have dwindled from \$757.6K to \$374.2K (\$214.8K Operating Deficit plus \$168.6K Infrastructure Charge).

The prospects for the current year are also dim. Even though the 2002 budget shows an income of \$1026.0K and expense \$1041.3K (this includes an Infrastructure charge of \$178.0K) for a small deficit of \$15.3K, I expect this deficit to grow to around \$200K. This is because we already know that the 2001 IFCS, which was budgeted for a surplus of \$35.6K, ended up with a deficit of \$26.2K, and the 2001 IUS, which was budgeted for a surplus of \$91.9K, ended up with a deficit of \$41.7K. Remember that Symposia income and expense normally show up in the Operating Statement the year after they are held due to the timing of closing the books on the conferences.

The good news in all this is that for 2003 things are looking up. The budget process has just started, and the IEEE Board seems to have taken drastic steps to increase income and reduce expenses so that the infrastructure charge to the Societies will be dramatically lower. Hopefully our Symposia will show surpluses again.

Herman van de Vaart
Chair UFFC Finance and Operations Committee
June 26, 2002

UFFC Operating Financial Statement 12/31/01

UFFC	INCOME		EXPENSE		NET	
	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
Interest/Capital Gains	0.0	0.0	-16.3	37.4	16.3	-37.4
Transactions	405.6	394.7	316.5	326.9	89.1	67.8
Periodical Related	0.3	0.6	11.8	132.4	-11.5	-131.8
Newsletter	0.0	0.0	18.7	22.6	-18.7	-22.6
Non-Periodicals	1.4	0.1	1.6	1.8	-0.2	-1.7
Symposia	833.4	454.1	617.4	309.8	216.0	144.3
Symposia Related	0.0	0.0	70.5	34.1	-70.5	-34.1
IEEE/TAB Administration	0.0	0.0	46.8	44.7	-46.8	-44.7
AdCom/Other	0.0	0.0	90.2	154.6	-90.2	-154.6
TOTAL	1240.7	849.5	1157.2	1064.3	83.5	-214.8

TRANSACTIONS	INCOME		EXPENSE		NET	
	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
Membership Fees	32.0	29.5	0.0	0.0	32.0	29.5
Individual Non-Member Subscriptions	89.6	67.6	0.0	0.0	89.6	67.6
All Transactions Package	194.6	203.1	0.0	0.0	194.6	203.1
Voluntary Page Charges	36.8	27.4	0.0	0.0	36.8	27.4
Overlength Page Charges	36.8	38.1	0.0	0.0	36.8	38.1
Reprints	15.8	29.0	0.0	0.0	15.8	29.0
UFFC Editor's Office	0.0	0.0	50.0	44.6	-50.0	-44.6
Composition (FASS)	0.0	0.0	66.0	72.8	-66.0	-72.8
Editing (FASS)	0.0	0.0	32.0	74.6	-32.0	-74.6
Printing (FASS)	0.0	0.0	126.0	137.8	-126.0	-137.8
Direct Expense (FASS)	0.0	0.0	10.0	0.0	-10.0	0.0
Web Support (FASS)	0.0	0.0	10.0	2.6	-10.0	-2.6
Indexing	0.0	0.0	2.4	0.4	-2.4	-0.4
Publication Administration	0.0	0.0	7.3	8.1	-7.3	-8.1
Subscription Handling	0.0	0.0	6.8	7.2	-6.8	-7.2
Miscellaneous	0.0	0.0	6.0	-21.2	-6.0	21.2
TOTAL	405.6	394.7	316.5	326.9	89.1	67.8

continued on page 34

UFFC Operating Financial Statement 12/31/01 (continued)

	INCOME		EXPENSE		NET	
	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
SYMPOSIA						
1999 Ultrasonics (1)	0.0	296.8	0.0	296.8	0.0	0.0
2000 Ultrasonics (2)	325.5	15.6	284.8	0.0	40.7	15.6
2000 Frequency Control (3)	284.4	131.8	214.7	106.8	69.7	25.0
2000 Ferroelectrics (4)	223.5	9.9	200.2	0.0	23.3	9.9
BookBroker	0.0	0.0	-82.3	-93.8	82.3	93.8
TOTAL	833.4	454.1	617.4	309.8	216.0	144.3
SYMPOSIA RELATED						
Student/Speaker Travel	0.0	0.0	55.5	16.9	-55.5	-16.9
Grants	0.0	0.0	15.0	16.0	-15.0	-16.0
Miscellaneous	0.0	0.0	0.0	1.2	0.0	-1.2
TOTAL	0.0	0.0	70.5	34.1	-70.5	-34.1
ADCOM						
	BUDGET	ACTUAL	OUTSTANDING LOANS			
President's Office	5.6	2.4	2001 Ultrasonics	45.0		
President's Discretionary Funds	25.0	7.6	2002 Ultrasonics	20.0		
AdCom Expenses (Meetings, etc.)	37.7	107.5	2001 Freq. Control	45.0		
Chapters/Distinguished Lecturer	21.0	7.9	2002 Freq. Control	45.0		
Technical/Membership/Awards	7.2	3.7	TOTAL	155.0		
IEEE HQ Expense	8.7	1.7	RESERVES			
Web	0.0	18.7	Reserve 1/1/01	757.6		
TMI/JLT	-15.0	-1.9	Surplus/Deficit	-214.8		
Grants	0.0	7.0	Infrastructure charge	-168.6		
TOTAL	90.2	154.6	Reserve 12/31/01	374.2		

(1) 1999 IUS: Income \$374.3K, Expense \$296.8K, Net \$77.5K, reported in 2000.

(2) 2000 IUS: Income \$377.6K, Expense \$362.0K, Net \$15.6K.

(3) 2000 IFCS: Income \$260.3K, Expense \$189.0K, Net \$71.3K, UFFC's portion \$38.2K.

Reported Net of \$25.0K is UFFC's portion reduced by AdCom expense and AdCom travel support.

UFFC Awards

The Chair of the UFFC Awards Committee, Reinhard Lerch, with the help of several committees makes recommendations to the AdCom for four major society wide awards, namely, the Achievement Award, the Distinguished Service Award, the Outstanding Paper Award, and the Distinguished Lecturer.

You are invited to nominate people for these awards at any time. For a complete listing of UFFC awards and nomination information, please visit http://www.ieee-uffc.org/index.asp?page=awards/UFFC_Awards.html&Part=9#top. Send your nominations to:

Reinhard Lerch
 Friedrich-Alexander-Universitat Erlangen - Nurnberg
 Lehrstuhl fur Sensorik
 Paul-Gordan-Strasse 3/5
 D-91052 Erlangen GERMANY
 FAX: (+49) 9131-85-23133
reinhard.lerch@lse.e-technik.uni-erlangen.de
r.lerch@ieee.org

Distinguished Lecturer Award

The Distinguished Lecturer represents the UFFC Society by giving lecturers 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 se-

lected 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.

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:

Professor Mack A. Breazeale
 Chair, UFFC-S Distinguished Lecturer Subcommittee
 The National Center for Physical Acoustics
 University of Mississippi
 University, MS 38677
 e-mail: breazeal@olemiss.edu

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

2003 – 2004 Distinguished Lecturer

Dr. Steven R. Jefferts
National Institute of Standards & Technology
 NIST - Time and Frequency Division
 325 Broadway
 Boulder, CO 80305
jefferts@boulder.nist.gov

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 $\delta f/f=5 \times 10^{-17}$. 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 μ K: 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 postdoctoral 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 07/03-12/04.



Dr. Steve Jefferts
2003-2004 UFFC
Distinguished Lecturer

2002 - 2003 Distinguished Lecturer

Dr. K. Kirk Shung

Department of Bioengineering
231 Hallowell Bldg.
Penn State University
University Park, PA 16802
Kksbio@enr.psu.edu

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



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

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

As the 2002-2003 distinguished lecturer, I gave the lecture at Department of Physics, University of Vermont, hosted by Profs. Junru Wu and Wes Nyborg on April 16. In addition to giving the lecture, I was able to tour their laboratories where exciting work on ultrasonic contrast agents and high frequency ultrasonic imaging of muscles following acupuncture is being carried out. I was able to also meet Dr. Brian Garra, an ultrasound radiologist, who moved from Georgetown to UVM Medical School as vice-chair and professor of radiology.

In May, I went to China giving the lecture at both Shanghai Jiao-Tong University in Shanghai and Nanjing University in Nanjing which was celebrating its 100 anniversary. Both are considered top universities in China. In Shanghai, I was hosted by Prof. Wende Shou, professor and Prof. Zhixing Xie, associate professor, Department of Biomedical Engineering. I was most impressed by the recently renovated facilities and faculty offices. In Nanjing, I was hosted by Prof. Xiu-fen Gong, professor of electronic sciences and engineering, who is considered a pioneer in bioacoustics in China. I delivered two lectures at Nanjing University, one as part of the 100 anniversary



Kirk Shung (5th from left) at Shanghai Jiao-Tong University with host Prof. Shou on his right.

sary celebration in a forum which featured well-known acousticians from all over the world, including Dr. Leo Beranek of Harvard University, Dr. W. Eisenmenger, University of Stuttgart, Germany, Dr. Taotsu Wu, Caltech, and Dr. J.D. Achenbach, Northwestern University. I was honored to be part of this distinguished group of speakers.

For the Fall, trips to Korea, Taiwan and Europe are being planned. Any group or individual who is interested in having me should contact me as soon as possible.

2001 – 2002 Distinguished Lecturer

Prof. David A. Payne

Department of Materials Science and Engineering
Materials Research Laboratory
University of Illinois at Urbana-Champaign,
Urbana, IL 61801, USA
d-payne@uiuc.edu

Recent Developments and Understanding of Ferroelectric and Piezoelectric Materials and their Applications

Exciting developments are taking place in the field of electroceramics in general, and for ferroelectric and piezoelectric materials in particular. This presentation documents some of the impressive gains in useful and enabling properties obtained from new and improved materials designed for specific applications.

Following a general introduction to ferroelectric and piezoelectric materials, with chronological developments, important milestones are high lighted where property limitations hindered future exploitation. The extent to which these problem areas have been solved or circumvented, by improvements in materials and processing, are outlined in the presentation. Two extrema are considered: the growth of large single crystals, and the deposition and patterning of thin films. Their applicability to ultrasonics, ferroelectrics and frequency control (UFFC) will be illustrated. For example, the crystal growth and properties of new piezoelectrics in the system $\text{Pb}_3\text{MgNb}_2\text{O}_9$ (PMN)- PbTiO_3 (PT) will be described with field-induced strains of 1-2%, piezoelectric coefficients over 4000 pC/N and electromechanical energy conversion efficiencies greater than 90%. The high signal-to-noise feature is of great interest for imaging devices, including medical micro-probes. With respect to thin films and patterning, novel chemical-solution deposition methods are outlined for the fabrication of integrated ferroelectric and piezoelectric devices. The additive patterning technique of micro-contact printing with self-assembled monolayers is described for a lift-off process. A variety of materials and structures have been fabricated for potential ferroelectric and piezoelectric applications, including device integration on curved surfaces. Concluding remarks address the future of ferroelectric and piezoelectric materials.

Feel free to contact Dr. Payne to schedule a visit to your area.

UFFC Fellows

The IEEE Grade of Fellow is 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.

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>.

Now is the time to begin thinking about nominees for 2003 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>.

UFFC Transactions

Bulletin

- January 1, 2002: TUFFC Editor-In-Chief's responsibilities transfer from Dr. William O'Brien to Dr. Jian-yu Lu and Dr. Marjorie Passini Yuhas.
- January 1, 2002: TUFFC begins monthly publication.
- June 1, 2002: TUFFC has entered with the manual process 118 new manuscript submissions in the last five months.
- June 1, 2002: TUFFC has completed six months of monthly publications...ninety papers, seven manuscripts and one letter.
- June 1, 2002: TUFFC releases Manuscript Central, an on-line peer-review system, for general use.
- June 30, 2002: TUFFC has assigned via the on-line MC system 30 new manuscripts to Associate Editors (AEs) in the last 30 days.
- June 30, 2002: TUFFC has increased the total number of AEs from 29 to 39. The 10 new AEs are Ahmad Safari, Susan Trolrier-McKinstry, Jon-Paul Maria, Sidney B.

Lang, Qiming Zhang, Eric S. Furgason, Yook-Kong Yong, Smaïne Zeroug, Keith Wear, Tai-Kyong Song.

January to June 2002 has been an exciting interval for the Transactions for Ultrasonics, Ferroelectrics and Frequency Control Society. It has been a time characterized by cooperation among the Editor-in-Chief, the Associate Editor-in-Chief and the staff at Industrial Measurement Systems who maintains the paper-based peer-review system. It has been a time of understanding among the authors, Associate Editors and the Editor-in-Chief and Associate Editor-in-Chief as they strive to maintain the process flow for publications. It has been a time of technical challenge between the Editor-in-Chief and the publishers, FASS, while they improved the online quality of the journal and established the platform for the on-line review system, Manuscript Central. It is our expectation that MC will reduce the time for handoffs during the review process and, therefore, will shorten the time between manuscript submission and publication. Finally, It has been a time for pride and satisfaction for all members of the UFFC as our journal continues to provide high quality technical publications and evolves to exploit the capabilities to do electronic submissions, review, and communications.

On behalf of the UFFC Society, We encourage you to submit manuscripts electronically via the website <http://tuffc-ieee.manuscriptcentral.com/>. In addition, we strongly encourage your participation in the peer-review process. If you would like to be an Associate Editor or reviewer, please contact either of us.

The Editor-in-Chief, Jian-yu Lu and the Associate Editor-in-Chief, Marj Yuhas, would like to thank Jan Brown for her support, all the Associate Editors, all the authors, and FASS. It has been an exciting, challenging and satisfying first six months with the TUFFC.

Jian-yu Lu (jilu@eng.utoledo.edu)
Marj Yuhas (myuhas@imsysinc.com)



Meet the IEEE UFFC Transactions Editor-in-Chief, Dr. Jian-yu Lu, and Associate Editor-in-Chief, Dr. Marjorie Passini Yuhas

History

This day in History

2 July 1862

(Sir) William Henry Bragg was born in Cumberland, England. In 1915 he was awarded the Nobel Prize for Physics*, along with his son William Lawrence Bragg for developing a new field of science, x-ray crystallography. In order to do this, however, he needed to invent and engineer a number of new x-ray instruments, so we honor him here. He died on 12 March 1942 in London.

*link to: <http://www.nobel.se/physics/laureates/1915/>

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.

*link to: <http://www.ncafe.com/chris/pat2/index.html>

20 July 1937

The radio pioneer Guglielmo Marconi, IRE Fellow and Medal of Honor winner, died in Rome at the age of 63, exactly 40 years to the day after he founded the Wireless Telegraph and Signal Company (in 1900 the name was changed to Marconi's Wireless Telegraph Company, and it exists in multinational corporate form to this day).

28 July 1904

Pavel Alekseyevich Cherenkov was born in Novaya Chigla, Russia (although this was deemed 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.

*link to: <http://www.nobel.se/physics/laureates/1958/cherenkov-bio.html>

14 August 1894

In a famous demonstration, Oliver Lodge performed experiments on Hertzian waves at the annual meeting of the British Association for the Advancement of Science.

A special thank you to Dr. David L. Morton of the IEEE History Center for supplying these facts. Please visit the History Center website at (www.ieee.org/organizations/history_center).

UFFC History Committee

Have an interest in history?

A History Committee is being formed to bring to our UFFC Society members and the engineering and scientific communities significant and interesting events of the society and its

related technologies over the past 50 years. A statement of the committee's vision, mission, and related tasks has been drafted and is given following this paragraph. This is a global venture and we need members from all countries, regions, and society related technologies. If you are interested in being on the committee and helping develop historical perspectives related to the UFFC Society, contact Fred Hickernell at the following email address, f.hickernell@ieee.org.

The UFFC Society History Committee

Vision:

The IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society disseminates related technological information through publications, conferences, and its website. The History Committee will bring the added dimension of historical perspective to the society regarding its areas of technology. This historical perspective will foster among members an awareness of their professional history and increase public understanding of the field.

Mission:

To promote a better understanding of the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society and its related technologies through the dissemination of historical information in various forms easily accessible to the scientific, engineering, and general public communities.

- To honor significant achievements in the history of the field.
- To encourage the preservation of historically important materials and sites.
- To collect documents, photographs, and objects pertaining to significant historical events and deposit them in appropriate repositories.

Goals:

I Preserve and Consolidate Existing Society and Technology History.

Objective:

Gather in a convenient and usable form for access by society members and interested parties, historical and technology documentation already in print.

Strategies:

1. Develop a bibliography of historical articles already published in journals, conference proceedings, and newsletters.
2. Develop a similar bibliography representing key milestone contributions to specific areas of the society's scientific and technological interests.
3. Make available selected articles of interest in special publications and on the website. This will be done in cooperation with the editors of society publications and the webmaster

II Promote New Historical Publications

Objective:

To develop written histories from knowledgeable authors in areas of their long-term contributions or interest.

Strategies:

1. Ask previous authors of historical articles to update and extend their contributions for presentation and publication.
2. Ask long-term contributors to particular technologies or society activities to write historical articles or anecdotal short stories or personal reflections.
3. Develop a format for interviewing pioneers of particular technologies and past society activities and have interviews with them for subsequent publication. {Tape or video are possible tools}
4. Consider a long-term set of oral histories to document the life of the society and the fields it covers. Establish a committee to think about who should be interviewed. Consider the IEEE History Center as a possible repository for the interviews.

III Develop a Global Perspective and Balance on Historical Articles

Objective:

To assure that historical contributions come from various countries and cultures and that the contributions are historically accurate.

Strategies:

1. Have on the History Committee at least one representative from a country, region, or technical area
2. Have that representative review, verify, and validate contributions or send the contribution to a competent reviewer.
3. Place contributions on the web for review and comments by interested parties before possible publication.

IV Actively Promote Sessions on Historical Papers at UFFC-Society Symposia

Objective:

To raise the awareness of the scientific and engineering community to the significance of the society's contributions.

Strategies:

1. Use the three symposia of the society to have presentations in oral or poster form related to their particular technology and interests.
2. On special anniversaries of the society, people, technologies, papers, or other key discoveries, have special oral or poster presentations and/or a display booth.

V Honor for Milestone Events

Objective:

To honor sites of historic significance to UFFC Society Technologies

Strategies:

1. Identify significant events in UFFC history for nomination to the IEEE History Center's Milestones Program.
2. Develop commemorative plaques to be mounted at the site of a significant event in electrical history related to UFFC Society technologies.

Fred S. Hickernell

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.

Fred S. Hickernell

PERSONAL RECOLLECTIONS OF THE EARLY HISTORY OF THE UFFC-S PART 1

by

Allen H. Meitzler
IEEE Life Fellow

This is the first of a three part series by Al Meitzler describing his recollections of the beginnings of the current UFFC Society.

Table of Contents

1. My Introduction to the IRE-PGUE
2. Early Meetings of the IRE-PGUE Administrative Committee
3. Meetings of the IEEE-GSU Administrative Committee

1. My Introduction to the IRE-PGUE

My earliest recollections of the historical predecessors to what is now the IEEE UFFC-S go back to the fall of 1955. In October of 1955, I received a Ph. D. in Physics from Lehigh University in Bethlehem, PA., and on October 11th, the day before Columbus Day, joined the Technical Staff of Bell Telephone Laboratories at the Whippany, NJ location. In those days the Whippany Laboratory was engaged primarily in the development of military systems and hardware. The department I joined was headed by Roger Sykes, a man who had spent much of his career in the Bell System developing quartz crystal resonators. There were three supervisory groups in the department at that time; a quartz resonator group, an ultrasonic delay line group, and a ferroelectric crystal memory development group. I wound up going into the group working on ultrasonic delay lines.

How did I wind up in the delay line group? Earlier in the year, as part of the Bell Telephone Laboratories recruitment procedure, I had a two-day tour of several different departments at the Murray Hill and Whippany locations of Bell Telephone Laboratories and had the possibility of selecting one of several different activities. My doctoral dissertation at Lehigh was an experimental study of the details of transient stress wave propagation at the end of an impacted aluminum bar. I thought it would be advantageous for my career to stay in an area of development activity close to the field of my doctoral research.



Fig. 1. Allen H. Meitzler (left) and John E. May, Jr. (right). This photograph was taken February, 1962. John May was the 4th Chairman of the IRE-PGUE AdCom and, in 1962, Allen Meitzler became the 6th Chairman.

The supervisor of the delay line group was Morton D. Fagen. The senior engineer in the group was John E. May, Jr. It happened that both these men were active in the founding of the Professional Group on Ultrasonics Engineering (PGUE) within the Institute of Radio Engineers (IRE). Within a few months John May became for me both a mentor and a close personal friend.

Within less than a year after receiving my first paycheck from Bell Telephone laboratories, I joined the IRE; my official membership enrollment date is June 1, 1956. Even before I became a member of the IRE, Mort Fagen and John May invited me to join them in attending committee meetings of the PGUE, which had been formed only a year earlier and was struggling to come up to a viable membership strength. These meetings all took place in New York City (NYC). Besides John May and Mort Fagen, other men I remember meeting at these early committee meetings were Warren Mason of the Murray Hill location of BTL and Prof. Cyril Harris of Columbia University. Unfortunately I have no recollection of meeting Amor Lane, although he played a major role in the initial formation of the IRE-PGUE and surely must have been present at some of meetings I attended.

In the late 1950s and early 1960s, there were two major meetings of the IRE. One was the IRE International Convention and Exposition, which took place in NYC around the second or third week in March. The other major meeting was the IRE Western Electronic Show and Convention.; this meeting took place at a site on the west coast, usually in August. In the fall of 1955, when I joined BTL, Mort Fagen was actively involved in organizing a PGUE Session for the '56 March Convention, and he was interested in increasing the PGUE participation to two sessions for the 1956 convention. As part of this effort to increase the number of PGUE sessions, he persuaded me to give a report on my doctoral research at Lehigh University in one of the PGUE sessions at the 1956 IRE March Convention¹. That



Fig. 2. Robert Thurston (left), the author (center), and Arthur Ballato (right). This photograph was taken during the summer of 1991. Bob Thurston was an early member of the IRE-PGUE. He was the Technical Program Chairman for the 2nd Ultrasonics Symposium held at Columbia University in NYC and served in 1962-63 as an elected member of the AdCom. Art Ballato was elected to the UFFC-S AdCom in 1980 and since 1981 has served as the Chairman of the UFFC-S Standards Committee.

was my first paper presented at an IRE meeting. (A printed version of the paper was published in the 1956 IRE Convention Record and can be found in the UFFC Digital Archive.)

2. Early Meetings of the IRE-PGUE Administrative Committee

When I think back and try to remember the people at the earliest AdCom meetings I attended, I find that basically the attendees at these committee meetings fall into three groups. Naturally enough, the people I remember best are those I had an association with as fellow employees of Bell Telephone Laboratories. In this group, fall people like Morton D. Fagen, John E. May, Jr., Warren P. Mason, and Robert N. Thurston. The group I remember next best are people who were involved in delay line, quartz resonator, and ceramic piezoelectric transducer development. This group includes people like David L. Arenberg; Don Berlincourt, Hans Jaffe, and Oskar Mattiat (Berlincourt, Jaffe, and Mattiat were all three of the Clevite Corp. in Cleveland, OH.); William F. Konig; J. J. G. McCue; Arthur Rothbart; Vincent Salmon, and Ralph Woolett.

The present-day IEEE UFFC-S AdCom and Symposium committee meetings involve people from Europe, Asia, Canada, and all over the United States. In contrast, the early IRE-PGUE AdCom and Symposium committees were made up mostly of people from the eastern half of the United States and meetings were pretty much east-coast centered, New York City activities. Most of the AdCom and Symposium Committee meetings were timed to coincide with the IRE International Convention, always held in New York City around the second or third week in March. Many of these committee meetings were held in the old IRE headquarters, which was a beautiful,

¹ Sometime during the 1956-57 time period, Roger Sykes' Department was reorganized. The quartz crystal activity stayed under Roger Sykes and was transferred to Merrimack Valley, Connecticut. John Rowen was brought in as a new Department Head to manage the ultrasonic device activity that remained at Whippany, New Jersey. Morton Fagen was promoted and transferred to the Public Relations Department at Murray Hill. With this transfer, he left the field of ultrasonics. An major career accomplishment of Fagen's was to serve as the editor of the first three volumes of a massive, seven-volume set of history books entitled, "A History of Engineering and Science in the Bell System" published by Bell Telephone Laboratories, 1978.

Table 1. The Membership Composition of the Early PGUE AdComs

Explanation of Symbols: C – Chair, V- Vice Chair, S- Secretary, T- Treasurer, EM- Elected Member, XO- Ex-officio Member. The asterisk indicates members whom I remember well enough to retain a mental image.						
Yr(s)	1954-55	1956	1957-58	1959-60	1961	1962
C	A. L. Lane	M. D. Fagen*	C. M. Harris*	J. E. May, Jr.*	W. Roth	A. H. Meitzler*
VC	M. D. Fagen*	J. F. Herrick	L. Batchelder*	L. Batchelder*	D. L. Arenberg*	R. S. Woollett*
S	M. Kenny	J. E. May, Jr.*	F. J. Larsen	H. J. Bickel	H. J. Bickel	A. Rothbart*
T	J. Bernstein	J. Bernstein	D. L. Arenberg*	D. L. Arenberg*	H. J. Bickel	A. Rothbart*
EM	W. J. Fry	W. A. Anderson*	W. A. Anderson*	D. Berlincourt*	D. Berlincourt*	R. Bechman*
EM	J. F. Herrick	C. M. Harris*	D. Berlincourt*	M. D. Fagen*	M. D. Fagen*	W. J. Fry
EM	W. P. Mason*	T. M. Lambert	E. G. Cook*	W. J. Fry	W. J. Fry	H. Jaffe*
EM	F. Massa*	W. P. Mason*	M. D. Fagen*	C. M. Harris*	F. Massa	J. J. G. McCue*
EM	O. Mattiat*	O. E. Mattiat*	J. F. Herrick	J. F. Herrick	O. E. Mattiat*	R. L. Rod*
EM	K. S. Van Dyke	K. S. Van Dyke	O. E. Mattiat*	F. Massa*	J. E. May, Jr.*	W. F. Konig*
EM				O. E. Mattiat*	J. J. G. McCue*	R. N. Thurston*
EM				A. H. Meitzler*	A. H. Meitzler*	
EM				V. Salmon*		
XO						D. L. Arenberg*
XO						M. D. Fagen*
XO						F. Massa*
XO						O. E. Mattiat*
XO						J. E. May, Jr.*
XO						W. Roth
XO						V. Salmon*

stately mansion at 1 East 79th St. in Manhattan. It was located at the corner of 5th Ave. and 79th St., across Fifth Ave. from the Metropolitan Art Museum. It was an architectural masterpiece with a wide, curved marble staircase, huge chandeliers, marble floors, and a large, high-ceilinged conference room with the largest mahogany conference table I have ever seen. After the IRE-IEE merged to become the IEEE, the IEEE management decided the mansion was no longer functional and sold the property. I really hated to see the mansion go.

While I can remember the mansion that served as the IRE Headquarters building well, I can only remember two meetings that took place in it. One was a meeting with a large group of people present. I suspect it was probably a meeting of something like the Technical Activities Board (TAB). The Chairman of the meeting was Bernard (Bernie) Oliver. At the time the meeting was held, Bernie Oliver held some high management position in the Hewlett Packard Corporation. There must have been at least forty people present and the meeting took

place in the large conference room on the second floor. This was the room with the huge chandelier and the large mahogany table. The other meeting that sticks in my memory was a meeting of the Program Committee for a Symposium when I was the Technical Program Chair. This meeting was held in a small corner room in the basement of the mansion, just slightly below street level, with bay windows that looked out on 79th St. Warren Mason was there and I remember I stood at a blackboard and wrote out the abbreviated names of the submitted papers so that we could decide which papers to accept and which to reject. After the initial selection process, the accepted papers were grouped into several technical sessions and the final program was arranged.

At the March, 1962 AdCom Meeting, I was elected Chairman of the AdCom and Ralph Woollett was elected Vice Chairman. The term of service was supposed to be from July 1, 1962 to June 30, 1963. I do remember I was quite thrilled to receive the recognition and honor of being elected Chairman of a national profes-

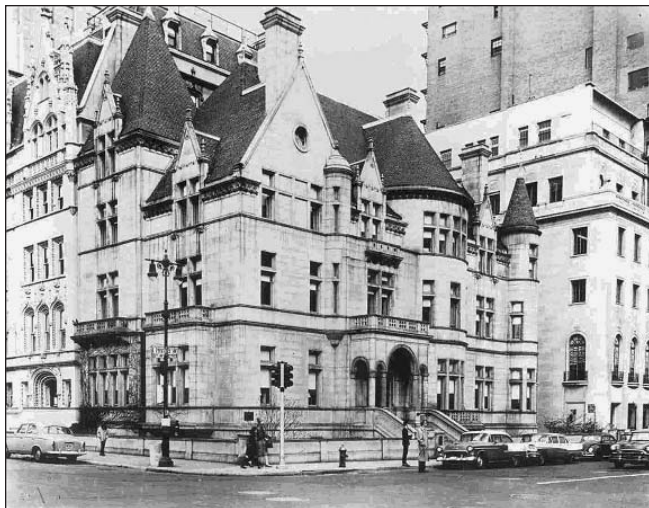


Fig. 3. The IRE Headquarters at 1 East 79th St. was the site of many committee meetings held by the early IRE-PGUE in the late 1950s. After the IRE and the AIEE merged to form the IEEE, the mansion was sold, torn down, and replaced by a modern office building. (Photograph supplied by the IEEE History Center.)



Fig. 4. Dr. Richard M. Emberson, IEEE Group Coordinator in the 1960s. He was appointed General Manager in February 1978 and served through 1978.

sional society. Curiously enough, writing this about 40 years later, I do not remember many of the details of my term of service as Chairman. I do remember that the newly merged IEEE was having money problems and the great concern was to manage the affairs of the group in such a way that no financial losses were produced.

One incident related to the financial concerns of the IEEE sticks in my memory. It was the custom in those days for the AdCom to meet in the morning at the old IRE Headquarters building. When lunch time came, we would adjourn and go to a restaurant nearby on 4th

Ave. and the Chairman would buy lunch for the group, sign a bill, and have the restaurant forward the bill to the IRE Headquarters for payment. About 12 to 15 AdCom members ate lunch and, following the practice that had been established by my predecessor chairmen, I signed the check for somewhere between \$200 and \$300 and told the restaurant manager to forward the bill to the IEEE. About two weeks later, I got a call from an irate woman in the IEEE Treasurer's office who gave me a severe, and especially memorable, tongue lashing for my extravagant expenditure of Group funds to buy lunch for the AdCom. (I sometimes think of this incident when I attend present UFFC-S AdCom meetings. These meetings are usually held in luxury hotels with 40 to 50 people in attendance.

The AdCom meetings are all-day affairs and include breakfast and lunch served buffet style, and in the evening, full-service, sit-down dinners. The dinners are preceded by social hours with an open bar and AdCom members are allowed to bring a spouse or companion to the dinner. The total bill for providing sustenance to the AdCom members for their whole day's efforts surely runs into the thousands of dollars. As far as I know, no one at IEEE Headquarters objects to these expenditures. *Quae mutatio rerum!*)

Around the time I became the group chairman, a practice was started by the IEEE Executive Committee of having a Headquarter's representative or Group Coordinator attend the meetings of the various AdComs. The man who served in this capacity was Dr. Richard (Dick) Emberson. Dick Emberson was a pleasant fellow who really was very helpful in transmitting the concerns of the society's Executive Committee to the individual professional groups and providing a return path for the groups to express their needs and concerns to the Executive Committee. At the end of my term of service to the AdCom as chairman, Dick Emberson asked me to write him a letter summarizing the activities and accomplishments of the group during my term of office as Chairman. I remember that I did what he asked, but unbelievably, I failed to keep a copy for my records. It would be nice to be able to include a copy of this report as an appendix to this document. In the past year, I contacted the historical records department of the IEEE to see if they could locate a copy of my letter in Dr. Emberson's correspondence, but they were unable to do so. I can remember only one accomplishment of the Group that was cited in the letter. That accomplishment was the following: during my term as Chairman, the Transactions went from a photocopied typed-manuscript format to a letterpress format, giving the *IEEE Transactions on Ultrasonics Engineering* more of the appearance of a professional publication. When my term as Chairman ended, Ralph Woollett indicated he had no desire to succeed me as Chairman; and the AdCom elected, J. J. G. (Jerry) McCue of the MIT Lincoln Laboratory to succeed me to the post of Chairman.

The last issue of the *IRE Transactions on Ultrasonics Engineering* was Volume UE-9, dated December 1962. In that issue I was listed as the AdCom Chairman and Ralph Woollett as the Vice-Chairman. The next Transactions was issued in July 1963 and was entitled *IEEE Transactions on Ultrasonics Engineering*. The inside cover of this issue listed J. J. G. McCue as the Chairman and William F. Konig as the Vice-Chairman, Arthur Rothbart was the Secretary and Treasurer. (I remember all three of these gentlemen very well.) By virtue of being a past chairman, I became an ex-officio member of the AdCom.

3. Meetings of the IEEE-GSU Administrative Committee (1962-1972)

After the formation of the IEEE by the merger of the American Institute of Electrical Engineers (AIEE) and the IRE, the AdCom and other committee meetings took place in the new IEEE office building, called the United Engineering Center (UEC), located at 345 East 47th St.. This building was a large modern office building with a number of conference rooms. The one I remember best was the conference on the top floor.

This was a large room that held about 50 people and was often used as the site for AdCom meetings, Symposium Program Committee meetings, and Standards Committee meetings. The conference room had large windows that looked out over 47th St. and, if you stood up close to the windows, you could look over towards the East River and see the United Nations buildings. I often looked over at the United Nations buildings when I visited the IEEE headquarters to attend some committee meeting or other. Sometimes, when I had time to spare after the meetings, I would walk over to the United Nations Plaza and look at the architectural features of the individual buildings, the works of sculpture, and the crowds of tourists waiting in lines to go on tours of the buildings.

Around the time of the IEEE formation, there was a strong initiative to change the name of the Group and broaden its scope of activity. Jerry McCue was a strong proponent of the change in name. I remember that, among the words considered for inclusion in the revised name of the Group, were words like “hypersonics” and “praetersonics”. These words were considered primarily to emphasize the idea that the group was interested in a wide range of scientific as well as engineering topics and to include the latest developments in high frequency devices and physical acoustics. Finally the decision was made to simply call the Group “the Group on Sonics and Ultrasonics”; and so, until the UFFC-S was established, the organization was known as the IEEE-GSU.

At the end of 1964, when Arthur Rothbart stepped down from the position of Secretary-Treasurer, I agreed to take on the post and served in this capacity until I resigned from the AdCom at the end of 1972. My resignation was not the result of any loss of interest in the IEEE-GSU, but rather it was the result of a change in jobs. In November of 1972, I left Bell Telephone Laboratories and joined the Research Staff of the Ford Motor Company in Dearborn, MI. My career interests were of necessity shifting from ultrasonics to automotive sensors and to electronic systems for control of exhaust emissions. Although I felt I could not expect Ford Motor Co. to support my continued activity on the AdCom, I was still very much involved with the development of ANSI/IEEE Std 176-1976 and managed to stay on as the Chair of the Piezoelectric Standards Sub-committee until that standard was completed. In addition, I was able to continue my membership in the Ferroelectrics Committee of the IEEE-GSU.

In the years between 1965 and 1972, employees of Bell telephone Laboratories continued to play a major role on the AdCom. T. R. Meeker was the Chairman of the AdCom in '65 and '66. Fig. 5 shows a picture of Trig Meeker and the author.

Meeker's tour of service as Chairman was followed in '67 by J. H. Rowen, by D. L. White in '68, by E. K. Sittig in '69, and by W. J. Spencer in '71 and '72. All of these men were in the ultrasonic device or quartz resonator activities at Bell Telephone Laboratories, either at the location in Murray Hill, NJ, or at the location in Allentown, PA. The last chairman of the AdCom with a Bell Laboratories connection was N. F. Foster who served in 1974. A year earlier, the title of the head of the AdCom changed from Chairman to President.

The reader might think that, as a result of serving in the capacity of Secretary-Treasurer, I would have many files bulg-

ing with documents from the time period between 1965 and 1972, but I don't. When I resigned the position I wanted to clean out my files of all the accumulated papers; and consequently, I turned over all my records to my successor, William D. O'Brien, Jr. Most, if not all, of the details of what went on in the AdCom meetings from 1965 to 1972 have since faded from my memory.



Fig. 5. The United Engineering Center at 345 East 47th St. This was the site of many GSU AdCom meetings, Technical Program Committee meetings for Ultrasonics Symposiums, and Standards Committee meetings during the 1960s. In the 1990s, the building was bought by Donald Trump, torn down, and replaced by a 91-story, luxury, residential tower. (Photograph supplied by the IEEE History Center.)



Fig. 6. The author (on the left) and T. R. Meeker (on the right). Trig served as AdCom Chairman in '65 and '66. (The photograph was taken in August 1991 on the front lawn of Trig Meeker's house in Allentown, PA.)

Before I conclude this portion of my history of the IEEE-PGUE, there is one other person I would specifically like to include, Richard (Dick) W. Damon, who was employed by the Sperry Research Corporation. Dick Damon was elected to serve on the 1967 AdCom. The following year, when Don White was elected Chairman, Dick Damon was elected Vice-chairman. When the list of proposed candidates for the elected AdCom offices was first drawn up for the 1968 AdCom, I remember having a conversation with John Rowen, who was then Chairman, in which I asked him, "How did Dick Damon's name get on the list as a candidate for the Vice-chairman office?" (I



Fig. 7. John H. Rowen (on the left) and the author. This photograph was taken on the New Jersey shore at John Rowen's residence on Long Beach Island, one summer day (probably in July, 1990).

think I felt at the time that there was a Bell Labs candidate who might be more suitable.) John Rowen replied, "Oh I don't know, I looked around one day and there was Dick Damon. The guy seems to be very energetic and good at getting into everything." John was quite right in his assessment of the capabilities of Dick Damon. Although Dick Damon did not go on to succeed Don White as the Chairman of the GSU AdCom, he went on to serve two terms as a Director in the IEEE, from '77 to '78 and '81 to '83, and as President of the IEEE in 1981. I will mention

Dick Damon again later in this history when I write about the 1981 IEEE Awards Ceremony held in New York City.

Editor's Comments

NEW in this Issue

In this issue you will note two new additions to the History column. Dave Morton of the IEEE History Center produces facts of the month from which I have selected a few items for inclusion in this newsletter. If you like them, I will continue to pick out ones of interest to UFFC fields of interest for future issues. Also in this issue is the first of a three part series by Al Meitzler of his recollections of the early years of UFFC.

Also note in the History column that Fred Hickernell, on behalf of the UFFC History Committee, is asking for you for **short anecdotal stories and personal remembrances** (serious, interesting, and funny) of people and places associated with our society and/or its technologies. I hope many of you answer Fred's solicitation for contributions.

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 Mike Garvey, Sorah Rhee, John Vig, Steve Jefferts, Kirk Shung, Jan Brown, Al Meitzler, and Gayle Gleichmann. Special appreciation to Andrea Watson and her 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 Spring Newsletter.

Jan Brown
UFFC-S Newsletter Editor

Future UFFC-S Symposia

2004 IEEE International Ultrasonics, Ferroelectrics, and Frequency Control 50th Anniversary Joint Conference

In 2004 the Ultrasonics, Ferroelectrics and Frequency Control Society will celebrate its 50th anniversary. To honor the occasion all three major UFFC-S sponsored symposia will join together for a single conference to be held in August in Montreal, Canada.

Location: Palais des Congres Montreal Convention Center, Montreal Canada
Dates: Tutorials/short courses: August 23 (Monday), 2004;
Technical sessions: August 24-29 (Tues-Fri), 2004

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**2004 IEEE International Frequency Control Symposium
- UFFC-S's 50th anniversary celebration; joint meeting
with the two other UFFC-S symposia, the Ultrasonics
Symposium and the International Symposium on the
Applications of Ferroelectrics**

Location: Palais des Congres Montreal
Convention Center,
Montreal, Canada

Dates: 23-29 August

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Program Chair: Chris Ekstrom
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FREQUENCY CONTROL SYMPOSIA

**2003 IEEE International Frequency Control Symposium
and PDA Exhibition Jointly With the 17th European
Frequency and Time Forum**

Location: Marriott Waterside Hotel,
Tampa, Florida, USA
Dates: Tutorials: May 4 (Sunday);
Technical sessions: May 5-8
(Mon-Thur)
General Chairs: R. Michael Garvey
Datum,
34 Tozer Road

ULTRASONICS SYMPOSIA

**2002 IEEE International Ultrasonics Symposium
In cooperation with the Association for Electrical,
Electronic & Information Technologies (VDE), Germany**

Forum Hotel, Munich, Germany
October 8-11, 2002
General Co-Chairs:
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Ruhr-Universitaet Bochum

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2003 IEEE International Ultrasonics Symposium

October 5-8, 2003
Honolulu, Hawaii

General Co-Chairs:

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Bioacoustics Research Laboratory
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**2004 IEEE International Ultrasonics Symposium -
UFFC-S's 50th anniversary celebration; joint meeting
with the two other UFFC-S symposia, the Frequency
Control Symposium and the IEEE International
Symposium on the Applications of Ferroelectrics**

Location: Palais des Congres Montreal
Convention Center,
Montreal, Canada

Dates: 23-29 August

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FERROELECTRICS SYMPOSIA

**2004 IEEE International Symposium on the Applications
of Ferroelectrics - UFFC-S's 50th anniversary
celebration; joint meeting with the two other UFFC-S
symposia, the Ultrasonics Symposium and the
Frequency Control Symposium**

Location: Palais des Congres Montreal
Convention Center
Montreal, Canada

Dates: 23-29 August

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