

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



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**2001 IEEE International
Frequency Control Symposium
& PDA Exhibit**

**Sheraton Seattle
Hotel and Towers**

Seattle WA, USA

6-8 June 2001



Invited Plenary Speakers IEEE International Frequency Control Symposium

5 – 8 June 2001 Seattle, WA

This year we are pleased to have 2 outstanding plenary speakers.

The theoretical physicist and popular science writer Paul C. W. Davies will speak on Wednesday, June 6 at 9am on **How to build a time machine**.

Time travel makes great science fiction, but can it really be done? Travel into the future is certainly possible, and has already been achieved in microsecond amounts. Visiting the past is much more problematic, but Einstein's theory of relativity does not rule it out. The currently favored scenario employs a wormhole in space. If travel backward in time is possible, all sorts of troubling paradoxes arise, prompting Stephen Hawking to postulate his "chronology protection conjecture" to outlaw it. However, all the paradoxes are evaded by adopting the fashionable many-universes interpretation of quantum mechanics.

On Thursday, June 7, at 9 am Carlene Stephens of the Smithsonian will speak about the transition from mechanical to quartz watches. In a talk entitled "**Engineering Time**" she will detail the very earliest efforts to make a quartz watch simultaneously in Switzerland, Japan and the US. Inventing the Electronic Wristwatch Clocks and watches stand at an important crossroads where science, technology and society intersect. Changes in timekeeping technology, beginning with the invention of the mechanical clock around A.D. 1300, have influenced the character of scientific observation, aided the development of other machine technologies and brought significant revisions to the way people think about and behave in time.

Robert Newnham Honored

A special session honoring Bob Newnham was held in January at the Cocoa Beach Meeting of the American Ceramic Society. The Robert Newnham Symposium on Piezocomposites was attended by more than a hundred transducer engineers from all over the world. The symposium included sessions on the modeling and design of composite piezoelectric transducers, together with papers on the electrical and mechanical properties, on processing and manufacturing methods, and applications to biomedical ultrasound, underwater acoustics, and vibration control. For the past twenty five years, Bob Newnham, Eric Cross and their colleagues at Penn State have pioneered the development of new ferroelectric crystals, ceramics, polymers, and composites for use as transducers, capacitors, sensors, and actuators. Much of the work was sponsored by the Office of Naval Research. Bob, Eric, and Wally Smith were honored with IEEE Third Millennium Medals at the ISAF Meeting in Hawaii last August.

In "Engineering Time," Carlene Stephens will explore one of the most recent episodes in this long history: the invention of the electronic wristwatch. Her talk, based on work she is doing with her colleague Maggie Dennis, focuses on the engineers who completely reinvented the wristwatch with all new electronic components thirty years ago. She will consider the contexts in which the engineers worked, outline the technical problems they faced, and analyze consumer reception, especially the lively public debate over the comparative benefits of digital versus analog watch displays.

The Invited Speakers this year will include:

- Errol EerNisse is the 2001 IEEE Distinguished Lecturer as well as the General Chair for FCS 2001. He will be giving his Distinguished Lecturer presentation.
- "Relationships Between the Classical and Langrangean Temperature Coefficients of the Elastic Constants, Piezoelectric Stress Constants, and Dielectric Permittivities of Quartz" By: Yook-Kong Yong* and Wu Wei of Rutgers University
- "Sub-10-Femtosecond Active Synchronization of Two Passively Mode-Locked Ti:Sapphire Oscillators - Application to Phase Lock of Two Femtosecond Lasers" By: Jun Ye*, John L. Hall, Henry C. Kapteyn, Long-Sheng Ma, Margaret M. Murnane, Robert K. Shelton of JILA, University of Colorado, and NIST
- "All Optical Atomic Clocks Based on a Single Mercury Ion and Calcium Atoms" By: Th. Udem, S.A. Diddams, K.R. Vogel, C.W. Oates, E.A. Curtis, W.D. Lee, W.M. Itano, R.E. Drullinger*, J.C. Bergquist, L. Hollberg of NIST
- "Wavelength Control and Calibration for Wavelength Division Multiplexed Optical Communication" By: Sarah L. Gilbert of NIST
- "Thin Film Shear Modules Determination with Quartz Crystal Resonators: A Review" By: Ralf Lucklam*, P. Hauptmann of Otto-von-Guericke-University
- "Quantum 1/F Effect in Piezoelectric Sensors" By: Peter H. Handel of University of Missouri
- "The Active-Bridge Oscillator for use with Liquid Loaded QCM Sensors" By: Kurt O. Wessendorf of Sandia National Laboratories
- "Acoustic Biomedical Sensors - Recent Advances and Applications" By: Ryszard M. Lec of Drexel University
- "Effect of Electric Twins on Acoustic Wave in a Quartz Resonator" By: Eiji Kamiyama*, Terumi Itoh, Yoshio Murakami, Yasushige Ueoka of Mitsubishi Materials Corporation, and Takehiko Uno of Kanagawa Institute of Technology

John Prestage

2001 IEEE International Frequency Control Symposium & PDA Exhibition

6-8 June 2001

and

TUTORIALS

5 June 2001

**Sheraton Seattle Hotel and Towers
Seattle, Washington, USA**

2001 IEEE INTERNATIONAL FREQUENCY CONTROL SYMPOSIUM & PDA EXHIBITION

Symposium Sponsored by:

IEEE Ultrasonics, Ferroelectrics &
Frequency Control Society

Exhibition Sponsored by:

Piezoelectric Devices Association
(division of the Electronic Components,
Assemblies and Materials Association)

General Chair:

Errol P. EerNisse, Quartzdyne, Inc.

Technical Program Chair:

John Prestage, Jet Propulsion Laboratory

Tutorial Chair:

Lute Maleki, Jet Propulsion Laboratory

Finance Chair:

Raymond L. Filler, US Army CECOM

Editorial Chair:

John R. Vig, US Army CECOM

Awards Chair:

Charles Adams, Agilent Technologies

Exhibit Chairs:

Pete Walsh, ECA

Rob Minor, M-Tron

Tom Jones, CCI/USA.

SYMPOSIUM INFORMATION

Symposium Site

This year's symposium will be held at *The Sheraton Hotel and Towers, Seattle, Washington, U.S.A.*, located in the heart of downtown Seattle adjacent to the Washington State Con-

vention & Trade Center. Called the Emerald City, Seattle has steep hills, lush greenery, and glimpses of water everywhere – Puget Sound, bays, lakes, rivers, and canals. Surrounded by the snowcapped Olympic Mountains to the west, Cascades to the east, the Emerald City of the Pacific Northwest has the perfect setting. The mountains shield Seattle, so the climate is mild year around. Normal June temperatures are highs of 69° F and lows of 53° F. Bring a sweater.

Seattle is also the cultural center of the northwest. From internationally renowned theater, opera and ballet companies to the Seattle Art Museum and dozens of fine galleries. The lively downtown district of Seattle abounds with department stores, specialty shops, renovated historic theaters, espresso stands, restaurants and unexpected shopping experiences. City Center's atrium includes a dazzling display of art glass from the internationally known Pilchuck School. The new Nordstrom flagship store is a brilliant counterpoint to Pacific Place, an upscale retail, dining, and entertainment complex in the adjoining block. "Hammering Man," a mammoth sculpture, stands guard at the entrance to the Seattle Art Museum, a striking post-modern structure exhibiting art from Africa and Native American Northwest art, as well as world-wide traveling exhibits. The Pike Place Market, next to the Sheraton Hotel and Towers, is the soul of Seattle, the oldest continually operating farmers market in the country. It is a free-form funhouse of sights, smells, sounds, and characters. Enjoy Pike Street Café's 27-foot dessert buffet. Countless eateries cook up tastes of the world and the original Starbucks coffee store still dispenses espresso drinks. The monorail provides quick and easy transportation to the Seattle Center.

It's only a 43-second elevator ride to the peak of the Pacific Northwest's top attraction, the Space Needle. Each year, more than one million visitors make the ascent to the 520-foot tall Observation Deck and find a 360-degree view of striking, spectacular scenery: the Olympic and Cascade mountain ranges, Mount Rainier, downtown Seattle, the Port of Seattle waterfront, Puget Sound and Lake Union. Twenty feet below the Observation Deck is the revolving restaurant level, which

offers both casual and family-oriented dining along with a more elegant setting.

Seattle's Waterfront was the last stop in the States for prospectors heading north to Alaska. Here you will find one and one-half miles of shops, restaurants, excursion boats and maritime sightseeing. The waterfront area is also home to the Seattle Aquarium and Odyssey Maritime Discovery Center. Bright lights and colorful banners, clanging bells on restored streetcars, ferry horns echoing off downtown skyscrapers, enticing aromas of salmon, crab and sourdough. Sailing adventures begin on the Waterfront. Washington State Ferries depart from Pier 52, offering rides of an easy half-hour to Winslow on Bainbridge Island, or an hour to Bremerton with its Puget Sound Naval Shipyard and its historic Navy ships.

Hotel Reservations

The Sheraton Seattle Hotel and Towers is located at 1400 Sixth Avenue, Seattle, Washington. For your convenience, a hotel reservation card is enclosed in the center of this booklet. It can be mailed to the address shown or faxed to: 206-621-8441. You may call the hotel at 1-800-204-6100 or 206-447-5555 directly to make your reservation. Reservations must be made with the hotel directly in order to get the discounted group rate. Be sure to mention you are attending the symposium. Arrangements have been made with the hotel to offer a limited number of rooms at a reduced rate to U.S. Government employees only. Government ID and/or government travel orders must be presented at time of check-in. These rooms are being offered on a first-come first-served basis. **All reservations must be made by 5 May 2001.** Any reservations made after this cut-off date will only be honored on a space available basis. Accommodations will not be guaranteed without a check or a major credit card number for the first night's lodging.

Parking at the Hotel

A private company manages parking at the Seattle Sheraton Hotel and Towers. Their current parking rates are \$22 per day for self-parking and \$24 per day for valet parking.

Air Transportation to the Seattle-Tacoma International.

Continental Airlines has been selected as the official air carriers for the symposium. To take advantage of the discounts offered you could either call your own travel agent or Continental Airlines directly at 1-800-468-7022. You must refer to reference number LM1VZH in order to get the discounted price. Outside the toll-free dialing area, contact the local Continental Reservations Office. Certain restrictions may apply and seats are limited.

Transportation from Airport to Hotel

Shuttle service from Seattle-Tacoma International Airport to the Seattle Sheraton Hotel and Towers is available every 30 minutes from Grayline. The shuttle ride to the hotel is approximately a 40 minute ride from the airport and the cost is \$8.50 one way or \$14.00 for a roundtrip. Reservations are not necessary. The shuttle departs from outside the baggage claim area. Taxi service is also available to the hotel from the airport at an approximate cost of \$32 each way.

Car Rental

AVIS Rent-A-Car has been appointed the official rental car agency for the symposium. Special group rates have been negotiated with AVIS for one week before and one week after the symposium. These rates include unlimited free mileage. The following rates will apply for symposium attendees and their guests:

Availability is limited so please reserve early. Return to the same renting location or additional surcharges may apply. Call 1-800-331-1600 and mention AVIS discount #A606098 in order to receive the discounted rates.

<i>Car Group</i>	<i>Daily Rate</i>	<i>Weekly Rate</i>	<i>Weekend</i>
Sub-Compact	\$31.99	\$143.99	\$21.99
Compact	\$35.99	\$153.99	\$22.99
Intermediate	\$39.99	\$166.99	\$23.99
2-door Full Size	\$40.99	\$175.99	\$24.99
4-door Full Size	\$42.99	\$184.99	\$25.99
Premium	\$46.99	\$197.99	\$28.99
Luxury/Mini Van/Sports Utility Vehicle	\$75.99	\$328.99	\$69.99

Registration Fees

Each symposium participant must register and receive a badge. The badge must be worn to gain admission to the technical sessions and the exhibit area. You will save time and money by registering in advance.

The advanced registration fee for IEEE/EIA Members is \$375 for registrations received NO LATER THAN 5 MAY 2001. After 5 May, the registration fee for IEEE/EIA Members is \$425. The advanced registration fee for Non-Members received prior to 5 May 2001 is \$450 and \$500 after that date. Please note: "member" is defined as any member of a sponsoring organization, either through individual membership in the IEEE or as derived membership as an employee of an EIA member company.

In order for attendees to receive the reduced rate for advanced registration, payment must be submitted with the advanced registration form. The registration fee entitles the registrant to admission to the technical sessions (but not the Tutorials), the exhibits, the refreshment breaks, three lunches (Wednesday, Thursday and Friday), the Welcoming Reception, the Exhibitor's Reception and one copy of the Proceedings. The Proceedings will be mailed to attendees several months after the symposium. Attendees will also receive a symposium tote bag compliments of Kolinker Industrial Equipments.

The registration fee for FULL-TIME students and FULL-TIME retirees with Proceedings is \$100 and \$50 without Proceedings. In addition, those individuals who wish to register for one day only may do so for a fee of \$200. There is also a \$50 registration fee available to all IEEE Life Members. The fee for one-day registrations and IEEE Life Members does not include Proceedings, which can be ordered at a cost of \$65 per copy. All registration fees MUST BE PAID IN US DOLLARS.

The advanced registration form for the symposium and tutorials is located in the center of this booklet. You may photocopy this form for use by additional registrants. Visa, MasterCard and American Express will be accepted. Registrations can be faxed to 732-681-9314 or mailed to the address shown on the form. Your badge, along with receipt, can be picked up at the symposium registration desk.

The registration fee is fully refundable up to five business days before the symposium/tutorials. After that date, there will be a service charge of \$50. Refunds will not, however, be issued once the tutorial/symposium begins. Substitutions may be made at any time.

Guest Registration

There will also be a Guest Registration this year at the symposium. The guest registration fee includes continental breakfast each morning (Wednesday, Thursday and Friday) and admittance to the Welcoming Reception and the Exhibitor's Reception. A representative from the Seattle Visitor and Convention Bureau will be on hand Wednesday morning to provide highlights and sightseeing tips for the Seattle area. The registration fee for the Guest Program is \$50 and it would be most helpful, for planning purposes, if you pre-registered using the enclosed registration form.

Registration Desk Hours

The registration desk for the Tutorial will be open on Monday, June 4th from 3:30PM to 5:30PM and on Tuesday, June 5th from 7:15AM to 5:00PM.

The registration desk hours for the Symposium will be as follows:

Tuesday,	June 6 th	7:00PM - 9:00PM
Wednesday,	June 7 th	7:00AM - 5:00PM
Thursday,	June 8 th	7:15AM - 5:00PM
Friday,	June 9 th	7:30AM - 1:00PM

Messages

Messages may be left for symposium and tutorial attendees at the "IEEE Frequency Control Symposium Registration Desk" through the hotel's telephone number: 206-621-9000.

No Taping or Job Posting

Please note that it is symposium policy that there is to be NO video taping of any kind, at any time, in any of the Tutorial or Symposium Sessions. It is also IEEE/EIA policy that there be no job posting, of any kind, at the Symposium. Your cooperation is appreciated.

All Proceedings Are Now Available in the UFFC Digital Archive

Full text of all the papers ever published in the Proceedings of the Frequency Control Symposium, i.e., since 1956, is now available in the Digital Archive at: <http://www.ieee-uffc.org/fc>

Also available at this website are reference and tutorial information, nine books, historical information, and links to other web sites, including a directory of company web sites. The Digital Archive is available for free to IEEE UFFC Society members only. (It is not available to non-members at any price.)

Speaker's Breakfast

Speakers and Session Chairmen for the Oral Sessions of the Symposium are requested to attend a complimentary Speaker's Breakfast on the morning of their presentation/session at 7:15AM. Please check with the symposium registration desk for the location.

Receptions

Exhibitor sponsored receptions will be held in the exhibit area on Wednesday and Thursday evening, June 6th and 7th, from 5:00PM to 6:30PM. All registered participants and registered guests of the symposium are cordially invited to attend.

Award Nominations

Nominations are sought for the 2002 awards. Information will be available at the Registration Desk and is also available on the above-mentioned website.

Exhibition

Exhibit your products or services to hundreds of engineers and managers, the largest single exposure to customers available in the industry. A limited number of booths are still available. For information and an application, contact Pete Walsh by e-mail: pwalsh@eia.org or visit: www.ec-central.org.

Listed below are companies with exhibit space reserved at the time of this printing:

A.T. Wall Company
Agilent Technologies
Alvord Systems, Inc.
Benchmark International, Inc.
Cambio International
CCI/USA
Datum Timing, Test & Measurement
EFG International
Femtosecond Systems
Great Southern Marketing
H.E.S. International, Inc.
Hoffman Materials, Inc.
Lighthouse Lubricant Solutions
Mackin Industries Corporation
Micro Abrasives Corporation
Nippon Maxis Company
NorCom Systems, Inc.
Perkin Elmer Optoelectronics
Polaris Electronics Corp.
Poseidon Scientific Instruments
Saunders & Associates
Sawyer Research Products
Shure Manufacturing
SML/Lap-Tech Inc.
Timing Solutions Corporation
Transat Corporation
Vast Interface Corporation
Zhejiang Quartz Crystal Factory

The PDA Exhibition hours will be as follows:

Wednesday, June 6th
10:00AM – 12:00 Noon 2:00PM – 6:30PM

Thursday, June 7th
 10:00AM – 12:00 Noon 2:00PM – 6:30PM
 Friday, June 8th
 9:30AM – 12 Noon

Soliciting on the Show Floor

IFCS& PDA reserve the right to escort any attendee from the Symposium and Exhibition if they are not an exhibitor and are reported to be soliciting on the exhibition floor or leaving product literature in the exhibit area or any other area of the hotel.

Coffee Break Sponsorship

Your company is invited to be a coffee break sponsor! The company name will be recognized in the final program and will be prominently displayed at the IFCS&PDA on a poster in the refreshment area. A table will be provided near the sign to display limited informational and promotional literature. To sponsor, please indicate on the registration form or call Pete Walsh at 703-907-7547. The prepaid fee is \$350 and must be received by May 5 in order to be acknowledged in the final program. Listed below are the company names that have contributed to the coffee breaks at the time of printing.

- Agilent Technologies
- Alvord Systems, Inc.
- EFG GmbH
- M-Tron Industries
- Saunders & Associates

Special Thanks

The IEEE/EIA community owes a sincere debt of gratitude to the following organizations for their generous contributions to the 2001 IEEE International Frequency Control Symposium and PDA Exhibition.

- Alvord Systems Inc.
- Agilent Technologies
- EFG GmbH
- Frequency Electronics Inc.
- IEEE/UFFC Society
- Jet Propulsion Laboratory
- Kolinker Industrial Equipments
- M-tron Industries
- NIST
- Northrop-Grumman
- Quartzdyne, Inc.

TUTORIALS

This year the Tutorials will be held on Tuesday, June 5th from 8:00AM until 5:00PM. Our tutorial leaders have been selected from among the best experts in the world. The tutorial presentations are designed for newcomers to the field, as well as containing state-of-the-art material for experienced practitioners desiring to keep up-to-date. We look forward to your participation.

Dr. Lute Maleki, Tutorials Chair
 Jet Propulsion Laboratory

A single registration fee will allow attendees to participate in the Tutorials, in all of the sessions, and includes morning and afternoon refreshment breaks, a binder and a CD contain-

ing hundreds of pages of instructional material. The advanced registration fee for IEEE/EIA members is \$160, if received no later than 5 May, and \$190 for on-site registration. The advanced registration fee for non-members is \$170, if received no later than 5 May and \$200 for on-site registration. All registration fees MUST BE PAID IN US DOLLARS. In order to receive the reduced rate, you must submit your payment with your registration form. The registration fee for FULL-TIME students and FULL-TIME retirees is \$50. A limited number of additional copies of the instructional material (CD only) will be available at a cost of \$75 at the registration desk.

TUTORIALS ON THE WEB

The slides from last year’s tutorial presentations may be viewed on the Frequency Control website, www.ieee-uffc.org/fc. This year’s tutorials are expected to be even better.

PROCEEDINGS ORDERING INFORMATION

NO.	YEAR	DOCUMENT #	FROM**
10	1956	AD-298322	NTIS1
11	1957	AD-298323	NTIS
12	1958	AD-298324	NTIS
13	1959	AD-298325	NTIS
14	1960	AD-246500	NTIS
15	1961	AD-265455	NTIS
16	1962	PB-162343	NTIS
17	1963	AD-423381	NTIS
18	1964	AD-450341	NTIS
19	1965	AD-471229	NTIS
20	1966	AD800523	NTIS
21	1967	AD-659792	NTIS
22	1968	AD-844911	NTIS
23	1969	AD-746209	NTIS
24	1970	AD-746210	NTIS
25	1971	AD-746211	NTIS
26	1972	AD-771043	NTIS
27	1973	AD-771042	NTIS
28	1974	AD-A011113	NTIS
29	1975	AD-A017466	NTIS
30	1976	AD-A046089	NTIS
31	1977	AD-A088221	NTIS
32	1978	AD-A955718	NTIS
33	1979	AD-A213544	NTIS
34	1980	AD-A213670	NTIS
35	1981	AD-A110870	NTIS
36	1982	AD-A130811	NTIS
37	1983	AD-A136673	NTIS
38	1984	AD-A217381	NTIS
39	1985	AD-A217404	NTIS
40	1986	AD-A235435	NTIS
41	1987	AD-A216858	NTIS
42	1988	AD-A217275	NTIS
43	1989	AD-A235629	NTIS
44	1990	AD-A272017	NTIS
45	1991	AD-A272274	NTIS
46	1992	92CH30833	IEEE*
47	1993	93CH32441	IEEE*

48	1994	94CH34462	IEEE*
49	1995	95CH35752	IEEE*
50	1996	96CH35935	IEEE*
51	1997	97CH36016	IEEE*
52	1998	98CH36165	IEEE*
53	1999	99CH36313	IEEE* ²
54	2000	00CH37052	IEEE*
55	2001	01CH37218	IEEE*

<http://www.fedworld.gov/ntis/search.htm>
 Customer.services@ieee.org
<http://www.ieee.org/ieeestore/ordinfo.html>

PLEASE MAIL HOTEL RESERVATION CARD TO:

Sheraton Seattle Hotel & Towers
 *** Attn: Reservation Dept. ***
 1400 Sixth Avenue
 Seattle, WA 98101

*IEEE members may order Proceedings at half price.
¹ Please check with NTIS and/or IEEE for current pricing.
² 1999 Joint Meeting with the EFTF
 ** NTIS * IEEE
 5285 Port Royal Road 445 Hoes Lane
 Springfield, VA 22161 Piscataway, NJ 08854
 Tel: 703-487-4650 Tel: 1-800-678-4333

PLEASE MAIL PRE-REGISTRATION FORM TO:

2001 IEEE FCS & PDA Exhibition
 c/o Synergistic Management Inc.
 3100 Route 138 – Bldg. #3
 Wall Township, NJ 07719

2001 IEEE INTERNATIONAL FREQUENCY CONTROL SYMPOSIUM & PDA EXHIBITION

*** HOTEL RESERVATION FORM ***

Circle choice:

This reservation must be received by 5 May 2001 in order to assure availability.

Main Hotel

Single/Double
 Rate: \$185++

A deposit of one night's lodging plus 8.6% sales tax and 7% room tax must accompany your reservation request. A deposit will guarantee your reservation and will be applied only for your confirmed day of arrival. Your deposit will be returned if a cancellation is received 48 hours prior to arrival. Check-in time is 3PM and check-out time is 12 Noon.

Club Level

Single Double
 \$217++ \$237++

Government Rate* \$109 ++

Government I.D and/or Government
 (limited number available)

* This rate applies to US Government employees ONLY.

Travel Orders must be presented at time of check-in in order to obtain the Government rate.

Date & Time of Arrival: _____

THIS RESERVATION IS GUARANTEED FOR LATE ARRIVAL BY:

Date of Departure: _____

Credit Card No. _____

Exp. Date: _____ Signature: _____

Name(s): _____ Telephone #: _____

Address: _____

PRE-REGISTRATION FORM

2001 IEEE INTERNATIONAL FREQUENCY CONTROL SYMPOSIUM & PDA EXHIBITION

Last Name		First Name		M.I.
Organization				
Street Address/Mail Stop				
City	State	Country	Zip Code	
Telephone No.		Fax No.		
E-Mail Address				

Attendee Profile: (circle one)

- Sales/Marketing
 Purchasing/Procurement
 Corporate Management
 Test
 Engineering Management Support
 Production/Engineering
 Manufacturing
 Other

Symposium Pre-Registration Fees (Pg.)::

	Cost if Received	
	By May 5	After May 5
IEEE/EIA Member (No. _____)	\$375	\$425
Non-Member	\$450	\$500
Student/Retiree with Proceedings	\$100	\$100
Student/Retiree without Proceedings	\$ 50	\$ 50
IEEE Life Member without Proceedings	\$ 50	\$ 50
One Day without Proceedings	\$200	\$200
<u>Extra Copy of the Proceedings</u>	\$ 65	\$ 65
<u>Tutorial Pre-Registration Fees (Pg.)::</u>		
IEEE/EIA Member (No. _____)	\$160	\$190
Non-Member	\$170	\$200
Student/Retiree	\$ 50	\$ 50
<u>Guest Registration (Pg.)</u>	\$ 50	\$ 50
Exhibition ONLY	\$ 0	\$ 10
Coffee Break Sponsorship (Pg.)	\$350	
Total Amount Due:	\$	\$

All checks are to be in US dollars, drawn against a US bank, if not, a processing fee will be charged. Checks should be made payable to: "IEEE FCS & PDA Exhibition" and be mailed with this form to:

Synergistic Management Inc.
 3100 Route 138 – Bldg. #3
 Wall Township, NJ 07719

Credit card registrations ONLY can be faxed to: 732-681-9314

Credit Card (V/MC/AE Number: _____)

2000 IEEE International Ultrasonics Symposium

October 22-25, San Juan, Puerto Rico



Prof. Rodolfo Almar, General Chair, opening the 2000 IEEE International Ultrasonics Symposium.

The 2000 IEEE International Ultrasonics Symposium, held at the Caribe Hilton Hotel in San Juan, Puerto Rico last October, was a very successful meeting. There were 729 registered attendees, with an additional 69 guests and 13 companies exhibiting their products.

The conference started on Monday 22nd with three short courses in the morning and three courses in the afternoon. About 250 people attended these

well-taught courses. In fact there was such demand for one of the courses that the registration had to be closed on Monday morning while people were still trying to register. I apologize for not having been able to accommodate those people, and I would like to emphasize the importance of registering early to avoid disappointments.

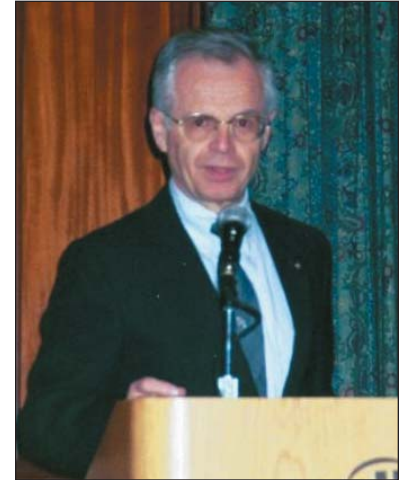
During the Plenary Session, on Monday morning, Dr. Jon Hagen of the Arecibo Observatory delighted everybody with an exciting talk regarding the work being performed at the observatory.

The presentation of papers, both in poster and oral sessions immediately followed the Plenary Session. The conference was run in five daily parallel meetings with 468 papers presented in the following categories:

- a) Medical Ultrasound
- b) NDE and Industrial Applications
- c) Physical Acoustics
- d) Surface Acoustic Wave Devices
- e) Transducer and Transducer Materials

On Tuesday night there was a reception at the swimming pool area of the hotel, with a beautiful view of the Atlantic Ocean. Although there was some concern about the weather we were very fortunate that it did not rain during the reception. Everybody enjoyed the music and the fireworks.

Following the reception, a banquet was held where the attendees tried the delicacies of the Puerto Rican cuisine. During the banquet the folk group Los Jibaros played beautiful Puerto Rican music and delighted everyone with typical dances. The



John Vig, UFFC 2000 Achievement Award recipient



Peter Wright, Technical Program Chair, welcoming participants.



Roger Tancrell, 2000 UFFC Distinguished Service Award recipient



Lewis Brown introducing the 2000 UFFC Distinguished Service Award recipient Roger Tancrell.



Reinhard Lerch (left) and Fred Hickernell presenting John Vig the UFFC 2000 Achievement Award.



Ahmad Safari presenting the IEEE Millenium Medal to Noriyoshi Chubachi.



Ahmad Safari presenting the IEEE Millenium Medal to Jan Brown.



Fred Hickernell presents the IEEE Fellow award to Shin-ichiro Umemura for contributions to biomedical ultrasonics



Fred Hickernell presenting Roger Tancrell the 2000 UFFC Distinguished Service Award.



Fred Hickernell presenting the Outstanding Paper Award for the 1999 Transactions on UFFC.



Helmut Ermert (right) receiving the IEEE Fellow Award for contributions to coherent wave imaging and its applications to medical diagnostics and nondestructive testing, and to engineering education.



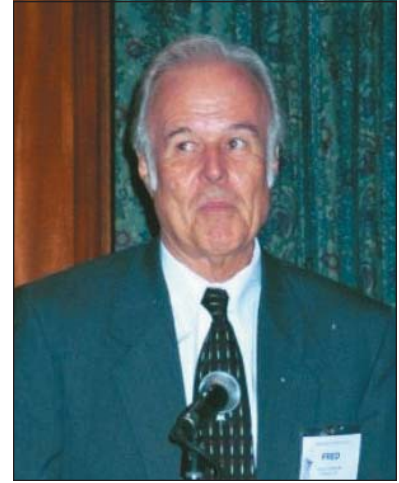
Ahmad Safari presenting the IEEE Millenium Medal to Fred Hickernell.



Art Ballato introducing the UFFC 2000 Achievement Award recipient, John Vig.



**Reinhard Lerch
UFFC Awards Chair**



**Fred Hickernell
UFFC President**



Reinhard Lerch and Ahmad Safari presenting Bill O'Brien with the IEEE Millennium Medal.

banquet concluded with some attendees dancing to the music of the Arpeggio group.

Sponsorship from the Puerto Rico Tourism Company, Rums of Puerto Rico, and the Puerto Rico Convention Bureau made this evening possible and it is duly acknowledged and appreciated here.

The social program was also very successful. The participants were able to travel around the island and to enjoy the beautiful scenery that Puerto Rico offers. Due to high demand, an extra tour was organized for Thursday to allow the engineers to be able to travel to the Arecibo Observatory. We were

a bit disappointed when we arrived since there had been some miscommunication and they were not expecting us. I called Dr. Jon Hagen, who had given a very exciting plenary speech, and he was so kind as to come to meet us and to give us a tour of the Observatory facilities. This was truly a feat since we were not only able to visit the Observatory but to benefit from Dr. Hagen's expertise also. We are indebted to him for his tour of the Observatory as well as for his very interesting and exciting plenary speech.

Finally, I would like to take this opportunity to thank every member of the Organizing Committee as well as the members of the Techni-

cal Program Committee for their hard work in making the 2000 IEEE International Ultrasonics Symposium a great success.

**Dr. Rodolfo Almar
2000 IEEE International
Ultrasonics Symposium General Chair**

Editor's Comments

Our Society was spoiled for more than 22 years by having our current President, Fred Hickernell as Newsletter Editor. For the past two years, Bill Hunt willingly and quite ably stepped into Fred's shoes. Bill agreed to a two-year term of office and since his term is up, we are in a position of **searching for a new Newsletter Editor**. We would like to take this opportunity to thank Bill for his work on the newsletter on behalf of the Society.

The UFFC Newsletter is produced twice a year in print. We would like to have a "realtime" online newsletter with links to the most up to date information on our website in all areas of interest to our members including conference information, chapter activities, membership data and services, awards, standard activities, UFFC publications, other IEEE related publications, distinguished lecturer schedules, and news in our technical areas.

The Society supplies support for all the mechanics of production including composition, layout and design, printing and putting it on the web, and mailing and distribution. The Editor is responsible for the content by gathering the information from the UFFC community, committee chairs, and other interested contributors.

We are seeking a creative individual who would like to be the Newsletter Editor to join the publications team. If you are in-

terested in the position, or know someone who is, please contact Jan Brown, UFFC VP Publications, jan.brown@ieee.org.

The Digital Archive is now available to all IEEE UFFC members online by going to <http://www.ieee-uffc.org/> and clicking on Digital Archive. This archive contains the full text of all Society publications from 1954 to the present as well as selected books, articles and other related information. A CD ROM version of this Archive will be available in late May in time for the 2001 IEEE INTERNATIONAL FREQUENCY CONTROL SYMPOSIUM & PDA EXHIBITION. Watch the UFFC website for news of its arrival and ordering information.

I thank all of you who sent articles and photos in for this issue. Special appreciation to Fred Hickernell for his guidance, and to Andrea Watson and her colleagues at IEEE headquarters for the production work and for their patience as we diligently missed deadlines.

All articles for the Fall Newsletter (in print) will be due at the NEW Editor's office by August 6th. In the meantime, please continue to send me information and photos as events occur so that we may post them on the Web. My contact information is jan.brown@ieee.org, 3545C North Hills Drive, Austin, TX 78731, Phone/Fax 512 794-9372.

Jan Brown

Acting UFFC-S Newsletter Editor

AdCom

AdCom Minutes 22 October 2000

[Abbreviated – Subject to Adcom Approval]

The Administrative Committee (AdCom) meeting of the Ultrasonics, Ferroelectrics, and Frequency Control Society (UFFC-S) was called to order at 9:00 am, 22 October 2000, by Society President Fred S. Hickernell. The meeting was held in conjunction with the International Ultrasonics Symposium, San Juan, Puerto Rico. John Vig made and Ahmad Safari seconded a motion that passed **To approve the minutes of the 29 July 2000 UFFC-S AdCom meeting held in Honolulu, Hawaii.**

Unfinished Business:

Al Meitzler made and Jan Brown seconded a motion to support conference attendance of Society retirees, Life Members and Fellows. The motion passed that **All three major symposia (ISAF, IUS, and FCS) sponsored by the UFFC-Society shall provide reduced (i.e. "student") registration fees for full-time retirees*, and zero registration fees for Life Members and Fellows. The reduced or zero registration fees shall not include proceedings; and the zero registration fee shall not include meals. *A "full-time retiree" is one who has no option to charge the registration fee to an employer or research grant.**

Gerry Blessing made and Jan Brown seconded a motion for a Society email procedural policy, which passed as follows: **After a motion is proposed and seconded for email vote, public discussions will be held on-line. The discussion will be open to the entire AdCom community (to include both voting and non-voting members), with the duration of the discussion determined by the President. The number of responding voters will determine whether a quorum (of nine) is met. Email voting will have three choices: Yes, No, and Hold. If more than 50% vote Yes, the motion carries. If at least 50% vote No, the motion is defeated. Otherwise, the motion shall be tabled until the next AdCom meeting. Such action for an official AdCom email vote is to be taken only when the motion should not wait until the next AdCom Meeting, as judged by the President.**

John Vig made and Dennis Pape seconded a motion to establish a policy for travel support of AdCom members to attend the biannual AdCom meetings. The motion was subsequently amended by Jan Brown and seconded by Tom Cutchen to raise the maximum reimbursement in any one year from \$1500 to \$2500. The motion and amendment were approved with specific guidelines for its implementation.

Call for Sensor Papers

The IEEE Sensors Journal is seeking paper submissions and subscriptions. The instructions for authors, subscription information, list of editors, etc. can be found at www.ieee.org/sensors

The Journal is a new, peer-reviewed print and online journal devoted to sensors. It is organized by a group of dedicated volunteers and is backed by the IEEE Sensors Council. The Council consists of 26 member societies with a combined membership of 260,000. UFFC-S is one of the 26 societies.

The Journal's inaugural issue is scheduled for June 2001. It will consist of review papers covering a wide range of sensor technologies. Subsequent issues will contain regular research contributions. The editorial board consists of internationally recognized experts, with a majority of editors from outside the USA. Widest circulation is assured because ~900 libraries, worldwide, subscribe to IEEE peri-

odicals packages that contain the IEEE Sensors Journal. Even though the first issue is three months away, ~2,000 individuals have also already subscribed.

The topics of interest include all types of sensing: mechanical, thermal, optical, magnetic, radiation, microwave, chemical, biological, mass, etc., both on macro and micro levels. Also of interest are packaging, interconnection, telemetry, characterization, noise, CAD, sensor arrays (e-nose), sensor-actuators, sensor systems, and, of course, applications.

The low subscription prices (\$19- per year for individuals) are made possible because the IEEE is a not-for-profit organization in which most of the work is done by volunteers like you. Please support this journal.

John Vig

Publications:

Jan Brown, Publications V-P, presented an oral report. Jan Brown moved and Helen Routh seconded a motion that passed: **The UFFC Society supports free access to IEEE abstracting and indexing information.**

Jan Brown moved and Jack Kusters seconded a motion which passed: **That reciprocal on-line access be made available to Instrument & Measurement Society and UFFC Society members for their respective Transactions Journals.**

Bill O'Brien, UFFC *Transactions* Editor-in-Chief, provided a written and oral report.

Bill Hunt, Newsletter Editor, had expressed his intent to retire from his position, having completed two years of service. As a result, the Society seeks a volunteer for Newsletter Editor.

John Vig, WEB-site Editor-in-Chief, reported that the digital archive is nearly complete. Virtually all proceedings, several reports and a number of books are on the WEB.

Ferroelectrics Committee:

Tom Cutchen, Ferroelectrics V-P, provided a written and oral report of a successful ISAF 2000 in Honolulu and plans for ISAF 2002 in Japan.

Frequency Control Committee:

Jack Kusters, Frequency Control V-P, presented a written and oral report of past and future symposia. He moved and John Vig seconded a motion that passed **To accept the current memorandum of understanding between the Piezoelectric Devices Association (PDA) and the UFFC Society, subject to exempting the 2004 UFFC-S joint symposium from that understanding.**

Jack Kusters made and Jan Brown seconded a motion that passed **To accept the 2001 budget for the IEEE International Frequency Control Symposium & PDA Exhibition.**

Ultrasonic:

Jim Greenleaf, Ultrasonics V-P, provided a written and oral report.

Rodolfo Almar, General Chair for IUS 2000 in Puerto Rico, reported a healthy to-date registration of 660 for the Symposium. Short Course registration was also strong.

Bill O'Brien, General Co-Chair with Mack Breazeale for the 2001 IUS in Atlanta GA, presented an oral report and a written budget for the symposium. Jan Brown moved and John Vig seconded a motion that passed **To approve the 2001 IUS budget.**

Helmut Ermert, General Chair for the 2002 IUS in Munich, discussed general logistics and plans for the Symposium.

Awards:

Reinhard Lerch, Awards Chair, provided a written and oral report including the awards to be presented at the Symposium (Puerto Rico) plenary session. The Society's *2000 Achievement Award* would be presented to **John R. Vig**, and its *2000 Distinguished Service Award* would be presented to **Roger H. Tancrell**. Co-authors **S. H. Chang, C. K. Tseng, and H. C. Chien** of the Society's *Outstanding Paper Award* would be recognized for their research. And five honored recipients of the *IEEE Millennium Award* would be recognized: **Jan Brown, Noriyoshi Chubachi, Fred S. Hickernell, William D. O'Brien, Jr., and Herman van de Vaart.**

Bernie Tittmann, Awards Vice-Chair, presented his subcommittee's choice for the Society's next Distinguished Lecturer: Professor David Payne, University of Illinois, from the ferroelectrics community. Jan Brown moved and Ahmad Safari seconded a motion that passed – **That AdCom accept David Payne as the Society Distinguished Lecturer for the term extending from July 2001 through December 2002.**

Don Malocha moved and Helen Routh seconded a motion that passed - **That the Awards Committee come back to**

AdCom with a proposal to consider multiple Distinguished Lecturers.

Fred Hickernell presented Society *Service Awards* recognizing 3 years of elected AdCom membership to **Daniel B. Hauden, T. R. (Raj) Gururaja, Allen H. Meitzler, and Kenji Uchino**; and a Society *Service Award* to **Karen E. Morgan** recognizing 2 years as appointed student representative.

Membership Services: Dennis Pape, Membership Services Chair, presented a written and oral report, indicating a Society growth rate of 2.1% over the past year.

Standards:

Art Ballato, Standards Chair, provided a written and oral report of activities in eight technical areas.

Fellows:

Dick White, Fellows Chair, provided a written report indicating that six nominees for Fellow have been submitted to the IEEE's review board.

Nominations:

Stuart Foster, Nominations Chair, presented a written and oral report to indicate that there is a good list of candidates standing for election to AdCom (their terms to begin 1 Jan 2001).

Long Range Planning:

Don Malocha, Long Range Planning Chair, provided a written and oral report. He seeks input for what the membership feels are important issues that his committee should be addressing. E.g., how society funds might best be used to benefit the membership.

Ryan Ong, student AdCom representative, offered to generate a WEB-site poster to pique student interest in the Society.

UFFC-S Representatives:

Kathy Nightingale moved and Jan Brown seconded a motion that passed To include Transactions on Medical Imaging (TrMI) in a journal bundle that EMBS is putting together for sale at a discounted rate (\$1350 vs. the non- bundled rate of \$1505). The bundle will include 5 journals: TrMI, TrRE, TrBME, TrITB, and EMBS.

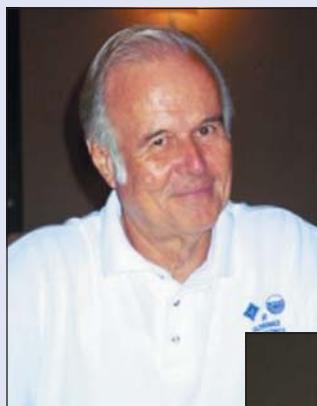
Jan Brown, representative for the IEEE Professional Activities Committee (PACE), provided an oral report re "IEEE USA" which is dedicated to member professional development.

John Vig, speaking for the Sensors Council, reported that the new *Sensors* Journal is experiencing a healthy start, receiving about 60 papers to date including a few from the UFFC community.

New Business:

John Vig made and Ahmad Safari seconded a motion that passed as follows: **The AdCom shall provide to each UFFC-S symposium matching funds in the amount of \$15,000 for travel support, and \$15,000 for student support.**

THE NEXT ADCOM MEETING will follow the 2001 Frequency Control Symposium & PDA Exhibition (5-8 June) in Seattle, Washington: 9:00 am Saturday, 9 June

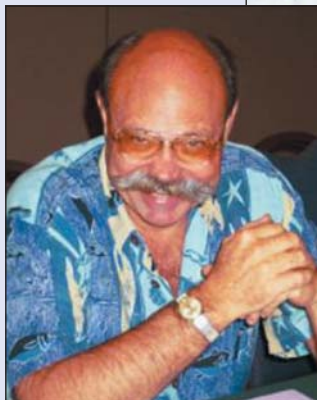


Fred Hickernell,
UFFC Society
President

Mike Dricoll, Elected
AdCom Member



Bill O'Brien,
UFFC Transactions
Editor-in-Chief



Karen Morgan,
Student AdCom
member



Gerry Blessing,
Secretary - Treasurer





Daniel Haugen receiving the award for AdCom service.



Al Meitzler, Elected AdCom Member



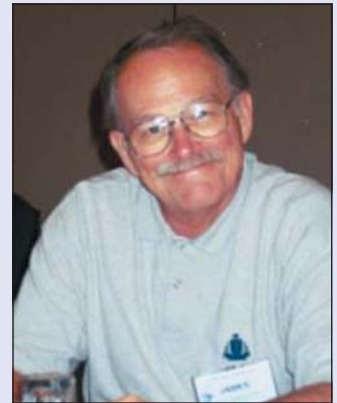
Tom Cutchen, Vice-President Ferroelectrics Committee



Ahmad Safari, President Elect



Al Meitzler receiving the award for AdCom service.



Jim Greenleaf, Vice-President Ultrasonics Committee



Katherine Nightingale UFFC-S Representative to the Transactions on Medical Imaging



John Vig WEB Editor-in-Chief



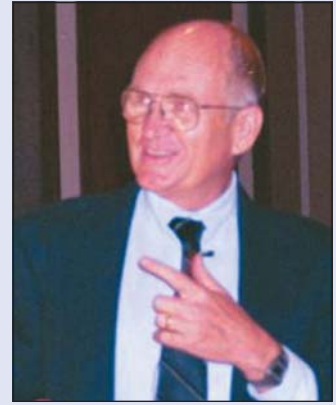
Karen Morgan receiving the award for AdCom service.



Jack Kuster, Vice-President Frequency Control Committee



Helmut Ermert preparing for the 2002 IEEE International Ultrasonics Symposium in Munich Germany.



Dr Jon Hagen of Arecibo National Observatory presenting the Plenary Lecture.



Reinhard Lerch Awards Chair



Ryan Ong Student Adcom Member

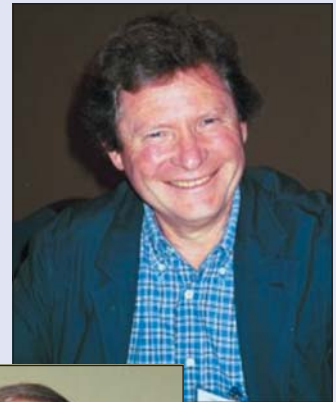


Helen Routh Elected AdCom Member

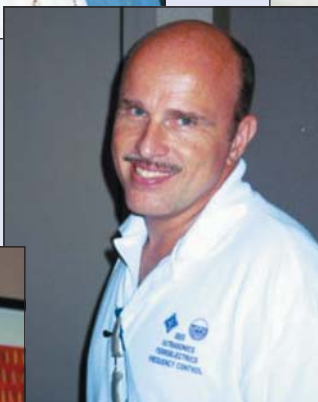
Jan Brown Vice-President Publications



Art Ballato Standards Chair



Daniel Hauden, Elected AdCom Member



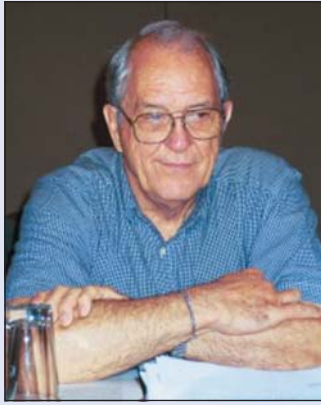
Don Malocha Senior Past President



Dennis Pape Membership Chair



Lewis Brown Elected AdCom Member



Mack Breazeale
Chair Distinguished
Lecturer Committee



**Helmut Ermert, General
Chair 2002 Ultrasonics Sym-
posium in Munich Germany.**



Masatsune Yamaguchi
Elected AdCom Member

2001. Planned reports include (1) the President's review of Society activities as presented to IEEE Headquarters, (2) an overview by Jan Brown of how the Society fits into the

broader IEEE organization, and (3) committee input re long-range plans for the UFFC-S surplus.

G. V. Blessing
UFFC-S Secretary/Treasurer

Report on the Third Asian Meeting on Ferroelectrics (AMF-3)

The Third Asian Meeting on Ferroelectrics (AMF-3) held on December 12-15-2000 was chaired by Professor Helen Chan and, was organized under the auspices of the Department of Applied Physics of the Hong Kong Polytechnic University. Participation to the conference was most impressive. With 348 attendees consisting of 245 distinguished colleagues/ scholars from 24 countries/regions and 103 graduate students, the meeting, in our opinion, was a success. Some facts and figures of the AMF-3 are given below:

Countries and Regions represented: Armenia, Australia, Canada, China, Czech Republic, Germany, Hong Kong (China), India, Israel, Japan, Korea, Malaysia, Poland, Russia, Singapore, Slovenia, Sweden, Switzerland, Taiwan, Thailand, The Netherlands, United Kingdom, U.S.A., Ukraine.

Abstracts : 447 **Oral Papers :** 69
Plenary Lectures : 8 **Poster Papers :** 343
Invited Talks : 27

Financial support to AMF-3 was provided by The Hong Kong Polytechnic University, The IEEE Ultrasonics, Ferroelectrics and Frequency Control (UFFC) Society, Gordon and Breach Science Publishers, the Innovation and Technology Commission of the Government of Hong Kong and; aixACCT and AIXTRON of Germany. The funds provided by the UFFC were mainly used for sponsoring the participation of students/scholars.

The 447 papers presented at AMF-3 covered very recent findings and advances in all aspects of the science and engineering of ferroelectrics and related materials. Majority of the

presentations concentrated on the theory, processing, properties and applications of ferroelectric, dielectric and piezoelectrics in ceramic, composite, thin film and single crystal state. In addition, two panel discussions on the future development of fundamental aspects in ferroics and applications of ferroelectrics in the 21st century were organized. Further details of the meeting's technical program can still be accessed at the AMF-3 web site: <http://ap.polyu.eduhk/amf3>.

The scientific as well as the social program of AMF-3 was very well received by the participants. The facts and figures of AMF-3 given above are not only a clear indication of the substantial growth and proof of current state of development of ferroelectrics research in Asia, but also an indication that AMF has become an international forum for the entire ferroelectrics around the world.

It is our pleasure to announce that the Fourth Asian Meeting on Ferroelectrics (AMF-4) will be held in Bangladore (India) in December 2003. Professor S. B. Krupanidhi of the Materials Research Centre at the Indian Institute of Science will be in charge of organizing the meeting. We wish him the best of success. We are also looking forward to your continued support for the AMF-4 meeting and, we hope to see you all in India in 2003 again.

H.L.W. Chan
AMF-3 General Chair
February 2001

UFFC Financial Report for 2000

The accompanying report shows the Operating Financial Statement of the Society for the year 2000. As you can see, we had a deficit of \$35.2K versus a budgeted surplus of \$3.7K. The main reason for the deficit can be found in the expenses incurred in the digitization of all our past Transactions and Proceedings

(listed under CD-ROM). Most of the costs for this effort were supposed to be invoiced in 1999, but delays in completion caused \$93.7K to be invoiced in 2000, while only \$30.5K was budgeted.

Three Symposia reported in 2000. The 1998 International Symposium on Applications of Ferroelectrics (ISAF), held

UFFC	INCOME		EXPENSE		NET	
	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
Interest/Capital Gains	27.6	10.2	0.0	0.0	27.6	10.2
Transactions	388.9	401.1	339.1	422.3	49.8	-21.2
Newsletter	0.0	0.0	18.3	9.2	-18.3	-9.2
Non-Periodicals	1.3	0.2	1.5	1.4	-0.2	-1.2
Symposia	410.2	286.8	318.4	148.3	91.8	138.5
HQ Administration	0.0	0.0	43.5	41.2	-43.5	-41.2
AdCom/Other	0.0	0.0	103.5	111.1	-103.5	-111.1
TOTAL	828.0	698.3	824.3	733.5	3.7	-35.2

TRANSACTIONS	INCOME		EXPENSE		NET	
	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
Membership Fees	30.6	28.1	0.0	0.0	30.6	28.1
Individual Non-Member Subscriptions	88.9	71.9	0.0	0.0	88.9	71.9
All Transactions Package	169.1	184.9	0.0	0.0	169.1	184.9
Voluntary Page Charges	35.0	43.3	0.0	0.0	35.0	43.3
Overlength Page Charges	35.0	34.3	0.0	0.0	35.0	34.3
Reprints	15.0	13.2	0.0	0.0	15.0	13.2
UFFC Editor's Office	0.0	0.0	44.0	31.5	-44.0	-31.5
Composition	0.0	0.0	55.0	62.7	-55.0	-62.7
Editing	0.0	0.0	36.0	70.6	-36.0	-70.6
Printing	0.0	0.0	149.0	125.7	-149.0	-125.7
CD-ROM	0.0	0.0	30.5	93.7	-30.5	-93.7
Web Support	0.0	0.0	0.0	10.4	0.0	-10.4
Indexing	0.0	0.0	3.2	4.0	-3.2	-4.0
Publication Administration	0.0	0.0	7.3	6.4	-7.3	-6.4
Subscription Handling	0.0	0.0	6.5	6.0	-6.5	-6.0
T. Medical Imaging, J. Lightwave Technol.	15.0	21.9	0.0	0.0	15.0	21.9
Miscellaneous	0.3	3.5	7.6	11.3	-7.3	-7.8
TOTAL	388.9	401.1	339.1	422.3	49.8	-21.2

SYMPOSIA	INCOME		EXPENSE		NET	
	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL
1998 Ferroelectrics	0.0	99.3	0.0	96.7	0.0	2.6
1999 Frequency Control	45.1	0.0	39.9	20.0	5.2	-20.0
1999 Ultrasonics	298.3	77.5	228.5	0.0	69.8	77.5
BookBroker	52.8	110.0	0.0	0.0	52.8	110.0
Symposia Travel Support	0.0	0.0	50.0	29.9	-50.0	-29.9
Miscellaneous	14.0	0.0	0.0	1.7	14.0	-1.7
TOTAL	410.2	286.8	318.4	148.3	91.8	138.5

ADCOM	BUDGET		ACTUAL		OUTSTANDING LOANS	
President's Office	30.0	10.3			2000 Ferroelectrics	25.0
AdCom Expenses (Meetings, etc.)	37.0	46.8			2000 Freq. Control	15.0
Chapters/Distinguished Lecturer	21.0	8.8			2000 Ultrasonics	30.0
Technical/Membership/Awards	7.0	3.8			2001 Ultrasonics	25.0
IEEE HQ Expense	8.5	9.0			2001 Freq. Control	30.0
Grants	0.0	31.0			TOTAL	125.0
Other	0.0	1.4				
TOTAL	103.5	111.1			Net Worth 1/1/00	1005.5
					Surplus/Deficit	-35.2
Long Term Investment	564.8	+88.3%			Net Worth 12/31/00	970.3

jointly with European Conference on Applications of Polar Dielectrics (ECAPD IV) and Electroceramics VI in Montreux, Switzerland had a small surplus of \$2.6K. The 1999 International Frequency Control Symposium (IFCS), held jointly with the European Frequency and Time Forum ended up with a deficit of \$20K. However, the 1999 International Ultrasonics Symposium (IUS) was a financial success, reporting a \$77.5K surplus. Also noteworthy is that our Conference Proceedings seem to sell very well; the BookBroker income was \$110.0K vs. budget of \$52.8K.

With the deficit of \$35.2K, UFFC's Net Worth at the end of the year was \$970.3K. Our Long Term Investment at \$564.8K

suffered a small loss during 2000 but is up 88.3% from our initial investment of \$300K. However, as you may be aware, the IEEE's reserves have dwindled to zero, and the Societies (the only entities with substantial income) have been forced to come to the rescue. UFFC's pro rata share to bail out the Institute has been calculated at \$105.2K. This will be reflected in the so-called 14th month statement, which is the post-audit report. This will increase our deficit for 2000 from \$35.2K to \$140.4K and reduce our Net Worth to \$865.1K.

Herman van de Vaart
Chair UFFC Finance and Operations Committee
March 4, 2001

International Joint Conference on the Applications of Ferroelectrics 2002 (IFFF 2002)

May 28 - June 1, 2002
Nara, Japan

The international joint conference on the applications of Ferroelectrics IFFF2002) will be held at Nara city, Japan, May 28 - June 1, 2002. It will be the first time that three meetings on the applications of ferroelectrics, ISAF, ISIF and FMA, will join together. The conference will have a scope similar to those of the individual meeting and will cover all topics related to the applications of ferroelectrics, piezoelectric, dielectric and electro-optic single crystals, polycrystalline ceramics, and films. You can see details in our web site: <http://fma.aist-nara.ac.jp>.

Prof. Tadashi SHIOSAKI
(Nara Institute of Science and Technology)
General Chair, IFFF2002
Contact Address:
Conference Secretary of IFFF2002
Shiosaki Lab., Graduate School of Materials Science,
Nara Institute of Science and Technology
8916-5 Takayama-cho, Ikoma, Nara 630-0101, Japan
Fax +81-743-72-6069, e-mail: fma@ms.aist-nara.ac.jp

Joint Meeting of the 2003 IEEE/EIA Frequency Control Symposium and the 17th European Frequency and Time Forum

Location: Marriott Waterside Hotel,
Tampa, Florida, USA

Dates: Tutorials: May 3 (Sunday);
Technical sessions: May 4-8
(Mon-Thur)

General Chairmen:

R. Michael Garvey
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rmgarvey@datum.com

Raymond Besson
Laboratoire de Chronometrie
Electronique Piezoelectricite
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Technical Program Chairman:

Pierre Thomann
Observatoire de Neuchatel
rue de l'Observatoire 58
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pierre.thomann@ne.ch

US Liaison for the Technical Program

Christopher Ekstrom
US Naval Observatory
34th and Massachusetts Ave.
Washington, DC 20392-5100
ekstrom@atom.usno.navy.mil

IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society Administrative Committee

SOCIETY OFFICERS

President	Fred S. Hickernell	Motorola (ret.)
President-Elect	Ahmad Safari	Rutgers University
VP, Ferroelectrics	J. Thomas Cutchen	Sandia Labs.
VP, Frequency Control	John A. Kusters	Agilent Co.
VP, Ultrasonics	James F. Greenleaf	Mayo Clinic
VP, Publications	Jan Brown	JB Consulting
Secretary-Treasurer	Gerald V. Blessing	National Institute of Standards & Technology

ELECTED COMMITTEE MEMBERS

1999 - 2001	Steven M. Pilgrim	Alfred University
1999 - 2001	Helen F. Routh	Advanced Technology Laboratory
1999 - 2001	Susan E. Trolier-McKinstry	The Pennsylvania State University
1999 - 2001	Masatsune Yamaguchi	Chiba University
2000 - 2002	Lewis F. Brown	South Dakota State University
2000 - 2002	Mike M. Driscoll	Northrup Grumman Corp.
2000 - 2002	Thomas E. Parker	National Institute of Standards & Technology
2000 - 2002	Clemens C. W. Ruppel	Siemens AG
2001 - 2003	Gordon Hayward	University of Strathclyde
2001 - 2003	Jacqueline H. Hines	Sawtek, Inc.
2001 - 2003	John A. Hossack	University of Virginia
2001 - 2003	Walter A. Schultz	Alfred University

EX-OFFICIO COMMITTEE MEMBERS

Awards	Reinhard Lerch	University of Erlangen
Fellows*	Richard M. White	University of California, Berkeley
Finance	Herman van de Vaart	VDV Associates
Historian*	Fred S. Hickernell	Motorola (ret.)
Long Range Planning	Donald C. Malocha	University of Central Florida, Orlando
Membership Services	Dennis R. Pape	Photonic Systems
Newsletter (acting)*	Jan Brown	JB Consulting
Nominations	F. Stuart Foster	University of Toronto
Standards	Arthur Ballato	U. S. Army CECOM, Fort Monmouth
Transactions*	William D. O'Brien, Jr.	University of Illinois, Urbana
Sr. Past President	Donald C. Malocha (1998-2001)	University of Central Florida, Orlando
Junior Past President	John R. Vig (2000-2003)	U. S. Army CECOM, Fort Monmouth
Student Member*	Ryan Ong (2001-2002)	University of Illinois
Jr. Student Member*	R. Brennan (2001-2002)	Rutgers University
WEB	John Vig	US Army CECOM, Fort Monmouth

UFFC REPRESENTATIVES

Committee on Man & Radiation

Paul J. Benkeser, *Georgia Institute of Technology*

Reinhard Lerch, *University of Erlangen*

Sensors Council

Stephen J. Martin, *Sandia Laboratories*

Educational Activities

Moises Levy

Journal of Lightwave Technology

David L. Hecht, *Xerox Corporation, PARC*

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March 1, 2001

Distinguished Lecturer

Notes from the 2001 Distinguished Lecturer

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

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

The award consists of a certificate, and reimbursement for an international lecture tour.

We are happy to announce that the 2001 Distinguished Lecturer is:

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.

Notes from the 2000 Distinguished Lecturer

Quartz Crystals vs. Their Environment: Time Bases or Sensors?

(Keeping the World On Time And Your Tanks Full Of Gas)

Errol P. EerNisse
2000 Distinguished Lecturer
Quartzdyne, Inc.
1020 Atherton Dr., Bldg. C
Salt Lake City, UT 84123

801 266 6958
email errol@quartzdyne.com

The Distinguished Lecturer program of the UFFC is a service provided by your society. Please feel free to contact me if you are interested in a lecture and I will try to work it into my schedule. The lecture can be adapted to the experience level of

the audience. It has been well received by audiences ranging from undergraduate engineering students to experienced research staff. There is no cost to the organization; travel costs are provided by UFFC and my time is donated by my employer.

This report covers the period August to December, 2000. A total of nine presentations were made in this period. All of the presentations used a laptop computer and projector, which allows appealing graphics and some educational animation of resonant modes in quartz crystals. A large variety of audiences have been involved. The following summarizes the institutions and audiences where presentations were made in this period.

Employees and customers of Quartz Pro AB, Stockholm, Sweden, attended the first presentation of this series in the company conference room. Quartz Pro is a manufacturer of quartz crystals and crystal oscillators. A tour of their facility prior to the talk was guided by my host, Guy Portnoff. A portable LCD projector was used for the presentation, which proved to be so practical that I purchased one just like it after returning to the U. S. It has been useful for several subsequent presentations to ensure compatibility with my laptop. I am now a self-contained road show, projector and all.

On the same trip, a presentation was made at SINTEFF in Oslo, Norway. This is a research institution established by the Marshal Plan to stimulate new technology and entrepreneurial activities to help Norway recover from WWII. Presently, a large variety of research topics are pursued with funding from the original endowment, industry, and government. The audience was made up of research staff with interest in sensors and high temperature electronics. My host was Dr. Ovidiu Vermesan.

A presentation was given to an Electronics Materials Seminar at the University of Utah in Salt Lake City, UT. The audience was mainly graduate and advanced undergraduate students with some faculty attending. My host was Prof. John Mathews, head of the Electrical Engineering Department. This lecture was one of a scheduled series of seminars for the students. Attendance was taken and notes were taken.

A similar talk was given at South Dakota State University, Brookings, SD. Although the bulk of the audience was from the Electrical Engineering Dept., a number of students and faculty from the Mechanical Engineering Dept. attended. My host was Prof. Lewis Brown, Head of the Electrical Engineering Dept. This lecture was scheduled as a stand-alone lecture.

A presentation was given at JPL in Pasadena, CA. Staff from the groups studying Atomic Clock phenomena attended. My host was Dr. John Prestage. A tour of their facilities was very informative, helping me to understand some of the important advances being made in Atomic Clocks. Atomic clocks outperform quartz oscillators in absolute accuracy, but are limited in application because of cost. In terms of cost/performance, quartz crystal oscillators have wide application in industry.

A trip was made to Seattle, WA, to lecture at the Applied Physics Lab of the University of Washington. The audience

was made up of staff and some people from industry. My host was Dr. Don Percival. A tour of some of their facilities and the campus in general was very interesting.

Three lectures were given during a trip to Japan. This trip was hosted by the Japanese Chapter of the UFFC. My wife and I had a fabulous time seeing Japan for the first time. Prof. K. Nakamura, Tohoku Univ., Sendai, was my main contact and provided much help in hotel accommodations and train travel tips. The first evening and night in Sendai were spent at a traditional Japanese Inn with Hot Springs baths. The traditional room, the traditional supper and breakfast, and the hot springs baths were powerful reminders of the beauty of historical Japanese culture.

The first presentation was for the USE2000 meeting in Sendai. This annual meeting brings together many of the researchers in Japan interested in ultrasonics. I was able to spend some time in a Poster Session, where enough of the work was in English that I could effectively interact with the authors. The lecture was in the afternoon in the form of an invited talk. The subsequent presentations were in Japanese, so I returned to the hotel. That evening there was a stand-up social event where we became better acquainted with a number of university and industry researchers from all over Japan.

After the USE2000, Dr. HIRAMA of Toyocom was kind enough to guide my wife and I through two connections between three trains to move us from Sendai to a suburb of Tokyo (Tama Station). This location allowed lectures at two places. The first lecture was at the Schlumberger facility nearby. Schlumberger is a large, world-wide corporation prominent in the oil and gas field service industry. The audience was composed of Schlumberger researchers and engineers from several different countries. There was an internal meeting there that week regarding pressure measurements in the oil and gas service industry, which brought a variety of attendees together. My host was Noriyuki Matsumoto. Bikash Sinha from the U. S. was there for the meeting, so we were able to visit as well. A tour was given of the Schlumberger testing facilities involved in pressure measurements downhole in the oil and gas service industry.

The final lecture in Japan was given at the Tokyo Metropolitan University campus. This university campus is only ten years old and is located on a beautiful hill top with forests and open ground. This lecture was sponsored by the Japanese Society for the Physical Sciences. My hosts were Profs. Sekimoto and Watanabe. The audience was a mixture of faculty, students, and staff from nearby industries. I was able to spend some time admiring the experimental and theoretical work their group does on resonant modes in quartz crystals. One of the highlights of the trip was being able to autograph their worn-out copy of my 1969 book on Design Of Resonant Piezoelectric Devices. Never before have I seen a copy of my book actually used enough to be worn out! I sent them a new copy.

Once again, contact me if you are interested in trying to schedule a lecture.

Nominations for DISTINGUISHED LECTURER AND/OR TOPIC

The UFFC-S Distinguished Lecturer is welcomed by organizations around the world to present an up-to-date review of new developments in ultrasonics, ferroelectrics, or frequency control. The Distinguished Lecturer represents the Society to the larger technical community, and stimulates interest in the Society's professional areas. Recent lecturers have spoken to local chapters, universities and companies throughout North America, Japan, Europe, China, and South America.

Which topics would you like to hear? Which member would give a stimulating lecture? Fresh ideas are always welcome. Nominations may be submitted at any time. Be heard by filling out the attached form.

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

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

Your Name/Address: _____

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

Notes from the 1999 Distinguished Lecturer

Bernhard R. Tittman "Turning Up the Heat on NDE"

What an absolute honor it was to be named IEEE-UFFC's distinguished lecturer. From May 1998 until January 2000, I visited the continents of Europe (including Poland, Austria, and Germany), Asia (China and Japan), as well as toured the U.S. (from Massachusetts all the way to Seattle, Washington) I gave my lecture entitled "Turning up the Heat on NDE," (concerning techniques and applications in the non-destructive evaluation of materials), and experienced a whirlwind of opportunities.

My lecture tour kicked off in May of 1998 with a visit to the SPIE conference on "Advances in Acousto-Optics" in Gdansk, Poland. I gave my lecture with people from around the world on a wooded peninsula on the Baltic Sea.

In June of 1998, I was fortunate to return to my native Austria for a presentation at the University of Linz. There, I joined Professor Reinhard Lerch and students at an outing in lower Austria. Austria is noted for its good food, alluring countryside, and excellence in science. During the



With Mack Breazeale enjoying lunch in Gdansk, Poland.



Dinner in Sendai, Japan



Is this nondestructive evaluation, Bernie?



You are lecturing on what kind of acoustics?

through the agricultural region of China. I donned traditional Chinese wear and visited the exquisite Imperial Gardens.

In November/ December I returned to Japan and toured Kyoto University. After my lecture, I attended dinner and rode on the super-fast train.

Lastly, I ended my tour with stops in the U.S.A. I spoke at the Acoustics Institute at the University of Mississippi and was hosted by Professor Mac Brazeal.

same year, I hosted seven Austrian students who worked on ultrasonic NDE here in my lab at the Pennsylvania State University.

My next talk included a stop in Japan where I gave my lecture at the Ultrasonics Symposium in Sendai.

Next, I was off to the Acoustics Workshop in Nanjing, China. I gave my talk, as well as explored the breath-taking countryside via an all-day bus ride from Shanghai to Nanjing

In Seattle, Washington, I presented at the Acoustical Society meeting.

In summary, my tour as Distinguished Lecturer allowed me to bring the IEEE-UFFC closer to engineers and scientists around the world. It also allowed me to make valuable professional contacts. Especially rewarding were the interaction with students; some of which actually ended up spending two months in my laboratory at Penn State.



Nanjing, China, Imperial Garden.



At a microbrewery near Linz, Austria. Prof. Reinhard Lerch and students, Dr. Manfred Koltenbacher and Dr. Todor Sheliaskov.

The 2000 UFFC IEEE FELLOWS

The UFFC congratulates its newest IEEE Fellows. The IEEE Grade of Fellow is conferred by the Board of Directors upon a person of outstanding and extraordinary qualifications and experience in IEEE designated fields, and who has made important individual contributions to one or more of these fields. 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.

Venceslav Frantisek Kroupa

Institute of Radio Engineering and Electronics
Academy of Sciences of the Czech Republic
Czech Republic

For a numerical theory of frequency synthesis, and for contributions to time and frequency measurements, frequency stability, and phase-locked loops.

Fred L. Walls

National Institute of Standards and Technology
Time and Frequency Division
USA

For contributions in the development of stable frequency sources and low noise signal processing equipment.

Masatsune Yamaguchi

Chiba University
Dean of Faculty of Engineering
Japan

For contributions to highly piezoelectric leaky surface acoustic waves.

If you would like to nominate a colleague for IEEE Fellow, information may be found at <http://www.ieee.org/about/awards/fellows/fellows.htm>

2002 IEEE International Ultrasonics Symposium in Munich, Germany

Next year's Ultrasonics Symposium will be in Munich/ Germany just after the well-known Oktoberfest (<http://www.munich-tourist.de/english/englisch/oktoberfest/munich-oktoberfest-welcome.htm>). The schedule is:

Dates	Events
September 21 (Sa) - October 6 (Su), 2002	Oktoberfest
October 8 (Tu) - October 11 (Fr), 2002	IEEE Ultrasonics Symposium

The symposium incl. exhibition, short courses will be in the Forum Hotel Munich (http://www.interconti.com/germany/munich/hotel_munfor.html). Conference accommodation will be in the Forum Hotel as well as in the City Hilton Munich (just adjacent to Forum Hotel) and in other hotels close to the Forum Hotel.

Everybody who is interested to arrive earlier in Munich in order to go to the Oktoberfest is urged to make **early hotel**

reservations! Please do not wait for the symposium announcements and **make your reservation for accommodation prior to the symposium as soon as possible**, not later than this summer! Reservations in other hotels (instead of Forum and Hilton) may be wise because of high room rates in Munich during the Oktoberfest time. Please contact the official Munich tourist office (<http://www.munich-tourist.de/>) or

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(Munich Hotel Association)
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Stealth Job Hunting: You Can Conduct a Job Search Without Shouting it to the World

by Robert Bellinger

You basically like your engineering job. But you wonder if there's something better out there. Yet, you don't want to circulate a resume or post your credentials on the web on a speculative hunt. You are what the technical recruiters call a "passive" candidate: interested if the right opportunity comes along, but not actively pursuing a new position. In this tight job market for technical professionals, you're among the most desirable candidates.

The IEEE has come up with a new Internet-based solution: a job site (www.ieee.org/jobs) that protects the anonymity of members while scanning an extensive database of employers for potential matches. Powered by an Austin, Texas-based application service provider — Hire.com — and sponsored by IEEE-USA and *IEEE Spectrum*, the site will give both active and passive job seekers more control over the recruiting process.

"Hire.com has developed a unique approach to Internet recruiting that leaves the candidate in control while making all candidates, passive and active, readily available to employers with interesting job opportunities," explains Jim Hammock, Hire.com's CEO.

It will work like this: on the www.ieee.org/jobs site, IEEE members will enter a profile of their professional skills and educational background, along with what they're looking for in a position, including desired salary, type of work and location. This profile will be used to search the database for a match. As additional profile-matching jobs are posted, the system will send immediate e-mail notifications.

"Candidates will select which opportunities interest them by responding only to those opportunities," Hammock said. "Passive candidate data will never be made available to prospective employers unless the candidate has 'opted in' to a recruiting relationship with that employer." Then and only then will the candidate send in a resume, and the employer will submit a prescreening test to determine if there is a good "fit." If so, candidates and employers can arrange for further contact.

The service, which is expected to be active in March, will be free to IEEE members. Employers will pay a fee on a per-job or fixed-fee basis.

This service will replace IEEE-USA's Job Service, a successful job site for six years. "We're proud of our success with IEEE-USA's job site," acknowledged IEEE-USA President Ned Sauthoff, "but we felt that to offer even better service, we needed to find a partner with a track record in Internet hiring. Hire.com's e-Recruiter software gives our members maximum control of the job-hunting process and

Reprinted with permission from **IEEE-USA News & Views**, March 2001. Bob Bellinger, Managing Editor of **IEEE-USA News & Views**, is a freelance editor based in Fort Lauderdale, FL.

offers employers unprecedented speed and precision in identifying qualified applicants.”

“The great thing about this new service,” Sauthoff continued, “is that job seekers don’t have to search the database like they did with our previous job site. If the program finds a match, you’ll be notified right away. Even after you turn your computer off, the virtual recruiter continues searching for you.”

Corporate human resource directors have recognized the Internet as a great tool for boosting recruitment, but complained that it is indiscriminate. Companies got too many electronic resumes from non-qualified candidates or from

candidates who were “window shopping.” The IEEE-USA Job Service always attracted qualified technical professionals for employers, but the new site will tap into a much larger pool of candidates—IEEE members who are open to a change but not willing to make their interest public.

“We believe this complete candidate control is the real power of the service for both the employers and the candidates,” Hammock noted. “Candidates submit only to positions that really interest them and employers are delivered interested, qualified candidates more quickly as a result—a real win-win in talent acquisition.”

International Forum on Wave Electronics and Its Applications

St. Petersburg, Russia, and Vicinity

14-18 September 2000

The International Forum on Wave Electronics and Its Application in Information and Telecommunication Systems was a combination of 5 conferences, some which have been held in Russia for several years. The first International Symposium on

Surface Waves in Solid and Layered Structures (ISSWAS) was first held in 1986 in Academgorodok near Novosibirsk and was opened to the western world for international participation. The National Conference on Acoustoelectronics (Professor Georgi Mansfeld-Chair) was started in 1972 as a Russian National Conference and was held every two years with international participation starting in 1992. This was the third International Conference for Young Researchers on Acoustoelectronic and Acoustooptic Information Processing (Professors Alexander Bugaev and Sergei Kulakov-Co-Chairs). The International Symposium on Spin-Wave Electronics and Optoelectronics (Professor Sergei Nikitov-Chair) and the 2000 International Symposium on Frequency Control and Signal Generation (Professor Valentin Kuleshov-Chair) rounded out the Forum. The IEEE UFFC Society, Societe Francaise des Microtechniques et de Chronometrie, and the Russian Center on Integration supported the Forum financially. This support helped offset expenses for students and those needing financial aid. Three Russian Institutions were involved directly in conference



Prof. Szustakowski (Military University of Technology, Warsaw, Poland).



Ludmila Konovalova and Irina Degtiarieve (researchers, Members of the Organizing Committee) are having a short rest.



Opening ceremony.



Tatiana Babkina (Moscow State University, student).



Ivan Anisimkin (IRE, young researcher).



Christoph Boedefeld (University of Munich, Germany, young researcher).

preparation, St. Petersburg University of Aerospace Instrumentation, the Institute of Radio Engineering and Electronics of the Russian Academy of Science (Moscow), and the Moscow Power Engineering Institute.

The opening ceremony of the meeting, the first plenary session, and the first poster session took place on the 14th of September, 2000, at a historical Russian building in downtown St. Petersburg which now houses the main campus of the St. Petersburg University of Aerospace Instrumentation. Academician Yuri Gulyaev, the General Chairman of the Forum, was honored in recognition of his 65th birthday. There were 350 attendees on the opening day. Fifty of these were young researchers under the age of thirty-three with forty-three from Russia. Fifteen countries outside of Russia with forty-one total attendees were represented at the Forum. One hundred eight posters were presented and seven plenary talks were given.

The remainder of the conference was held aboard the Russian Cruise Ship, Kronstadt, as it sailed out of St. Petersburg along the Neva River into Lake Ladoga and to the picturesque archipelago of Valaam. There were two hundred fifty attendees aboard. There was time after arrival in Valaam on Friday to spend the day on a walking tour of the beautifully wooded island with its magnificent wooden churches and chapels and to visit its famous monastery that before World War II origi-

nally served five hundred monks. The monastery now has a population of one hundred, and the large sanctuary with its beautiful wall paintings and iconostasis is undergoing reconstruction.

Saturday was a full conference day onboard with three parallel sessions. Saturday night the ship sailed for Mandrogi. On Sunday afternoon the group toured the village of Mandrogi with its beautiful wooden architecture, the reconstruction of an old rich Russian village with tradesmen and craftsmen.

Concluding conference sessions were held in the late afternoon as the ship sailed back overnight to St. Petersburg. We were favored by excellent weather, treated to the rich cultural heritage of Russia, all while learning about the latest scientific and technological results in the acoustic and acoustooptic areas.

The attendees were especially appreciative of the hard work of the organizing committee led by Sergei Kulakov and thirteen of his coworkers at the State University of St. Petersburg for Aerospace Instrumentation. Ludmila Konovalova, Kirill Volianski, Irina Degtiarjeva, and Viacheslav Nefedov, co-workers of Professor Kulakov, were especially involved in conference preparation and continuing work during the Forum. Valeri Proklov with his Program Committee arranged an excellent technical program. Those who stayed a few days beyond the conference were treated to tours, muse-



Prof. George Mansfield (IRE, Russia).



Prof. Raymond Besson (ENSMM, France).



Prof. Elena Charnaya (St. Petersburg State University, Russia).



Dr. Jaques Sapriel (France Telecom).



Prof. Francis Yu (Pennsylvania State University, USA).

their spirits are uplifting to all who meet them. Our IEEE UFFC Society is proud to be one of the major sponsors of such symposia. Our society thanks the members of the Russian Chapter of UFFC-S and all who assisted with the conference for their work in helping to organize such a technically and culturally rewarding symposium.

Fred Hickernell

(The accompanying photographs were supplied by Sergei Kulakov)

ums, folk dances, ballets, philharmonic symphony, and even a circus. The people of Russia are most gracious hosts, and

Guests Enjoy St. Petersburg, the Beauty of Valaam Island, and the Russian Village of Mandrogi

The guests of the Russian September conference were treated royally while in St. Petersburg and touring on the ship. Special guides who shared the history, development, and beauty of their country escorted us.

The first tour was of the city of St. Petersburg on September 14th, while the opening conference session was taking place. The guide explained the architecture of this 300-year-old city. The city tour took us to four special places. The first was the Neva River with wonderful views of the Peter and Paul Fortress, the Navy Building, the Winter Palace, and the Admiralty Building. The second stop was near the "iron horseman," which is a monument of Nicolaus I. Here we also viewed the Mary Palace that was constructed for the

daughter of Nicolaus I. Today it is the seat of the city parliament. The third place we visited was Isaac's Cathedral. It is one of the biggest cupola buildings of the world, third in rank. In 1928, it was changed to a museum, but then in 1990, it was again a place of worship. The fourth stop was the Russian Museum and Pushkin Museum where Pushkin lived until he died in a duel.

After the opening ceremony and a lovely lunch at the St. Petersburg University of Aerospace Instrumentation, Professor Vladimir Sokolov escorted the ladies to the Hermitage Museum, the former winter palace. We viewed many artifacts, paintings, furniture from the 18th Century representative of



Professor Georgi Mansfield and Professor Elena Charnaya at the closing banquet.



On the ship at sunset: Manfred Weihnacht, Elke Weihnacht, Thresa Hickernell, Fred Hickernell, Werner Buff, Renate Buff.



Resting on the Trail at Valaam Island.

Italian, French, German, and Russian artists. Tea and coffee were enjoyed in the courtyard. At the end of the day we boarded the cruise ship Kronstadt for the overnight trip to Valaam Island.

Arriving by ship the next day at Valaam Island, we took a three-hour walking tour in the morning with our guide, Anna. Valaam is one of the islands in the northern archipelago of Lake Ladoga. It is unique in Europe with sheer rocks rising high from the depths, little islands, capes, and bays. The island has been developed like the Holy Land specifically designed to glorify God. There is a Garden of Gethsemane, a Mount of Olives, and a Kidron Valley. It has many chapels, churches, and small prayer gardens. These structures are in the midst of oak, ash, elm, poplar, birch, and Siberian fir trees. We enjoyed special music by a male trio in one of the churches.

That afternoon we took a small ship to the large Monastery of the Transfiguration. Around the beautiful monastery is a courtyard, garden, and cemetery. At present over 100 monks and novices live on the island, dedicating themselves to the old strict monastic rules, restoring the newly returned buildings, and concerning themselves with everyday matters requiring much work and patience. Our guide, Anna, was very informative. Ladies had to wear skirts and cover their heads when going into any part of the main monastery.

The next day Anna took us on a walking tour along a narrow path to the southeast coast into the deep forest of Valaam. This trail led to an area where the Finnish naval barracks and fort were built. Finally we arrived at the beautiful scenic coastline. This slow walk gave our ladies from five different countries time to get acquainted, share experiences, and



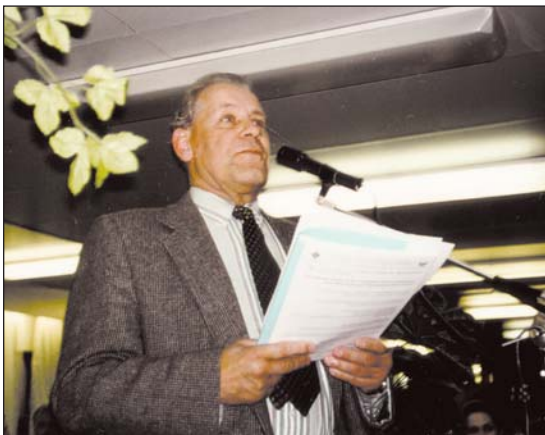
Picturesque Russian House at Mandrugi.



Party time: Sergei Kulakov and friends.



Russian Cruise Ship "Kronstadt."



Professor Sergei Kulakov at the closing banquet.



Concert given by Anastasiya Volianskaya.



Outside the Hermitage Museum (left to right): Elke Weihnacht, Thresa Hickernell, Renate Buff, Anita Yu See, and Akemi Yamada.

learn about the culture of each other's countries. Some of the women renewed old acquaintances, while all of us met new friends.

On the ship that evening we enjoyed a concert given by the newlywed, Anastasiya Volianskaya. She sang and played the grand piano, classical and favorite music from Liszt and Chopin. Anastasia is a very talented.

Sunday afternoon the ship docked at the village of Mandrogi, a small developing tourist town. There were shops selling Russian crafts, a hotel, and restaurants. The architecture was unique, as it is very colorful and looked like "gingerbread houses" in the old Russian style. The weather was beautiful, so the sun highlighted the village and the changing leaves of the birch trees that surrounded it

Joining the conferees for parties and the closing banquet was a very special. We thoroughly enjoyed the food, the sharing of conversation, and the joy of being together.

Thresa Hickernell

IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society

Newly Elected Members to the Administrative Committee for a Three-Year Term Beginning 1 January 2001

ULTRASONICS

JOHN A. HOSSACK (M '90) is an associate professor in the Department of Biomedical Engineering at the University of Virginia. He received the B.Eng. (Hons. I) in Electrical and Electronic Engineering from the University of Strathclyde, UK, in 1986 and the Ph.D., from the same department, in 1990.

He performed postdoctoral research in the E.L. Ginzton Laboratory, under Professor B.A. Auld, at Stanford University from 1990 to 1992. This work investigated various aspects of the design and modeling of composite piezoelectric transducers for naval and medical applications.

In 1992, Dr. Hossack joined the transducer development group at Acuson, Mountain View, California. Initially, his work was related to modeling and design of new diagnostic transducer arrays with improved sensitivity and bandwidth. In 1997, he joined the Acuson Laboratory where his primary focus was on various beamforming and imaging techniques. One project involved image matching between successively acquired images with the object of producing either a 3D-volume image or an extended length 2D image. A second project involved a beamforming approach wherein different frequencies are focused to different depths with the goal of obtaining an improved focal zone over extended depth. Many of these concept developments resulted in issued patents.

Dr. Hossack was recognized in 1999 as an Acuson Fellow for 'excellence in technical contribution'.

At the beginning of 2000, Dr. Hossack made the difficult decision to leave Acuson and join the Department of Biomedical Engineering at the University of Virginia. His research interests include high bandwidth transducers, new approaches to beamforming, and novel 3D imaging techniques. Taking advantage of his industrial experience, Dr. Hossack desires to make his research relevant to practical application in the biomedical field, and to express to students the link between academic studies and the solution of engineering design / development problems.

With respect to IEEE duties, Dr. Hossack is committed to making the engineering profession attractive to good students. He has been a member of the IEEE Ultrasonics Symposium Technical Program Committee since 1996. Away from work, John is mostly an outdoors person. He likes to climb mountains, windsurf, and bicycle. Bicycling events completed include the 'The California Alps Death Ride', 'The Terrible Two' (200 miles), and the 24-hour mountain bike relay ride at Snowshoe Mountain in West Virginia.

FERROELECTRICS

WALTER A. SCHULTZ (M'84, SM'98) was born in Philadelphia, Pennsylvania on December 8, 1943. He re-

ceived the B.S. degree in Electrical Engineering from Penn State University, State College, PA in 1965. He received the M.S. and Ph.D. degree in Solid State Science from Penn State University, State College, PA in 1969 and 1973 respectively.

He joined the Materials Research Laboratory at Penn State in 1974 as a Senior Research Associate engaged in the research and development of electronic ceramics and composite hydrophone materials. In 1977 he became an associate professor of Materials Research at Penn State. While at MRL, he participated in the commercialization of PLZT as a high voltage capacitor material, the incorporation of internal electrodes in low voltage piezotransformers, the adaptation of 1-3 composite to medical ultrasonic transducers and the adaptation of grain orientation to ferroelectric ceramics through salt processing and tape casting. In 1983, he joined New York State College of Ceramics at Alfred University where he is now a professor of Ceramic and Electrical Engineering and Graduate Program Director for CEMS. His current research interests are in the theory, design, characterization and modeling of new electronic materials and sensors. He also conducts research on materials for thick film circuits and is exploring the use of rapid prototyping techniques for fabrication of circuits and transducers.

Dr. Schulze has been a member of the IEEE/UFFC Ferroelectrics Committee since 1995 and a General Co-Chair of the Ferroelectrics Component of the UFFC-S 2004 meeting. He was a co-recipient of the IEEE /UFFC Best Paper Award in 1985. In other societies, he has been an Associate Editor (electronic materials) since 1993 for the American Ceramics Society Journal. In 1996, he became a Centennial Fellow of the Earth and Mineral Science College at the Pennsylvania State University. In 1997, he was co-recipient of the Best Paper of the Year Award from the Electronics Division of ACerS.

FREQUENCY CONTROL

JACQUELINE H. HINES was born in Alamogordo, New Mexico on March 21, 1962. She earned her B.S. degree in Applied and Engineering Physics from the Cornell University College of Engineering, Ithaca, New York, and her M.S. and Ph.D. degrees in Electrical Engineering from the University of Central, Florida-Orlando. Mrs. Hines is currently conducting research at Sawtek Inc. in Orlando Florida.

As an undergraduate, Dr. Hines was involved in several research efforts, including work as a research assistant at Bell Labs investigating the feasibility of using polyacrylamide gels in the fabrication of optical fibers and work in the Theoretical and Applied Mechanics Division of Cornell University's College of Engineering on creep crack propagation modeling. From 1984 to 1988, Mrs. Hines served on active duty in the U.S. Navy, leaving active service at the rank of Lieutenant. Her primary responsibility was technical instruction in the areas of physics and reactor theory at Naval Nuclear Power School in Orlando, Florida. Dr. Hines joined Sawtek Inc., Orlando Florida in 1988, as a Research and Development Engineer. Her research activities have included the theoretical and software implementation of a time domain approach to analyzing diffraction effects in SAW devices, investigations into the effects

of ionizing radiation on SAW devices, and work on high frequency devices. Dr. Hines served as Manager of Research and Development at Sawtek Inc. for several years prior to stepping down to become an individual contributor in December 1999.

Dr. Hines is currently the Finance Chair for the upcoming IEEE 2000 Ultrasonics, Ferroelectrics, and Frequency Control Society Symposium, and a member of the Technical Program Committee for the Frequency Control Symposium (FCS). She has served as the IEEE Orlando Section Secretary, Treasurer, Vice-Chairman, Chairman, Junior Past Chairman and Awards Chairman, and has filled several positions including Chairman in the Orlando Chapter of IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society (UFFCS). She has served on the organizing committee for several conferences, including the 1991 UFFCS Symposium, the 1995 NTC Conference, and the 1998 SECON. Dr. Hines is a member of IEEE, Tau Beta Pi, and Phi Kappa Phi, and was recently awarded an IEEE Millennium Medal by the Orlando Section of IEEE.

REGIONS 8 – 10

GORDON HAYWARD has been engaged in ultrasonics related research since 1981, with particular emphasis on the modeling and design of transducer and array systems for non-destructive testing, sonar, biomedical and industrial processing applications. During this period, over 200 publications have appeared in international journals and conferences, many of which are recognized as significant contributions to the field. He is the founder and Director of the recently created Centre for Ultrasonic Engineering, a collaboration involving the University of Edinburgh and Glasgow Caledonian University. His research at Strathclyde has attracted external support from both government (EPSRC, MOD-DRA, DTI and EEC) and industrial organizations. Major UK collaborations have involved Fugro - UDI, Sonavision, GEC, British Aerospace, Rolls Royce, British Gas, Ford and BP-Amoco. Three internationally funded projects with the USA and Canada have been established, in addition to five EEC research programs, mainly covering the areas of sonar and non-destructive testing. Professor Hayward is an Associate Editor of the IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control, with a specific remit for ultrasonic devices and systems. He became a Fellow of the IEEE in 1995 and a Senior Member in 1990.

His research activity has received recognition and subsequent practical implementation in two principal areas. Firstly, he pioneered the application of 1-3 connectivity composite transducers and arrays for high frequency underwater sonar and imaging. In conjunction with FUGRO-UDI and DERA Bingley, composite array transducers are now manufactured commercially and incorporated within state of the art minehunting sonar instrumentation. A second area of significant impact involves innovative transducer systems for non-destructive testing and structural monitoring applications. Specifically, a range of new flexible transducers and arrays have been developed for conformable ultrasonic imaging of solid materials, in conjunction with new transducers and arrays for non-contact (through air) inspection and high temperature monitoring applications. Most developments have been aimed at the aerospace industry, with initial support from DERA, EPSRC, Rolls Royce

and British Aerospace. With the assistance of further EU funding, the first commercial prototype air coupled inspection systems were installed at BAe Warton in 1998. This work has had application in other industries, including inspection of gas pipelines, remote and rapid inspection of automobile components and biomedical imaging. Several national awards have further recognized the value of his research. In 1993, Professor Hayward was awarded the *Roy Sharpe Prize* from the British Institute of Non-Destructive Testing for 'contributions to the benefit of industry and society through research and development in ultrasonic transducers and signal processing.' In 1994, he was

awarded the *Makdougall-Brisbane Prize* from the Royal Society of Edinburgh for 'outstanding research in the field of ultrasonics'. In 1997, Professor Hayward received the *John Logie Baird Award* for technical innovation for his work in air coupled ultrasonic systems. He was the recipient of the *John Grimwade Medal* in years 1997, 1998 and 1999, awarded by the British Institute of non-destructive testing, for the best papers to be published in the journal INSIGHT.

Membership

UFFC Membership

UFFC Society membership data as of 31 January 2001

Members and affiliates (31 Jan 2001)	2373
Members and affiliates (31 Jan 2000)	2354
Growth	19 (0.8%)

We need your help to accomplish a goal for this year. We would like to double the membership of IEEE UFFC in 2001. To do that, we need you to volunteer for an assignment...to ask a colleague of yours to join UFFC.

We could pursue several other approaches to increasing membership this year. We could advertise in technical publications. We could send out bulk mailings or emails. Those reach a small percentage of the people who should be members, but for the most part these efforts are like seeds sown on barren ground. However, when you ask a colleague to become a member, it is more like transplanting a seedling into a garden. You are already sold on the benefits of membership. The colleague that you select to ask is someone that you feel would benefit as well. A personal invitation may be the missing element that may have kept that colleague from joining in the past.

Why increase membership? The Society is based on the efforts of its members to promote their common interests in ultrasonics, ferroelectrics, and frequency control. Volunteers devote their time and talent to assessing and disseminating information about the field to the benefit of others and themselves. The more members of the community who participate, the more successful that endeavor will be.

Not everyone can devote the same time and effort each year to volunteering. Some veterans of the Society have retired recently; others have taken job assignments that require more hours than are found in a day. To be a vibrant organization, we need new volunteers to replace those veterans. The larger our membership, the larger is the pool of volunteers who are at the appropriate point in their careers to undertake a technical committee assignment, a role in a local chapter, or the review of a journal paper. In turn, the efforts expended by each will serve a larger number of colleagues, making their volunteer work more valuable.

Resolve to ask a colleague to Join UFFC!

UFFC Membership Ambassador Program

The UFFC sponsors a membership outreach program for our members whose annual income is lower than \$8,600. The IEEE dues for these members are one half the regular dues. The UFFC will pay these dues, as well as, the \$15 UFFC Society dues for qualifying individuals. In 2000, UFFC sponsored 27 members in this program – 15 from Region 8 (primarily Russia) and 12 from Region 10 (primarily China). If you qualify or know someone who does, contact Dennis Pape, the UFFC Membership Chair, dpape@milcomtech.com.

MEMBERSHIP SHATTERS RECORDS: IEEE membership totaled 366,135 in 2000, exceeding the membership development goal of 365,000.

Higher-grade memberships grew three percent to a total of 307,815 members, while student memberships climbed to 58,320, almost a 10 percent growth rate.

Both represent record membership numbers for the IEEE. The number of Senior Members also hit a new milestone in 2000, now totaling 26,394.

The five fastest-growing IEEE Societies were:

- | | |
|------------------------------------|---------------|
| 1. Lasers and Electro Optics | +17.1 percent |
| 2. Microwave Theory and Techniques | +7.9 percent |
| 3. Solid-State Circuits | +7.7 percent |
| 4. Communications | +6.3 percent |
| 5. Power Electronics | +5.3 percent |

Here is a summary from the membership report:

	Higher grade	Student	Total
2000			
U.S.:	209,049	24,923	233,972
Non-U.S.:	98,766	33,397	132,163
Total:	307,815	58,320	366,135
1999			
U.S.:	204,748	23,584	228,332
Non U.S.:	94,241	29,686	123,927
Total:	298,989	53,270	352,259
Change:	+3.0%	+9.5%	+3.9%

For more information, visit <http://www.ieee.org/organizations/rab/md/jan01prog.html>.

Nominations for UFFC-S DISTINGUISHED SERVICE AWARD

The Distinguished Service Award is a new award created by AdCom to recognize long-term support of the Society's activities. The first Award was presented in 1997. Recognition is given to those who innovate new Society programs, administer major Committees, manage Society functions, or promote the Society's areas of technical interest to the larger community. The recipient usually has served for many years with sustained participation in the Society's management. Selection is made by the Officers and the Awards Committee. Nominations may be submitted at any time. Who is the person you would like to honor in this way?

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

Suggestions for the next **Distinguished Service Award** :

Your Name/Address: _____

Send at anytime to: Prof. ref. Dr.-Ing Reinhard Lerch
Chair, UFFC-S Awards Committee
Department for Sensortechnology
Paul-Gordan-Str. 3/5
D-91052 Erlangen
Germany
FAX: +49-9131/85-23133
Email: r.lerch@ieee.org

Nominations for UFFC-S ACHIEVEMENT AWARD

The Achievement Award is the highest Society-wide award presented to a member in special recognition of outstanding technical achievements. Take a moment to identify members whom you think deserve to be honored. The award is granted for significant technical publications in the field of ultrasonics, ferroelectrics, or frequency control; for presentation of lectures; and/or for service to the Society.

The award embraces all technical fields in the society, and includes both technical and organizational achievements. Each nomination receives serious consideration by the Officers and the Awards Committee. Nominations may be submitted at any time during the year.

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

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

Nominee's Name & Main Contributions: _____

Your Name/Address: _____

Send at anytime to: Prof. ref. Dr.-Ing Reinhard Lerch
Chair, UFFC-S Awards Committee
Department for Sensortechnology
Paul-Gordan-Str. 3/5
D-91052 Erlangen
Germany
FAX: +49-9131/85-23133
Email: r.lerch@ieee.org

Chapter Activities

Kiyoshi NAKAMURA, Chair of UFFC-S Japan Chapter in 1999-2000

Japan Chapter

The Japan Chapter held 5 technical meetings during the second half of 2000, 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) July 7	13	Tokyo
2) September 1	7	Kanagawa
3) September 18-19	17	Sendai
4) October 11	7	Chiba
5) November 16	7	Shizuoka
6) December 14	6	Yokohama

UFFC-S 2000-2001 Distinguished Lecturer Program

Dr. Errol P. EerNisse of Quartzdyne, Inc., the UFFC-S 2000-2001 Distinguished Lecturer, was invited to Japan and visited on Nov. 3-17. He favored us with impressive and instructive lectures on the topic, "Quartz Crystals vs. their Environment: Time Bases or Sensors?" at the USE 2000 Symposium in Sendai, at Schlumberger Corporation in Kanagawa, and at the meeting of the 150th Committee on Acoustic Wave Device Technology held at Tokyo Metropolitan University.

21st Symposium on Ultrasonic Electronics (USE2000)

The 21st Symposium on Ultrasonic Electronics (USE2000) was held in Sendai on Nov. 6-8, cosponsored by the Japan Chapter and attended by about 380 participants. There were three invited talks (one of them by Dr. EerNisse), and 188 contributed papers were presented. Most of the papers presented will be published in a special issue of the Japanese Journal of Applied Physics, Vol. 40, No. 5B (2001). Titles and abstracts of the articles in J.J.A.P. including back issues will be browsed by accessing the J.J.A.P. home page at <http://www.jjap.or.jp/online/>.



Dr. EerNisse giving his lecture at the 21st Symposium on Ultrasonic Electronics held in Sendai.

Special Lectures

The Japan Chapter held special lectures by two researchers from the Penn State University. One was by Professor T. R. ShROUT entitled "Recent Innovations in Piezoelectric Materials and Fabrication for Ultrasound Transducers", and the other was by Dr. Sorah Rhee entitled "Microwave Sintering of PZT for Ultrasound Transducers and Microscale Devices." The lectures were held at Tohoku University in Sendai on Dec. 19, cosponsored by the Tohoku Section of the Institute of Electronics, Information, and Communication Engineers of Japan and attended by 53 participants.

2001 Officers

The officers of the Japan Chapter for 2001 are:

Chair: Professor Yasuhiko Nakagawa, Faculty of Engineering, Yamanashi University, 4-3-11, Takeda, Kofu 400-8511

Vice Chair: Associate Professor Ken Yamada, Graduate School of Engineering, Tohoku University, 05 Aramaki-Aza-Aoba, Aoba-Ku, Sendai 980-8579

Secretary and Treasurer: Associate Professor Kentaro Nakamura, Precision and Intelligence Laboratory, Tokyo Institute of Technology, 4259 Nagatsuda, Midori-Ku, Yokohama 226-8503

Sadayuki Takahashi
Vice Chair
UFFC-S Japan Chapter



Dr. and Mrs. E. P. EerNisse with members of the IEEE UFFC Japan Chapter at the welcome party held in Tokyo. Front row (left to right): Sadayuki Takahashi (Vice Chair), Dr. and Mrs. E. P. EerNisse, Ken-ya Hashimoto. Back row (left to right): Yasuaki Watanabe, Ken Yamada, Kiyoshi Nakamura (Chair), Hitoshi Sekimoto.



Dr. and Mrs. EerNisse with their "Sensu" (Japanese fan).

The 12th IEEE International Symposium on the Applications of Ferroelectrics

Waikiki Beach, Hawaii
July 30-August 2, 2000

The 12th IEEE International Symposium on the Applications of Ferroelectrics was held at a beautiful location in the Hilton Hawaiian Village directly on Waikiki Beach on July 30th to August 2nd, 2000. The Symposium Organizers were Angus Kingon (North Carolina State University) and Dwight Viehland (US Navy).

The Symposium was attended by about 330 people, and over 300 oral papers or posters were presented. Attendees came from 14 different countries, with the number of attendees from North America closely followed by those from Asia, as befitting the location of them Symposium.

The Technical Program Chairs were Susan Trolier McKinstry (Penn State University) and Steve Pilgrim (Alfred University). Plenary speakers were Dave Payne (University of Illinois on Chemical Solution Processing of Integrated Ferroelectrics), S. Takahashi (NEC Corporation, Non Linear Behavior in Piezoelectric Ceramic Transducers), Detlev Hennings (Philips Research Labs, Multilayer Ceramic Capacitors with Base Metal Electrodes), Y Yamashita (Toshiba, Piezoelectric Materials in the 21st Century), and Scott Summerfelt (TI, High Density Embedded Ferroelectric Memory). Professor Payne discussed the chemical solution processing of integrated ferroelectrics, reviewing this popular method of thin film deposition, and going on to demonstrate how innovative chemical 'self-assembly' tech-

niques can be used to form microstructural templates and patterns. The plenary presentations of Drs Takahashi, Hennings and Yamashita reverted back to bulk materials. Dr Takahashi addressed specifically the area of piezoelectric transformers, which he has been developing at NEC for a number of years, and presented quantitative models for the electromechanical transduction of these devices, which are finding growing niche markets. He pointed out that we need to pay greater attention to the non-linear properties of the piezoelectric materials, where they are being used in this high power, continuous-mode application. Dr Hennings provided a detailed review of the multilayer capacitor industry over the past years, emphasizing the switch to base metal electrodes as a cost-driven, fundamental change in the technology. Dr Yamashita's presentation on single crystal piezoelectrics was more forward-looking, postulating some rules for searching for new materials, and suggesting some promising materials compositions. The final plenary presentation was the culmination of the meeting, and it was good to see the session as full as the opening plenary on the first morning of the Symposium, despite the attraction of the spectacular beach only yards away. This was a tribute to the presenter, but also reflected the interest in the thin film ferroelectric materials as a critically important direction for the field. The audience reflected the fact that the ISAF meeting is the prime venue for interactions between industry and academic researchers who develop ferroelectric materials in bulk form, and those developing the materials for thin and thick film applications. Dr Summerfelt presented a comprehensive account of the issues and difficulties associated with integrating ferroelectric films as high density memory in



Ahmad Safari, past Chairman of the Ferroelectrics Committee (right), teaching an avid admirer to dance the hula during the Luau!



After the awards ceremony at the opening of the Symposium, (from left) Tom Cutchen, new Ferroelectrics Committee Chairman, Glenda Cutchen, Theresa Hickernell, and Fred Hickernell, President of the UFFC.

semiconductor chips (low density devices have already found their way into niche markets).

The rest of the program reflected some interesting trends. Clearly, the research interest in thin and thick films continues to grow, although there were fewer papers on FRAMs and DRAMs than the previous Symposium. Instead, dielectric applications, particularly at RF and microwave frequencies, were represented by a larger number of papers, as well as a distribution of other thin film applications such as piezoelectric (both MEMS and non-MEMS). The topic of large high piezoelectric coefficient materials (for example, the PZN and PMN single crystals) was well represented, including investigations of low cost fabrication methods via modified ceramic processing routes. There remains significant interest in non-Pb-containing piezoelectric and ferroelectric materials, although the small number of papers on the topic confirms the difficulty of replacement. The trend towards fewer papers on piezoelectric device designs appears to be continuing. A new trend for the ISAF symposium was the large number of papers on new and novel characterization techniques, or techniques which had not previously been found in this community. This is a reflection of the increasingly multidisciplinary nature of the ISAF community.

In addition, several distinguished awards were presented to worthy recipients at the meeting. These included the presentation of the IEEE Millennium Award to L. E. Cross, R. E. Newnham, and W. Smith, and the UFFC-Ferroelectrics Achievement Award to A. Safari and R. Waser.

The program appeared to compete successfully with the lure of the beach, with many people reserving the pre- and post-symposium period to explore the Hawaiian islands. During the meeting, social functions were well-attended. The meeting began with a reception, sponsored by the German equipment supplier, Aixtron, outside on the hotel "village green" on the balmy Sunday evening. On Tuesday evening, shaking off threats of a hurricane, about 300 guests attended an outdoor 'luau', where traditional foods and island entertainments were provided. This was sponsored by equipment supplier aixAcct, and chemical company (ANGUS insert). The evening coincided with the wedding anniversary of Professor Don Smythe and his wife, and the contributions of Professor Eric Cross and his wife, Scilla, were also celebrated.

To date, over 230 papers have been received and undergone format review, and the camera-ready proceedings are soon expected to be received from the publisher.

In Memorium

Alan Robert Selfridge

1954 - 2001

Alan Robert Selfridge was born Feb. 27, 1954 in Midland, Michigan, just twenty minutes after his fraternal twin brother Rohn. In 1958 the family moved to Citrus Heights, Calif. where Alan's father Robert worked on solid fuel rocket propellants for Aerojet General. Alan graduated from San Juan High School in 1972, and subsequently from UC Davis with an emphasis on pre-med subjects. In 1976 Alan began his doctoral studies in electrical engineering at Stanford, with an emphasis on ultrasonic physics. He received a Ph.D. in 1982 and began his consulting business, Ultrasonic Devices Inc., from his home in Palo Alto.



In 1983, Alan bought a beautiful piece of land in the redwoods of the Santa Cruz mountains, with an old house and barn on the property. He also purchased Specialty Engineering Associates (SEA,) then located in Milpitas, Calif. to complement and expand his consulting business.

In 1988, Alan and Peggy Johnson began their loving relationship, and their daughter Julia Maria Selfridge was born on May 9, 1989. Alan and family moved to the mountain land shortly before the birth of Aaron Rohn Selfridge on June 8, 1993. Alan and Peggy were married on August 24, 1996 at the Skyland Church.

Peter Goetz, his good friend, joined SEA as Alan's business partner in 1995. In the summer of 1996, Alan bought a large warehouse in Soquel, Calif., into which the company moved late in 1996. Alan was a man of incredible energy. His perfect workday began with a morning spent in his mountain studio programming, consulting, developing, and testing acoustic devices for medical and other industrial applications. He held a number of patents on various ultrasonic concepts, and his work has impacted people throughout the world. Professionally he was widely noted for his brilliance and his technical achievements in the physics of ultrasonic transducer design and measurement, as well as his folksy nature and his ability to make the difficult seem easy.

He loved to spend afternoons working on the property, putting in trails, managing his extensive water system, building a spiral staircase up a redwood tree, and running with Peggy. Alan loved the mountain and seldom had a desire to leave it. Because he worked primarily at home, he was present and supportive to Peggy, Julia, and Aaron to an extraordinary extent.

We will miss him.

Standards

New Standards Committee on Losses in Electromechanical Materials

The first meeting of the Standards Subcommittee on Losses in Electromechanical Materials took place on Monday evening, October 23rd, in San Juan, Puerto Rico. The meeting was held in conjunction with the IEEE 2000 International Ultrasonics Symposium. The subcommittee is a new branch of the IEEE UFFC-S standards development activity.



The meeting was chaired by Stewart Sherrit of the Jet Propulsion Laboratory. The photograph above shows Stewart, on the left, sitting at the head table with two other committee members, Claudio Zanelli and Alan Selfridge. The darkness of the background of this picture underscores the fact that the meeting took place rather late at night, roughly between 9:00 and 11:00 p.m.

Other subcommittee members present for the meeting were Ahmed Amin, Nicola Lamberti, Allen Meitzler, Binu Mukherjee, Craig Near, Massimo Pappalardo, Harold Robinson, and Jan Smits. Two guests, Wanda W. Wolny and Torsten Bove, representing the European Committee for Standardiza-

Standardtion, were also present. Ahmed Amin agreed to serve as the Secretary for the subcommittee.

Several months before the meeting took place, Stewart Sherrit circulated an incomplete first draft of a standard. This provided a basis for some starting discussions of the many challenging problems in relation to the development of the desired standard that need

to be resolved before the standard can be completed.. One of the first items agreed upon at the meeting was what to call the standard. The name selected is "IEEE Standard on the Characterization of Losses in Electromechanical Materials". In the discussion that took place during the latter half of the meeting, an attempt was made to identify the most challenging problems requiring further development and a number of research topics were assigned to members of the subcommittee. A second meeting is planned for the Ultrasonics Symposium in Atlanta

Stewart Sherrit, Chair
Ahmed Amin, Co-Chair, Acting Secretary
Allen Meitzler

Draft #11 of a New Standard on Ferroelectric Materials Available for Review on the Internet

The original IEEE Standard on ferroelectric materials was IEEE Std 180-1962. "IEEE Standard Definitions of Primary Ferroelectric Terms". This Standard was revised and reissued as Std 180-1986 which lasted until a few years ago when it was withdrawn. Since early in 1996, the Sub-committee on Ferroelectric Standards of the IEEE Ferroelectrics Committee has been working on a new standard called "IEEE Standard Definitions of Terms Associated with Ferroelectric and Related Materials". Draft # 11 is now completed and available for review by interested parties on an internet website;

<http://www.mrl.psu.edu/Faculty/trolrier-mckinstry.html>

Since the standard is close to its final state of development, the sub-committee is very interested in receiving critical comments or

suggestions for improving the standard before it is put into its final form and circulated for approval. It is worth reporting that a draft of the standard has been available for viewing on the web site just cited for more than a year; and in that time, the only comments received have been from members of the sub-committee working on the standard. Comments can be forwarded to Allen Meitzler (Chair) or Susan Trolrier-Mckinstry (Vice-chair and Secretary):

allen@meitzler.org

or

STMckinstry@mrl.psu.edu

During year 2000, the Sub-committee on Ferroelectric Standards met twice in day-long (9:00 to 5:00) meetings at the Materials Research Laboratory of the Pennsylvania State University.

One meeting was held on May 8th and the other on August 21st. The photograph below shows the sub-committee members who attended the meeting on May 8th.



Seated in the front row (from left to right) are Al Meitzler, Bob Newnham, Susan Trolrier-McKinstry, Eric Cross, and Wenwu Cao. Standing in the rear (from left to right) are John Ballato, Phil Bloomfield, Joe Dougherty, and Amar Bhalla. Other members of the sub-committee, who are contributing to the work on the new standard but who were not present at the time the photograph was taken, include Jan Fousek, Ruyan Guo, Clive Randall, and Quiming Zhang.

President's Message

What's the Forecast

The showers moved in as Thresa and I drove out of Phoenix north to Flagstaff and across Northern Arizona to Albuquerque for the IEEE Technical Activities Board (TAB) meeting in mid-February. As the altitude increased the rain turned to heavy snow, and we found ourselves creeping along in the tracks of semi-trucks and trailers wondering whether we desert dwellers made the right choice and were moving along in the right direction at the right time. After two hours of being in heavy snow and out of Flagstaff east, the snow transitioned to light rain, and then to sun. Speed picked up, and we proceeded on to Albuquerque through the picturesque Painted Desert and sculptured red rock regions now dusted lightly with the snow.

The journey reminded me that our own UFFC Society moves through similar periods. We have had our trying times of stormy weather when we wondered if we were headed in the right direction at the right time. Fortunately, we have slowed down, made some prudent financial and directional choices, persisted, and came through to sunnier times. Our society has been fortunate to have had a cadre of dedicated volunteer leadership guiding us during these times. The last few years we have been moving along at high speed and blessed with a sunny financial situation, increasing conference attendance in growing technical areas, and more opportunities for serving our members through publications and web based information. The question we continue to need to ask ourselves is "Are we headed in the right direction?"

Our UFFC Society continues to look at ways to better serve our membership. We are a society with particular technical interests. We are very international and enjoy a diversity apparent in attendance at conferences and authorship of publications. Besides our three regular symposia in 2000 we supported conferences in St. Petersburg, Russia, Nanjing, China, and Hong Kong. But how do we measure the success of our society, by the amount of accumulated reserves? Absolutely not! I believe the measure of success of a society is its technical vitality, the enthusiasm of its members, and the support of its volunteers. We should grade ourselves against our mission and vision. The vision is to be the leading provider of technical information and professional services to the world's ultrasonics, ferroelectrics, and frequency control community, increasing and improving member value, and more timely delivery of services. We are a service organization, both to the professional and to the society at large. Your Administrative Committee (AdCom) will continue to support the society members as best we can. We need member feed-back to AdCom on where we can improve society member value, and we need volunteer help. That is how we will continue to be a vital society.

Fortunately, we are not alone on the road. We have a strong IEEE Society and forty sister societies and councils from which to garner support and gauge our progress. It was a great experience to gather with the other society presidents in Albuquerque, share experiences, good and bad, concern ourselves with the direction of IEEE Technical Activities, and learn about the activities of the other IEEE boards and committees. We were fortunate to have other UFFC Society members at the meetings who are presently serving as council presidents and on major committees. Our society does have strong voices in IEEE Society activities.

The IEEE, had a deficit in the year 2000, primarily from poor stock market performance which did not yield the anticipated investment returns. Our society also had a drop in investment returns, but remains financially healthy. Our society reserves will be taxed along with the reserves of the other societies. Our society in recent years has benefited from publication return and surpluses in conferences. The society has also benefited from investment returns from the strong stock market through 1999. We have used our surpluses to develop the digital archives which allows member access to our publications and classic book literature. In essence we are returning a portion of those surpluses for this year and maybe will the next as well. We will slow down and need to make sure that our dollars spent in the next few years are in the best interest of society members.

This might be considered a stormy time, but there is a brighter side, too. The IEEE is still the premier electrical, electronic, and computer engineering society in the world with its technical journals, conferences, web information, and other member benefits (e.g. insurance and travel). It continues to look at new technology initiatives and to service those in emerging technologies. It continues to strategically plan for the future.

Our journey continues. Our membership continues to grow. There will continue to be sunny times when we can speed up and stormy times when we have to slow down. Surely, there will be volunteer leadership who will move us through those times and continue to bring benefits to our membership, the technical community at large, and the public in general. But we as members need to be reminded that that the future of IEEE and our UFFC Society is in our hands. It is we, as IEEE members, who are the major contributors to write and review articles, edit, read and promote the journals, attend the symposia, and encourage our colleagues to join IEEE. We should be diligent to do our tasks with integrity and a view toward serving others.

Fred S. Hickernell

The 8th International Workshop on Modern Acoustics – NDE Summary

The 8th International Workshop on Modern Acoustics – NDE (8th IWMA) was held on October 28 – 31, 2000, at the Hilton Hotel, Nanjing, China. The 8th IWMA was organized by Nanjing University of China in cooperation with the IEEE UFFC Society (USA) and the Third World Academy of Sciences (TWAS, Italy). The Workshop was sponsored by the National Ministry of Science and Technology of China, the National Natural Science Foundation of China, as well as, Jiangsu Education Commission, Jiangsu Science and Technology Society, and Jiangsu Acoustical Society. Prof. Shu-yi Zhang, the Director of the Institute of Acoustics of Nanjing University, a member of the Chinese Academy of Sciences, and Prof. Robert L. Thomas, one of the Distinguished Scientists of NDE, the Dean of the College of Science, Wayne State University, USA, were the co-chairs.

The workshop Committee received 127 abstracts, among which about one third submitted were from authors of foreign countries. The contents of the papers covered the fundamentals of acoustics – physical acoustics, typical ultrasonic nondestructive evaluation/testing, nonlinear acoustical characterization, acoustical imaging, photoacoustics, laser ultrasonics, medical acoustics, and signal processing.

The Workshop had about 120 participants including old friends and new friends, as well as, graduate students. There were more than 30 invited speakers from 10 foreign countries, including Belarus, Belgium, Canada, Germany, Japan, Russia, Singapore, South Africa, UK, USA, and the home country China. Most of the invited speakers were very famous scientists in the field, such as Prof. K. Kawashima (Japan), Prof. C. D. N. Cheeke (Canada), Prof. W. Eisenmenger (Germany), Prof. L.M. Lyamshev (Russia), Prof. H. A. Mackenzie (UK), Prof. L. D. Favro (USA),

and Prof. R. J. Wei (China). The invited speakers gave excellent lectures with advanced scientific ideas, knowledge, investigative results, and vivid descriptions, which gave the attendees very deep impressions. Some of the Chinese graduate students gave oral presentations with fluent English, which also attracted great attention. As the previous seven Workshops of the series organized by Nanjing University, the 8th IWMA will also greatly promote the research on acoustics and related fields in Nanjing University and in China in the near future.

During the Workshop, most of the participants visited the Laboratory of Modern Acoustics and the Institute of Acoustics of Nanjing University. The experimental results, scientific instruments, and speed of development of the laboratories were impressive. In addition, the participants were joyful to go sightseeing on the beautiful Nanjing scenic areas, such as the Eastern suburbs – Zhongshan Mountain, Xuan-wu Lake, and Zhong-hua Castle.

In general, the Workshop provided an open forum for exchanging the progress in ultrasonic investigations, mainly in acoustic NDE, between foreign and Chinese scientists. Especially it gave the foreign scientists a first hand view of the ultrasonic research in China, and gave the Chinese students a good opportunity to meet foreign scientists. The important topics, contents, and excellent arrangements, as well as, the wonderful hospitality of the Workshop made it a great success. Finally, the participants hope that the Workshop series will be continued in the future.

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Book Review

Elastic Waves in Solids I and II

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Elastic Waves in Solids, a two volume work, is a tribute to the careers of its two French authors, Professors Royer and Dieulesaint, and a major contribution to the physics of acoustic waves in solids. The two-volume work, originally published in French in 1996, focuses on the propagation and generation of waves in crystalline solids and their application in signal processing and instrumentation. The original French version of the first volume was translated by David P. Morgan and the second volume by Stephen N. Nyle. The first volume

describes the basics of free and guided wave propagation in crystals, emphasizing the different types of waves. The second volume shows how these waves are generated and their device application. The book is addressed to advanced students, engineers, and scientists working in the general field of ultrasonics and in particular telecommunications and sensors. Each chapter throughout the text has a set of problems and their solutions that are of valuable assistance to the reader in understanding the concepts introduced.

Volume I, which carries the subtitle *Free and Guided Propagation*, begins with a delightful survey of the chief historical landmarks in the development of acoustics, with special emphasis on its relationship to electronics in the 20th century. Each chapter that follows gives a precise introduction, making the reader aware of what is to follow and the significance and limitations of the treatment. Chapter 1 of Volume I begins with a basic treatment of waves in a fluid which can be described by a scalar model. Basic relations of acoustic propagation, reflection, guidance, impedance, etc. are described.

To understand wave propagation in solids, and in particular crystals, it is important to understand the properties of crystal structure. Illustrations of crystal structure are given for crystals commonly used in transduction and propagation in solids in Chapter 2. The problems at the end of the chapter are especially useful in understanding the concepts.

Chapter 3 brings together the concepts of stress and strain, the elastic field, and the coupling that occurs through the piezoelectric effect in crystals. Equations are introduced governing the relationships between stress and strain and a table of elastic constants for selected crystal classes given. The piezoelectric property is developed together with constants for various crystal classes. The tables draw on representations and values found in classic piezoelectric theory.

With the properties of elasticity and piezoelectricity in place, the authors proceed to discuss plane waves in crystals. The concept of slowness surfaces is introduced in understanding the concepts of inverse velocity phase fronts, energy flow, and piezoelectric effects on slowness. Elastic relations for pure mode directions in different crystal classes are given. The equations of reflection and refraction with a solid and air, liquids and a second solid are developed. The problems, which are by no means trivial, serve to illustrate important points of the chapter.

The first volume closes with guided waves. Starting with planar waveguide equations, the authors move to Rayleigh, BGS, pseudo-SAW, Love, and Lamb waves. The concept of surface permittivity is introduced as an aid to characterizing surface waves. The chapter's final discussion is with the variety of waves in cylindrical waveguides.

The second volume of *Elastic Waves in Solids* carries the subtitle *Generation, Acousto-Optic Interaction, and Applications*. The volume describes ways to generate and detect bulk and surface waves, their action on light waves, and the construction of a variety of useful components. The second volume follows the first in its mathematical and diagrammatical approach to understanding and its careful selection of a challenging set of problems with solutions to further extend and solidify the readers knowledge.

The analysis of bulk wave transducers in Chapter 1 focuses on one-dimensional equivalent circuit models. The

Mason-Redwood equivalent circuit is deduced from impedance considerations. The KLM (Krimholtz, Leedom, and Matthaei) model derives from dynamical and stress considerations. Low and high frequency transducer relations are considered. In the case of high frequency, examples of the effects of electrode and matching layer on bandshape and loss are depicted graphically.

In the second chapter of Volume II, the authors consider a multifaceted approach to the interdigital-electrode transducer used to generate surface waves on a piezoelectric plate. The discussion moves from simple descriptions of the interdigital-electrode transducer and possible secondary effects to more quantitative models including discrete source, impulse, and the piezoelectric permittivity method. This is followed by matrix representations including coupling of modes. Considerable mathematical detail is used giving a good overall view of the transducer models with their advantages and limitations. A short section on materials and technology gives the reader a feeling for some practical aspects of SAW developments.

The recent explosion of optical devices and systems, signals new possibilities for the use of acoustic waves in controlling the properties of light in solids. Elastic waves in optical solids and the resulting acousto-optic interaction is well covered in Chapter 3 of Volume II. The acousto-optic interaction of monochromatic light with acoustic waves in a solid is a simple means of changing the intensity, direction, and frequency of the light and, as such, has produced several useful signal-processing components. The first part of the chapter deals with the basic interaction, followed by measurement techniques and photothermal generation.

Chapter 4 addresses the important practical area of signal processing components. Both bulk and surface wave acoustic components are considered with the emphasis on delay lines, filters and resonators. Matched filters, spectrum analyzers, and convolvers using SAW techniques are discussed and illustrated.

Chapter 5, entitled "Sensors and Instrumentation," describes how acoustic components have contributed to this fast growing area. Ultrasonic motors and actuators are also addressed. Acoustic waves have been an important tool for determining the surface and near surface properties of materials. Other novel ways of exploiting ultrasonic waves for probing the properties of materials are also included. The second volume ends with helpful appendices and well-chosen references.

This two-volume work brings the latest of information on ultrasonics, particularly as applied to components and systems, and is a welcome addition to the reference library of physicists, engineers, and advanced students.

Reviewed by Fred S. Hickernell, Adjunct Professor, University of Arizona