R. Michael Garvey

Welcome to Montréal!

One of my favorite cities, Montréal provides a fitting venue for our 50th Anniversary Conference. Montréal is not quite 500 years old, 10 times the age of UFFC. With its culture, restaurants and entertainment around us, I hope that you will find some time to get to know Montréal.

This Conference joins, for the first time, the three brother entities that make up the UFFC. We have the opportunity to learn from each other the problems, the solutions and the challenges facing us.

We have an excellent technical program with nine parallel oral sessions and three poster sessions; you can attend those that interest you. On the social side, we have a Conference Lunch, a Welcoming Reception and a Banquet. There is an interesting Guest Program as well.

I hope that you enjoy the meeting and find it a rewarding experience.

R. Michael Garvey
General Chair

Registration Desk for the Conference

The registration desk is located in De Bleury Hall. Hours for the Registration Desk are:

Sunday, Aug. 22	6 p.m. to 9 p.m.
Monday, Aug. 23	7 a.m. to 7 p.m.
Tuesday, Aug. 24	7 a.m. to 6 p.m.
Wednesday, Aug. 25	7 a.m. to 5:30 p.m.
Thursday, Aug. 26	7 a.m. to 5:30 p.m.
Friday, Aug. 27	7 a.m. to 1:00 p.m.

Registration and Fees ($USD)

Advance	**After July 23**[1]	
$425	$525	IEEE Member
$525	$625	Non-Member
$75	$75	Students
$75	$75	Retirees
$300	$300	One Day (Without Proceedings)

[1]On-site registration fees may be paid in US dollars or in Canadian dollars at the prevailing exchange rate.

Refund Policy

There will be a $25.00 USD service charge to process refunds for those who have pre-registered but who are unable, for whatever reason, to attend the Conference. A letter requesting the refund should state the registrant's name and to whom the refund check should be made payable. No refunds will be given for requests received after August 18, 2004. FAX the letter to 2004 IEEE UFFC Anniversary Conference at 217/398-4119.

IEEE and UFFC-S Enrollment

If you wish to join the IEEE when registering for the Conference, you may register at the member rate and receive one year of free membership in the Ultrasonics, Ferroelectrics and Frequency Control Society (UFFC-S). This offer applies only to on-site registration and is applicable only to memberships above the Student Member level.

IEEE/UFFC-S enrollment forms will be available at the IEEE exhibit booth.

Messages

A bulletin board for posting messages will be located in the registration area. Telephone: 514/871-5825

Proceedings of the Conference

The Conference Proceedings (CD format) will be available November, 2004. A copy will be mailed to qualified registrants.

Printed paper versions of the Conference Proceedings are available at additional cost (see Conference Registration Form).

Please note that only those papers presented at the Conference will be included in the Proceedings.

Speaker's Breakfast

A Speaker's Breakfast is available to authors of oral presentations. The primary purpose of this event is to allow authors to load their presentations on the Conference computers.

This event is not open to authors of poster presentations.

UFFC CD Archive

The UFFC Digital Archive that you have been enjoying at http://www.ieee-uffc.org is now available in a CD ROM version for the price of $60 USD. The Archive CDs are available to UFFC members only. Please see the Registration Form for ordering information.

Conference Support

The Conference Organizing Committee gratefully acknowledges the support of the following organizations.

Agilent Technologies
Frequency Electronics
Jet Propulsion Laboratory
National Institute of Standards and Technology
Northrop Grumman Electronic Systems
Quartzdyne
Symmetricom
Timing Solutions
Statek

Student Breakfast

All students attending the Conference are invited to attend a complimentary breakfast on Thursday August 26 from 6:30 am to 8:00 am in Room 710B. This is an opportunity for students to network with other students and with the Administrative Committee members of the UFFC Society. Look forward to seeing you at breakfast.

Gerry Blessing
President UFFC Society

Guest Program

We encourage guests of conference attendees to register. The registration fee of $35 US permits you to attend our continental breakfast each morning (Tuesday through Friday) as well as the Welcoming Reception Tuesday evening. The breakfast will provide an opportunity to meet fellow guests and coordinate daily excursions and activities.
Guests should register with their accompanying Conference attendees on the Conference Registration Form.

Three guest tours, individually priced, have also been arranged, see below.

The guest breakfast will be from 8:00 a.m.-10:00 a.m. in the Delta Centre-Ville Hotel. The specific location will be listed in the hotel lobby. The Hotel will also be the departing and return points for the guest tours.

PLEASE NOTE: THE GUEST BREAKFAST IS FOR REGISTERED GUESTS ONLY—NOT FOR CONFERENCE ATTENDEES.

GUEST TOURS

(All departing from the Delta Centre-Ville Hotel)

Tour A
Tuesday, August 24, 2004
CITY TOUR AND RIVER CRUISE
[$45 US]
Tour does not include lunch
9:00 a.m. to 5:00 p.m.

This is a complete bus tour of the City, including a stop at the Notre Dame Basilica, St. Joseph's Oratory (photo stop), residential and financial districts, Old Montreal (photo stop), French Quarter, outside view of Olympic Site (photo stop), McGill University and a panoramic view from an observation point on top of Mt. Royal. This tour will conclude in Old Montreal where participants can get lunch at any of the many small restaurants and cafes. After lunch, we will cruise a delightful two hours on the St. Lawrence River aboard the Cavalier Maxim from whose deck you will get a fabulous view of historical and modern sights of Montreal. The bus will return us to the Delta Centre-Ville Hotel.

Tour B
Wednesday, August 25, 2004
BOTANICAL GARDENS and CHATEAU DUFRESNE
[$50 US]
Tour includes lunch
9:30 a.m. to 4:00 p.m.

NOTE: This tour involve extensive walking and use of Montreal's Metro system. Participants should wear comfortable shoes. In case of heavy rain, there will be a tour of the Garden's comprehensive greenhouses. Founded in 1931 by Frere Marie-Victorin, the renowned 180 acre site contains more than 21,000 varieties of plants in 30 gardens, 10 exhibition greenhouses, and a large arboretum. The World Federation of Rose Gardens chose the 10,000 plant Rose Garden as the Best Rose Garden of 2003. The Chinese Friendship Garden is in Ming Dynasty style featuring a miniature tree (penjing) collection, waterfall, ornamental pond and several pavilions. The Japanese garden and pavilion is in traditional style, with koi ponds, streams, bridges, a Zen garden, bonsai courtyard and tea garden. A buffet lunch will be served in the Fuji Pavilion. After lunch we will walk across the street to the Chateau Dufresne. This Gothic-inspired mansion designed by Parisian architect, Jules Renard, is based on the Petit Trianon in Versailles, France, and was constructed from 1915 to 1918. It was decorated with a series of beautiful murals and ceiling paintings by artist Guido Nincheri in the 1920's. Many original furnishings are included. At the conclusion of the tour, we will return to the Delta Centre-Ville Hotel by Metro.

Tour C
Thursday, August 26, 2004
MCCORD MUSEUM EXHIBITS
[$45 US]
Tour includes lunch
9:30 a.m. - 3:00 p.m.

NOTE: This tour involves extensive walking and use of Montreal's Metro system. Participants should wear comfortable shoes.

The McCord Museum was founded in 1921 by David Ross McCord as a place to house his extensive collection of historically significant objects from throughout Canada. Today the Museum is a public research and teaching museum dedicated to the preservation, study, diffusion and appreciation of Canadian history.

We will be given a guided tour of two exhibits: "Simply Montreal", a presentation on the rich and varied experience offered by the city; and "Dyed in the Wool", the history of the Scots in the metropolis and the country; that involves more than bagpipes, kilts and whisky. The tour will be followed by a film: "Montreal, An Island in Time". A multi-course lunch will be served in a fine French restaurant next door. After lunch participants will be free to return to the museum to explore "Turning the Tables", the world of the table, including lovely settings, decorations, etiquette, rituals and the enjoyment of good company. At the conclusion of the tour, we will return to the Delta Centre-Ville Hotel by Metro.

Exhibits

The Exhibits will be in Room 220A. Companies will display their products, and representatives will be there to meet Conference attendees. The exhibitors will be in place on the following dates and times:

Tues-Thurs: 10 am to noon & 2 pm to 6 pm Friday: 9 am to noon

Registered exhibitors as of June 2004 include:

Advanced Modular Sputtering
Agilent Technologies
CCI/USA Inc.
EFG International
Ferroperm Piezoceramics
Fotofab
Frequency Electronics
Fujitsu
IEEE-UFFC Society
Imasonic
Kolinker Industrial Equipment
Legacy Technologies Inc.
Locus, Inc
LongFang CEC
NoFech Electronics Ltd
Panametrics-NDT
Polaris Electronics Corp
Poseiden Scientific Instruments
Precise Time and Frequency
Saunders & Assoc.
Sensor Technology Ltd
Smart Material Corp
Sound Technology, Inc
Spectra Dynamics, Inc.
Staveley Sensors, Inc
Symmetricom, Inc
Timing Solutions Corp
TRS Technologies
Twist Semiconductor
Unitek Benchmark
Valpey Fisher Corp
VC America
VNIISIMS
W.L. Gore & Assoc.

Ultrasonics Short Courses August 23, 2004, Locations to be announced			
8:15-10:15	**U1A:** Fundamentals of Ultrasonic Waves Part A *Martins Viens*	**U2A:** Medical Ultrasound Transducers Part A *L. Scott Smith & Douglas G. Wildes*	**U3A:** Micromachined Ultrasonic Transducers and Actuators Part A *Amit Lal*
10:15-10:30	**Break**	**Break**	**Break**
10:30-12:30	**U1B:** Fundamentals of Ultrasonic Waves Part B *David Cheeke*	**U2B:** Medical Ultrasound Transducers Part B *Douglas G. Wildes & L. Scott Smith*	**U3B:** Micromachined Ultrasonic Transducers and Actuators Part B *Richard M. White*
12:30-1:30	**Lunch - 710A**	**Lunch - 710A**	**Lunch - 710A**
1:30-3:30	**U4A:** Finite Element Modeling of Electromechanical Transducers Part A *Reinhard Lerch*	**U5A:** Elasticity Imaging Part A *Stanislav Emelianov*	**U6:** Ultrasonic Characterization of Properties, Microstructure, and Processing of Metals *Andre Moreau*
3:30-3:45	**Break**	**Break**	**Break**

3:45-5:45	**U4B:** Finite Element Modeling of Electromechanical Transducers Part B *Manfred Kaltenbacher*	**U5B:** Elasticity Imaging Part B *Stanislav Emelianov*	**U7:** Ultrasonic Piezoelectric Transducers and Probes for High Temperature Applications *Cheng-Kuei Jen*
6:15-7:15	**U8:** Silence is Golden *Fred Hickernell*		

Ferroelectrics Short Courses August 23, 2004, Locations to be announced

8:15-10:15	**FE1:** Fundamentals of Ferroelectric Materials, *Susan Trolier-McKinstry*
10:15-10:30	**Break**
10:30-12:30	**FE2:** Overview of Ferroelectric Thin Film Devices and Materials, *Bruce A. Tuttle*
12:30-1:30	**Lunch - 710A**
1:30-3:30	**FE3:** Structure-Property Relationships for Dielectric Materials, *David A. Payne*
3:30-3:45	**Break**
3:45-5:45	**FE4:** Atomistic Computer Simulations of Ferroelectric and Related Materials, *Alastair Cormacki*

Frequency Control Short Courses August 23, 2004, Locations to be announced			
8:15-10:15	**FC1A:** Phase Noise I *Enrico Rubiola*	**FC2:** Introduction to Quartz Frequency Standards *John Vig*	**FC3:** Time and Frequency Transfer *Tom Parker*
10:15-10:30	**Break**	**Break**	Break
10:30-12:30	**FC1B:** Phase Noise II *Craig Nelson*	**FC4:** Passive Atomic Frequency Standards *Len Cutler*	**FC5:** Resonant Piezo-devices as Physical and Biochemical Sensors *Fabien Josse/ Richard Cernosek*
12:30-1:30	**Lunch - 710A**	**Lunch - 710A**	**Lunch - 710A**
1:30-3:30	**FC1C:** Phase Noise III *Enrico Rubiola*	**FC6:** MEMS for Frequency and Timing References *Clark T.-C. Nguyen*	**FC7:** SAW Identification Marks and Sensors *Clemens Ruppel*
3:30-3:45	**Break**	**Break**	**Break**
3:45-5:45	**FC8:** Optical Measurement & Synthesis *Jun Ye*	**FC9:** The Role of Time and Frequency in GPS *Joe White*	**FC10:** Digital Measurement of Precision Oscillators *S. R. Stein*

The brothers have come home.....

A welcome from the technical chairs

The IEEE UFFC has a common administrative committee and a journal. Even so the conferences for Ultrasonics, Ferroelectrics and Frequency Control have been separate for quite a while. These three brothers have many things in common and it was time for a reunion. It has been an interesting experience to guide this family reunion on the occasion of the 50th anniversary of the UFFC society. This year at the joint conference you will find much that is familiar, and many aspects that are the result of fruitful cross-fertilization between our communities.

The Joint Technical Program Committee has boiled down 1126 abstracts into 3 plenary sessions, 99 oral sessions and 3 huge poster sessions. The plenary sessions will contain presentations of broad interest from each community. The rest of the program will allow you to get the latest update in your own field, but also to get acquainted with what the others in our society are doing and, even more interesting, to find out the perspective that the other participants have on your field. We trust that if you are interested in Ultrasonics, Ferroelectrics or Frequency Control you will find this to be an exciting and important conference.

Enjoy,

Walter Shulze *Christopher Ekstrom*

Conference Officers

General Chair
R. Michael Garvey
Symmetricom, Beverly, MA , USA
rmgarvey@ieee.org

Technical Program Chairs
Ultrasonics
Ton van der Steen
Erasmus University,
Rotterdam,The Netherlands
a.vandersteen@erasmusmc.nl

Ferroelectrics
Steve Pilgrim and Walter Schulze
Alfred University, Alfred NY, USA
pilgrim@alfred.edu and
schulze@alfred.edu

Frequency Control
Christopher Ekstrom
U.S. Naval Observatory, Washington, DC, USA
ekstrom@atom.usno.navy.mil

Short Course/Tutorial Chairs

Ultrasonics
David Cheeke
Microbridge Technologies, Montreal, Canada
dcheeke@mbridgetech.com

Ferroelectrics
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schulze@alfred.edu

Frequency Control
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myuhas@imsysinc.com

Awards Chair
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reinhard.lerch@lse.e-technik.uni-erlangen.de

Exhibit Chair
Jack Kusters
jkusters@ieee.org

Local Arrangements
David Cheeke
Microbridge Technologies, Montreal, Canada
dcheeke@mbridgetech.com

Future UFFC-S Symposia

Ultrasonics 2005
General Chair: Ton van der Steen
a.vandersteen@erasmusmc.nl
Rotterdam, The Netherlands
September 18-21, 2005

Ultrasonics 2006
General Chair: Stuart Foster
s.foster@ieee.org
Vancouver, Canada

Ultrasonics 2007
General Chair: John Kosinski
j.a.kosinski@ieee.org
New York, NY, USA

Ultrasonics 2008
General Chair: Jian-Yu Lu
jilu@eng.utoledo.edu
Bejing, China

Ferroelectrics 2006
General Chair: Jon-Paul Maria
jpmaria@ncsu.edu
North Carolina, USA
July 30-August 2, 2006

Frequency Control 2005
General Chair: Michael Driscoll
michael.driscoll@ngc.com
Vancouver, Canada
August 28-31, 2005

Frequency Control 2006
General Chair: Michael Driscoll
michael.driscoll@ngc.com
Miami, FL USA
June 4-7, 2006

Opening Session

Room 210
8:30 am-10:00 am
24 August, 2004

Welcome
R. Michael Garvey, Conference General Chair
Ton van der Steen, Ultrasonics TPC Chair
Walter Schulze, Ferroelectrics TPC Chair
Chris Ekstrom, Frequency Control TPC Chair

UFFC Awards and Recognitions

Achievement Award
Distinguished Service Award
Distinguished Lecturer Award
Fellows Awards
Best Paper Award from UFFC Proceedings

Recognition of Past Presidents, UFFC

Tuesday Morning Coffee Break
Room 220A
10:00 am - 10:30 am

Ultrasonics Plenary
Room 210
10:30 am to 12:00 noon

Ultrasonics Award
Rayleigh Award

From Hearing to Seeing
The Ultrasound Stethoscope and History of Echocardiography
Nicolaas Bom
Thoraxcenter Erasmus Medical Center
Rotterdam, The Netherlands

The speaker will present an evolutionary history of the development of ultrasound technology for cardiac visual imaging and diagnosis. For a full abstract of this talk, please see the Conference Abstract Book

Conference Lunch
Room 710A
12:00 noon to 1:30 pm

Tuesday Afternoon Technical Session I
1:30 pm to 3:00 pm

Tuesday Afternoon Coffee Break
Room 220A
3:00 pm to 3:30 pm

Tuesday Afternoon Technical Session II
3:30 pm to 5:00 pm

Tuesday Poster Session
Room 220B
5:00 pm to 6:30 pm

Welcoming Reception
Room 220A
6:30 pm - 8:00 pm

Wednesday, August 25, 2004

Plenary (Frequency Control)
Room 210
8:30 am - 10:00 am

Awards and Recognition
Rabi Award
Sawyer Award
In Memoriam: Robert Smythe

Unwinding a Biological Clock
Gene Block
University of Virginia
Charlottesville, VA USA

From primitive algae to man, organisms have acquired the ability to synchronize critical physiological and behavioral processes to important external periodicities. For a full abstract of this talk, please see the Conference Abstract Book.

Wednesday Morning Coffee Break
Room 220A
10:00 am - 10:30 am

Wednesday Morning Technical Sessions
10:30 am - 12:00

Lunch - On Your Own
12:00 noon - 1:30 pm

Wednesday Afternoon Technical Sessions
1:30 pm - 3:00 pm

Wednesday Afternoon Coffee Break
Room 220A
3:00 pm - 3:30 pm

Wednesday Poster Session
Room 220B
3:00 pm - 6:30 pm

Banquet
Room 710
6:30 pm - 10:00 pm

Thursday, August 26, 2004

Plenary (Ferroelectrics)
Room 210
8:30 am - 10:00 am

Awards
Ferroelectrics Recognition Awards

Fifty Years of Ferroelectrics
Robert Newnham
Pennsylvania State University University Park, PA, USA

The speaker will present an historical perspective of the use of ferroelectric materials for non-volatile memories, electro-optic and acousto-optic modulators, holographic data storage and other applications. For a full abstract of this talk, please see the Conference Abstract Book.

Thursday Morning Coffee Break
Room 220A
10:00 am - 10:30 am

Thursday Morning Technical Sessions
10:30 am - 12:00 noon

Lunch - On Your Own
12:00 noon - 1:30 pm

Thursday Afternoon Technical Sessions I
1:30 pm - 3:00 pm

Thursday Afternoon Coffee Break
Room 220A
3:00 pm - 3:30 pm

Thursday Afternoon Technical Session II
3:30 pm - 5:00 pm

Thursday Poster Session
5:00 pm - 6:30 pm

Friday, August 27, 2004

Friday Morning Technical Session I
8:30 am - 10:00 am

Friday Morning Coffee Break
Room 220A
10:00 am - 10:30 am

Friday Morning Technical Session II
10:30 am - 12:00 noon

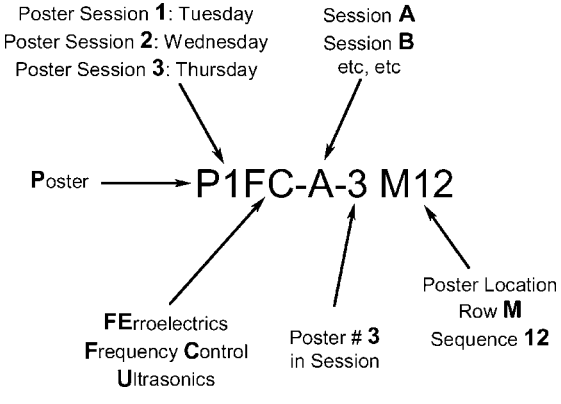
Lunch - On Your Own
12:00 noon - 1:30 pm

Friday Afternoon Technical Session I
1:30 pm - 3:00 pm

Friday Afternoon Coffee Break
3:00 pm - 3:30 pm
Room 220B

Friday Afternoon Technical Session II
3:30 pm - 5:00 pm

GUIDE TO POSTER CODES



	Session U1-A **CONTRAST AGENTS - PERFUSION** Chair: F. Forsberg Thomas Jefferson University	*Session U2-A* **TISSUE ELASTICITY I** Chair: S. Emelianov University of Texas	*Session U3-A* **NDE NON-CONTACT MEASUREMENT TECHNIQUES** Chair: R. Addison Rockwell Scientific Company	*Session U4-A* **OPTICAL INTERACTIONS** Chair: D. Hecht DLH Laboratories	*Session U5-A* **SAW DEVICE MODELING** Chair: V. Plessky GVR Trade SA	
	510AC	**510BD**	**511AB**	**513AB**	**512C-H**	
1:30 p.m.	**U1-A-1 Ultrasound-Induced Coalescence of Contrast Agent Micro-bubbles.** M. Postema*[1,2], C. T. Lancée[1], N. de Jong[1,3], P. Marmottant[3], and S. Hilgenfeldt[3], [1]Dept. of Experimental Echocardiography, Thorax-centre, Erasmus MC, [2]Interuniversity Cardiology Institute of The Netherlands, [3]Physics of Fluids, Dept. of Applied Physics, Faculty of Science and Technology, University of Twente	**U2-A-1 Transient Radiation Force Elastography: Modeling of the Shear Wave Propagation in Heterogeneous Tissue by a Pseudospectral Method.** S. Callé, M. Elkateb, and J.-P. Remenieras*, GIP Ultrasons / LUSSI - FRE 2448 CNRS	**U3-A-1 (Invited) Laser-Ultrasonics: From Birth to the Present Day.** J. P. Monchalin*, Industrial Materials Institute, Québec, Canada	**U4-A-1 Acousto-Optic Properties of Photonic Crystal Fibers.** M. W. Haakestad and H. E. Engan*, Norwegian University of Science and Technology	**U5-A-1 Prediction of the P-Matrix Parameters Dispersion using Periodic FEM/BEM Analysis.** Th. Pastureaud*, TEMEX	
1:45 p.m.	**U1-A-2 Perfusion Estimation Using Subharmonic Contrast Microbubble Signals.** F. Forsberg*[1], J. B. Liu[1], W. T. Shi[1,2], R. Ro[1], K. M. James[1], X. Deng[1], and A. L. Hall[2], [1]Department of Radiology, Thomas Jefferson University, [2]GE Medical Systems	**U2-A-2 3D Ultrasound-Based Dynamic Elastography : First in vitro Results.** J. Bercoff*[1], R. Sinkus[2], M. Tanter[1], and M. Fink[1], [1]Laboratoire Ondes et Acoustique, [2]Philips Research Lab		**U4-A-2 FDTD Analysis of Wavelength-Selective Switching in Weighted Acoustooptic Switches for WDM Photonic Routers.** N. Goto*[1] and Y. Miyazaki[2], [1]Toyohashi University of Technology, [2]Aichi University of Technology	**U5-A-2 Modified P-Matrix Model and It's Implementation for Desigh of SAW Resonator Filters.** A. N. Rusakov*, RF Monolithics Inc.	

*Author presenting paper.

2:00 p.m.	**U1-A-3 Assessment of Transient Myocardial Perfusion Defects in Intact Mice using a Microbubble Contrast Destruction / Refill Approach.** J. A. Hossack*, Y. Li, and B. A. French, University of Virginia	**U2-A-3 Optimizing Multicompression Approaches to Strain Imaging.** H. Du*[1], J. Liu[1], C. Pellot-Barakat[1,2], and M. F. Insana[1], [1]University of California, Davis, [2]INSERM	**U3-A-2 Inline Measurements of Texture and Recrystallization on Aluminum Alloys.** A. Moreau*[1], C. Bescond[1], S. Bolognini[1], M. Lord[1], S. E. Kruger[1], and C.-S. Man[2], [1]Industrial Materials Institute, [2]University of Kentucky	**U4-A-3 New Architecture of Tunable Acoustooptical Add/Drop Multiplexer for Dynamic DWDM with 25 GHz ITU Grid.** A. Tsarev* and E. Kolosovsky, Institute of Semiconductor Physics SB RAS, Novosibirsk, Russia	**U5-A-3 Wavelets Constructed from Spectral Domain Asymptotic Tails of Green's Functions.** A. Baghai-Wadji*[1] and G. G. Walter[2], [1]Vienna University of Technology, [2]University of Wisconsin-Milwaukee	
2:15 p.m.	**U1-A-4 Identification of Ultrasound-Contrast-Agent Dilution Systems for Cardiac Quantification.** M. Mischi*[1], T. A. C. M. Kalker[1], and E. H. M. Korsten[1,2], [1]Technical University Eindhoven, [2]Catharina Hospital Eindhoven	**U2-A-4 Automated Thermal Coagulation Segmentation of Three-Dimensional Elastographic Imaging using a Coarse-to-Fine Active Contour Model.** W. Liu*, J. Zagzebski, T. Varghese, C. Dyer, and U. Techavipoo, University of Wisconsin - Madison	**U3-A-3 A Novel Technique for Enhancing the Signal to Noise Ratio of Laser-Based Ultrasonic Systems.** O. Balogun*, N. Pratt, and T. W. Murray, Boston University	**U4-A-4 High Frequency Ultrasound Detection using Fabry-Perot Optical Etalon.** S. Ashkenazi* and M. O'Donnell, University of Michigan	**U5-A-4 Quasi-Static Transduction in Mechanically-Reflective Gratings, with Application to STW Transducers.** D. P. Morgan*, Impulse Consulting	
2:30 p.m.	**U1-A-5 Quantitative Laser Doppler Anemometry Measurements of the Shear-Stresses Exerted on Ultrasonic Microbubbles Attached to Surfaces Under Physiological Flow Conditions.** M. B. Butler*[1], C. M. Moran[1], C. Cunningham[2], J. Ross[2], W. Easson[3], and W. N. McDicken[1], [1]Medical Physics, [2]Tissue Injury and Repair Group, [3]Mechanical Engineering	**U2-A-5 Estimation of Displacement Vectors and Strain Tensors in Elastography using Multiple Angular Insonifications.** U. Techavipoo*, Q. Chen, T. Varghese, and J. A. Zagzebski, The University of Wisconsin-Madison	**U3-A-4 Optical Measurement of Transient Ultrasonic Shock Waves.** C. Barrière, G. Montaldo, X. Jacob*, D. Royer, and M. Fink, Laboratoire Ondes et Acoustique, Université Paris 7-UMR CNRS 7587-ESPCI	**U4-A-5 Characteristics of Acousto-optic Devices for Generating Symmetric Diffracted Scanning Beams.** D. L. Hecht*, DLH Laboratories	**U5-A-5 Fast Calculation of Gradients and Difference Vectors of IDT's P Matrix.** G. Martin*, Institute for Solid State and Materials Research Dresden	
2:45 p.m.	**U1-A-6 Physicochemical Properties of the Microbubble Lipid Shell.** M. A. Borden* and K. W. Ferrara, University of California, Davis	**U2-A-6 Adaptable Coded Excitation for Elasticity Imaging.** J. Liu* and M. F. Insana, University of California, Davis	**U3-A-5 Withdrawn**	**U4-A-6 The Formation of Two-Beam Technological Laser with Use of the High Efficiency Acoustooptic Modulator.** S. Antonov[1], V. Proklov*[1], Y. Rezvov[2], L. Chesnokov[1], and V. Chesnokov[1], [1]Institute of Radio Endineering and Electronics RAS, [2]Novomoskovskii Institute of Russian Chemistry and Technology University	**U5-A-6 On the Polynomial Approximation of the Dispersive COM-Parameters.** B. V. Sveshnikov*[1], V. I. Cherednick[1], and K. K. Bhattacharjee[2], [1]Nizhny Novgorod State University, [2]Clarisay Inc.	

	Session FE1-A **THIN FILM I** Chair: S. McKinstry The Pennsylvania State University			*Session FC1-A* **HISTORICAL OVERVIEWS** Chair: F. Hickernell The University of Arizona	*Session FC2-A* **THIN FILM RESONATORS (FBAR)** Chair: A. Kong Northrop Grumman Corporation	
	513CD			**511CF**	**511DE**	
1:30 p.m.	**FE1-A-1 Using the Cantilever Contact Resonance in Voltage-Modulated Force Microscopy to Study the Electromechanical Properties of Thin Films.** C. Harnagea*[1], A. Pignolet[1], M. Alexe[2], and D. Hesse[2], [1]Institut National de la Recherche Scientifique - Energie, Materiaux et Telecommunications, [2]Max Planck Institute for Microstructure Physics			**FC1-A-1 (Invited) Disruptive Technologies and Dead Ends: Time and Frequency Standards in the 1930s.** C. E. Stephens*, Smithsonian Institution	**FC2-A-1 Materials Property Dependence of the Effective Electromechanical Coupling Coefficient of Thin Film Bulk Acoustic Wave Resonators.** Q. Chen*, F. Li, and Q.-M. Wang, University of Pittsburgh	
1:45 p.m.	**FE1-A-2 Simulation and Measurements of the Piezoelectric Properties Response (d_{33}) of Piezoelectric Layered Thin Film Structures Influenced by the Top-Electrode Size.** K. Prume*[1], P. Gerber[2], C. Kügeler[2], A. Roelofs[2], U. Böttger[2], R. Waser[2], T. Schmitz[1], and S. Tiedke[1], [1]aixACCT Systems GmbH, [2]Institute of Materials in Electrical Engineering and Information Technology 2 (IWE2)				**FC2-A-2 Fabrication and Testing of AlN FBARs with a Silicon Electrode.** L. A. Callaghan*[1], M. V. Requa[1], V. Lughi[2], N. C. MacDonald[1,2], K. L. Turner[1], and D. R. Clarke[1,2], [1]Mechanical & Enviromental Engineering Department, University of California - Santa Barbara, [2]Materials Department, University of California - Santa Barbara	

2:00 p.m.	**FE1-A-3 Application of PZT Films to Large-Stroke, Continuous Membrane Deformable Mirrors.** J.-G. Cheng*[1], S. Trolier-Mckinstry[1], Y. Hishinuma[2], and E.-H. Yang[2], [1]Materials Research Institute and Materials Science and Engineering Department, Penn State University, [2]Jet Propulsion Laboratory			**FC1-A-2 (Invited) Building an Industry from Scratch: The Quartz Crystal Oscillator Industry of World War II.** R. Thompson*, McMurry University	**FC2-A-3 Electrically Tunable and Switchable Film Bulk Acoustic Resonator.** W. Pang*[1], H. Zhang[1], H. Yu[1], and E. S. Kim[2], [1]University of Southern California, [2]University of Southern California	
2:15 p.m.	**FE1-A-4 Epitaxial Thick Film Heterostructures of $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ Relaxor Ferroelectric Films on Silicon for High Performance Electromechanical Systems.** D. M. Kim*[1], C. B. Eom[1], J. Ouyang[2], V. Nagarajan[2], R. Ramesh[3], V. Vaithyanathan[4], D. G. Schlom[4], W. Tian[5], and X. Q. Pan[5], [1]University of Wisconsin, [2]University of Maryland, [3]University of Califonia, [4]The Pennsylvania State Univesity, [5]University of Michigan				**FC2-A-4 A MEMS-Based Quartz Resonator Technology for GHz Applications.** F. Stratton*, D. Chang, D. Kirby, R. Joyce, T.-Y. Hsu, and R. Kubena, HRL Laboratories, LLC	
2:30 p.m.	**FE1-A-5 (Invited) Structure and Ferroelectric Properties of Sputtered PMNT Thin Films.** K. Wasa*[1], I. Kanno[2], T. Suzuki[2], S. H. Seo[3], D. Y. Noh[3], H. Okino[4], and T. Yamamoto[4], [1]Yokohama City University, [2]Kyoto University, [3]Kwanju Institute of Science and Technology, [4]National Defence Academy			**FC1-A-3 (Invited) Historical Highlights in Ultrasonics - 2.** K. Graff*, Edison Welding Institute		
2:45 p.m.						

	Session U1-B **DIRECTIONS IN ULTRASOUND IMAGING** Chair: T. van der Steen Erasmus University	*Session U2-B* **THERAPY: ADVANCED APPLICATIONS** Chair: C. Cain University of Michigan	*Session U3-B* **NOVEL TRANSDUCER APPLICATIONS** Chair: Y. Takeuchi Kagoshima University	*Session U4-B* **BULK WAVE MATERIALS AND EFFECTS** Chair: E. Adler McGill University	*Session U5-B* **FROM SAW TO THIN FILMS** Chair: W. Hunt Georgia Tech	
	510AC	**510BD**	**511AB**	**513AB**	**512C-H**	
3:30 p.m.	**U1-B-1 (Invited) My 50 Years of Medical Imaging with Ultrasound.** J. Reid*, Drexel University	**U2-B-1 Finite Element Analysis of Temperature Rise from an Integrated 3D Intracardiac Echo and Ultrasound Ablation Transducer.** K. L. Gentry*, M. L. Palmieri, N. Sachedina, and S. W. Smith, Duke University Department of Biomedical Engineering	**U3-B-1 Prototype Dual Frequency Bilaminar Array Transducer Capable of Therapeutic Exposure at 500 kHz and Doppler Monitoring at 2 MHz.** T. Azuma*[1], S. Umemura[1], M. Ogihara[2], J. Kubota[2], T. Kobayashi[2], M. Izumi[2], A. Sasaki[2], M. Nakano[3], J. Shimizu[3], T. Abe[4], and H. Furuhata[3], [1]Central Research Laboratory, Hitachi Ltd., [2]Hitachi Medical Corporation, [3]ME Lab. Jikei Univ. School of Med., [4]Dept. of Neurosurgery Jikei Univ. School of Med	**U4-B-1 Growth of AlN Film on Mo/SiO_2/Si(111) for 5GHz-Band FBAR using MOCVD.** C.-M. Yang*, U. Kensei, Y. Aota, S.-K. Kim, S. Kameda, H. Nakase, Y. Isota, and K. Tsubouchi, Research Institute of Electrical Communication, Tohoku University	**U5-B-1 Study of Layered SAW Devices Operating at Different Modes for Gas Sensing Applications.** K. Kalantar-zadeh*[1,2], D. A. Powell[1,2], S. Ippolitto[1,2], and W. Wlodarski[1,2], [1]RMIT University, [2]CRC for Microtechnology	
3:45 p.m.		**U2-B-2 Feasibility of Noninvasive Trans-esophageal Cardiac Thermal Ablation using an Ultrasound Phased Array.** X. Yin* and K. Hynynen, Focused Ultrasound Laboratory, Department of Radiology, Brigham and Women's Hospital	**U3-B-2 Design of a Multi-Layer Transducer for Acoustic Bladder Volume Assessment.** E. J. W. Merks*[1,3], N. Bom[1], A. Bouakaz[1,2], N. de Jong[1,2], and A. F. W. van der Steen[1,2], [1]ErasmusMC, [2]ICIN, [3]Diagnostic Ultrasound Europe	**U4-B-2 Re-Growth of C-Axis Oriented AlN Thin Films: Microstructure and Piezoelectric Properties.** F. Martin[1], P. Muralt*[1], M. Cantoni[1], and M.-A. Dubois[2], [1]Ceramics Laboratory, Swiss Federal Institute of Technology EPFL, [2]RF Microelectronics, CSEM	**U5-B-2 High Coupling and High Velocity Surface Acoustic Waves Using a Three-layer structure ZnO/AlN/diamond.** M. El Hakiki[1,3], O. Elmazria*[1,3], M. B. Assouar[1,3], V. Mortet[2], A. Talbi[1,3], and F. Sarry[1,3], [1]LPMIA UMR 7040 Université H. Poincaré - Nancy I, [2]IMO Limburgs Universitair Centrum, [3]Laboratoire Européen de Recherche Universitaire: Saarland -lorraine (LERUSL)	

4:00 p.m.	**U1-B-2 Portable, Low-Cost Medical Ultrasound Device Prototype.** M. Fuller*[1], K. Ranganathan[1], S. Zhou[1], T. Blalock[2], J. Hossack[1], and W. Walker[1,2], [1]Dept. of Biomedical Engineering, University of Virginia, [2]Dept. of Electrical and Computer Engineering, University of Virginia	**U2-B-3 Generation of a Pseudo Point Source by Nonlinear Beam-Mixing in the Presence of Ultrasound Contrast Agent.** J. Seo*, J. J. Choi, T. L. Hall, J. B. Brian, M. O'Donnell, and C. A. Cain, University of Michigan	**U3-B-3 Real-Time 3D Color Flow Doppler for Guidance of Vibrating Interventional Devices.** M. P. Fronheiser*[1], P. D. Wolf[1], S. F. Idriss[2], R. C. Nelson[3], and S. W. Smith[1], [1]Deptartment of Biomedical Engineering, Duke University, [2]Department of Pediatrics, Duke University Medical Center, [3]Department of Radiology, Duke University Medical Center	**U4-B-3 PZT Material Properties at UHF and Microwave Frequencies Derived from FBAR Resonator Measurements.** J. D. Larson III*[1], S. R. Gilbert[1], and B. Xu[2], [1]Agilent Laboratories, [2]Palo Alto Research Center (PARC)	**U5-B-3 (Invited) Two Bits of History: Thermoelastic Wave Generation and SAW Transduction.** R. M. White*, University of California at Berkeley	
4:15 p.m.	**U1-B-3 Real Time 3D Imaging of the Brain.** N. M. Ivancevich*[1], K. K. Chu[1], E. D. Light[1], S. F. Idriss[2], P. D. Wolf[1], and S. W. Smith[1], [1]Department of Biomedical Engineering, Duke University, [2]Department of Pediatrics, Duke University Medical Center	**U2-B-4 A HIFU System using Annular and Strip-Electrode Arrays with a Digital Diagnostic Array System.** R. Muratore*, F. Lizzi, P. Lee, S. Ramachandran, and A. Kalisz, Riverside Research Institute	**U3-B-4 Finite Element Modeling of Ultrasonic Separation at the Microscale.** M. K. Araz*[1], C.-H. Lee[2], and A. Lal[1], [1]SonicMEMS Laboratory, [2]Veeco Probes	**U4-B-4 Frequency Sensitive Reflection, Refraction, and Transmission of Bulk and Shear Waves in Functionally Graded Materials (FGM).** J. Vollmann*, D. M. Profunser, and J. Dual, ETH Zurich		
4:30 p.m.	**U1-B-4 3D Contrast Harmonic Echocardiography.** M. M. Voormolen*[1,2], A. Bouakaz[1,2], B. J. Krenning[1], C. T. Lancée[1], W. B. Vletter[1], F. J. ten Cate[1], and N. de Jong[1,2], [1]Thoraxcenter, Erasmus MC, [2]ICIN, Interuniversity Cardiology Institute of the Netherlands	**U2-B-5 A Novel Multi-Focus Acoustic Lens Transducer System for Ultrasound Thermal Therapy.** X. Wu*[1], A. Worthington[1], M. Jewett[2], and M. Sherar[1,3] [1]Dept of Medical Biophysics, [2]Dept of Surgery and UroOncology, [3]Dept of Radiation Oncology	**U3-B-5 Two-Dimensional Ultrasound Detection with an Optical Multilayer Hydrophone using Serial and Parallel Data Acquisition.** C. Koch* and M. Klann, Physikalisch-Technische Bundesanstalt	**U4-B-5 (Invited) Acoustoelectronics: New Ideas for a New Era.** Y. V. Gulyaev*[1] and F. S. Hickernell[2], [1]Institute of Radioengineering and Electronics RAS, [2]The University of Arizona	**U5-B-4 Diamond-Based SAW Oscillator at 1GHz.** U. Prechtel[1], V. Ziegler[1], S. Kolodzik[1], B. Plehn[2], H. Downar[2], J. Haering[3], R. Kunze[4], G. Martin[4], H. Schmidt[4], and M. Weihnacht*[4], [1]EADS Corporate Research Center, [2]EADS Deutschland GmbH, [3]Dornier GmbH, [4]Leibniz Institute for Solid State and Materials Research Dresden	
4:45 p.m.	**U1-B-5 Increasing Frame-Rate in Ultrasound Imaging by Temporal Morphing using Tissue Doppler.** S. Brekke*, C. B. Ingul, S. A. Aase, and H. Torp, Dept. of Circulation and Medical Imaging, Norwegian University of Science and Technology	**U2-B-6 Non-Invasive Measurement of *In Situ* Thermal Diffusivity and Local Heat Source using Backscattered Ultrasound for Thermal Therapy Planning and Monitoring.** A. Anand* and P. J. Kaczkowski, University of Washington	**U3-B-6 Piezoelectric Transducer Surface Vibration Characterization using Acoustic holography and Laser Vibrometry.** O. A. Sapozhnikov*[1], A. V. Morozov[1], and D. Cathignol[2], [1]Faculty of Physics, Moscow State University, [2]Unité 556, INSERM		**U5-B-5 Fabrication of 5-GHz-Band SAW Filter with Atomically-Flat-Surface AlN on Sapphire.** K. Uehara*[1], C. -M. Yang[1], T. Shibata[2], S. -K. Kim[1], S. Kameda[1], H. Nakase[1], Y. Isota[1], and K. Tsubouchi[1], [1]Research Institute of Electrical Communication, Tohoku University, [2]NGK Insulators, Ltd.	

	Session FE1-B **TUNABLE AND RF MATERIALS** Chair: M. Lanagan The Pennsylvania State University			*Session FC1-B* **SINGLE CRYSTAL PIEZOELECTRIC MATERIALS** Chair: V. Klipov Sawyer Research Products	*Session FC2-B* **COLD ATOM CLOCKS** Chair: A. Bauch PTB	
	513CD			**511CF**	**511DE**	
3:30 p.m.	**FE1-B-1 Low-Loss Capacitor Realization and Its Modeling with Cubic Pyrochlore Bismuth Zinc Niobate (BZN) Thin Film.** J. Park*[1], J. Lu[2], R. York[1], and S. Stemmer[2], [1]University of California, Santa Barbara, [2]University of California, Santa Barbara			**FC1-B-1 (Invited) History of the Industrial Production and Technical Development of Single Crystal Cultured Quartz.** G. R. Johnson*, Sawyer Research Products, Inc.	**FC2-B-1 Recent Improvements in NIST-F1 and Resulting Accuracies of < $7x10^{-16}$.** T. P. Heavner*, S. R. Jefferts, E. A. Donley, J. H. Shirley, and T. E. Parker, NIST Time and Frequency Division	
3:45 p.m.	**FE1-B-2 Co-Fired BST Thick Films on Alumina Substrates for rf/Microwave Phase Shifter Applications.** M. Kunduraci*, K. Akdogan, and A. Safari, Rutgers, The State University of New Jersey				**FC2-B-2 Development of Compact Cold Atom Frequency Standards: From Microwave to CPT Interrogations.** S. Trémine, T. Zanon, S. Guérandel, E. de Clercq, D. Holleville, A. Clairon, and N. Dimarcq*, BNM-SYRTE, CNRS UMR8630	

4:00 p.m.	**FE1-B-3 A Highly Tunable Radio Frequency (RF) Filter using Dense Bulk Ferroelectric Materials.** M. K. Roy*[1] and R. R. Neurgaonkar[2], [1]Rockwell Collins, [2]Rockwell Scientific Company			**FC1-B-2 Distribution of Al and OH Impurities in Synthetic Quartz Crown from Cylindrical Seeds.** P. L. Guzzo[1], A. H. Shinohara*[1], C. V. D. Cabral[1], A. E. S. Santos[1], A. A. Raslan[2], and T. Kagami[3], [1]Federal University of Pernambuco, Department of Mechanical Engineering, [2]Federal University of Uberlandia, Faculty of Mechanical Engineering, [3]Nihon Dempa Kogyo Co., Ltd.	**FC2-B-3 The Cesium Physics Package Design for the PARCS Project.** E. Burt*[1], W. M. Klipstein[1], and S. R. Jefferts[2], [1]Jet Propulsion Laboratory, California Institute of Technology, [2]National Institute for Standards and Technology	
4:15 p.m.	**FE1-B-4 Design, Fabrication and Characterization of Tunable PZT Film Bulk Acoustic Resonators.** C. Zinck*[1], G. Caruyer[2], A. Volatier[2], E. Defaÿ[1], D. Pellissier-Tanon[2], L. Figuiére[3], and M. Aid[1], [1]CEA-DRT - LETI/DTS - CEA/GRE, [2]STMicroelectronics, CCMC Crolles, [3]STMicroelectronics			**FC1-B-3 Phase Transitions in Langasite Family Crystals.** B. V. Mill*[1], B. A. Maximov[2], Yu. V. Pisarevsky[2], A. Pavlovska[3], S. Werner[3], J. Schneider[3], and N. P. Danilova[1], [1]Moscow State University, [2]Institute of Crystallography RAS, [3]Universitat Muenchen, Institut fuer Kristallographie und Angewandte Mineralogie	**FC2-B-4 Progress Towards an Operational Rb Fountain.** S. Crane*, S. Peil, T. Swanson, and C. Ekstrom, U. S. Naval Observatory	
4:30 p.m.	**FE1-B-5 (Invited) Tunability and Loss of the Ferroelectric-Dielectric Composites.** V. O. Sherman*, A. K. Tagantsev, and N. Setter, Swiss Federal Institute of Technology				**FC2-B-5 Microwave Cavities with Small Phase Gradients.** R. Li and K. Gibble*, Penn State University	
4:45 p.m.					**FC2-B-6 An Optical Molasses Loaded from a Low-Velocity Intense Source of Atoms.** E. A. Donley*, T. P. Heavner, and S. R. Jefferts, NIST Time & Frequency Division	

Session PS1 **STUDENT PAPER FINALISTS**	**PS1-8 A8 Performance Assessment of a New Kalman Filter-Based Method for Ultrasonic Time-of-Flight Estimation.** L. Angrisani[1], A. Baccigalupi[1], and R. Schiano Lo Moriello*[2], [1]Università di Napoli Federico II - Dipartimento di Informatica e sistemistica, [2]Università di Napoli Federico II - Dipartimento di Ingegneria Elettrica	**PS1-16 B5 SAW and BAW Response of C-Axis AlN Thin Films Sputtered on Platinum.** M. Clement[1], L. Vergara*[1], J. Olivares[1], E. Iborra[1], J. Sangrador[1], A. Sanz-Hervás[1], and C. Zinck[2], [1]Universidad Politécnica de Madrid, [2]CEA-DRT-LETI/DIHS-CEA/GRE	**PS1-24 C7 Evolution of the UWA Solid Nitrogen Dual-Mode Sapphire Microwave Oscillator.** J. Anstie, J. Hartnett*, M. Tobar, E. Ivanov, and F. Van Kann, University of Western Australia	**PS1-32 C5 Complex Lattice Quasicontinuum Theory and Its Application to Ferroelectrics.** O. Kowalewsky*, J. Knap, and M. Ortiz, California Institute of Technology	**PS1-40 D6 Direct Mounting of Quartz Crystal on a CMOS PLL Chip.** H. Kim*[1], J. Lim[1], K. Choi[1], D. Kenny[2], and T. Jackson[1], [1]The Pennsylvania State University, [2]Saronix East Development Center
PS1-1 A1 Bubble-Based Acoustic Radiation Force for Monitoring Intraocular Lens Elasticity. T. N. Erpelding*[1], K. W. Hollman[1], T. Juhasz[1,2], and M. O'Donnell[1], [1]University of Michigan, Biomedical Engineering Department, [2]University of Michigan, Center for Ultrafast Optical Science	**PS1-9 A9 Dual Configuration High Temperature Hydrogen Sensor on LGS SAW Devices.** J. A. Thiele* and M. Pereira da Cunha, Dept. of Electrical and Computer Eng., University of Maine	**PS1-17 B6 FEM/BEM Impedance and Power Analysis for Measured LGS SH-SAW Devices.** T. D. Kenny*, T. B. Pollard, E. Berkenpas, and M. Pereira da Cunha, Dept. of Electrical and Computer Engineering, University of Maine	**PS1-25 C8 SH-SAW Transducer Analysis on Single Crystal $KnbO_3$ for Liquid Sensors.** T. B. Pollard*, T. D. Kenny, and M. Pereira da Cunha, Dept. of Electrical and Computer Eng., University of Maine	**PS1-33 D1 Design, Fabrication and Characterization of Tunable PZT Film Bulk Acoustic Resonators.** C. Zinck*[1], G. Caruyer[2], A. Volatier[2], E. Defaÿ[1], D. Pellissier-Tanon[2], L. Figuiére[3], and M. Aid[1], [1]CEA-DRT - LETI/DTS - CEA/ GRE, [2]STMicroelectronics, CCMC Crolles, [3]STMicroelectronics	**PS1-41 D7 Large Enhancement of CPT Signals in Frequency Standards.** Y.-Y. Jau*[1], E. Miron[2], A. Post[1], N. Kuzma[1], and W. Happer[1], [1]Princeton University, [2]NRCN
PS1-2 A2 Intravascular Ultrasound Tissue Harmonic Imaging in vivo. M. E. Frijlink*[1], D. E. Goertz[1,2], and A. F. W. van der Steen[1,2], [1]Erasmus MC, Biomedical Engineering, [2]Interuniversity Cardiology Institute of the Netherlands	**PS1-10 A10 A Theoretical Study of Love Wave Sensors Mass Loading and Viscoelasticity Sensitivity in Gas and Liquid Environments.** P. Mazein*[1], D. Rebiére[1], C. Déjous[1], F. Josse[2], and J. Pistré[1], [1]Université Bordeaux, [2]Marquette University	**PS1-18 B7 Evaluation of Material Constants and SAW Properties in $LaCa_4O(BO_3)_3$ Single Crystals.** H. Shimizu*[1], H. Takeda[1], T. Nishida[1], T. Shikita[2], S. Okamura[1], and T. Shiosaki[1], [1]Nara Institute of Science and Technology (NAIST), [2]Sakai Chemical Industry Co., Ltd.	**PS1-26 C9 An Efficient Numerical Method in Calculating the Electrical Impedance Different Modes of AT-Cut Quartz Crystal Resonator.** S.-Y. Pao[1], M.-C. Chao[2], C. S. Lam[2], and P.-Z. Chang[1], [1]Institute of Applied Mechanics, National Taiwan University, [2]TXC Corporation	**PS1-34 D2 Conversion of 45° Rotated X-Cut $KnbO_3$ Plates to Y-Cut Plates by Compression.** K. Nakamura, N. Chiba, and S. Ito*, Graduate School of Engineering, Tohoku University	**PS1-42 D8 Frequency Transfer of Optical Standards Through a Fiber Network using 1550-nm Mode-Locked Sources.** K. Holman*, D. Jones, and J. Ye, JILA, NIST and University of Colorado
PS1-3 A3 Increasing Binding Efficiency of Ultrasound Targeted Agents with Radiation Force. S. Zhao*, M. Borden, S. Bloch, D. Kruse, K. W. Ferrara, and P. A. Dayton, University of California, Davis	**PS1-11 A11 Dedicated Finite Elements for Electrode Thin Films on Quartz Resonators.** S. Srivastava*[1], Y.-K. Yong[1], M. Tanaka[2], and T. Imai[2], [1]Rutgers University, [2]Seiko Epson, Inc	**PS1-19 B8 Optimized Membrane COnfiguration Improves CMUT Performance.** Y. Huang*, E. O Hæggström, X. Zhuang, A. S. Ergun, and B. T. Khuri-Yakub, Edward L. Ginzton Laboratory, Stanford University	**PS1-27 C10 Effects of Electric Bias and O_2 Content on Properties of ZnO Films and Chracterization of ZnO-based Film Bulk Acoustic Resonator.** D.-Y. Kim*, D.-H. Cho, B.-H. Kim*, J.-B. Lee, J.-P. Jung, and J.-S. Park, Dept. of Electrical Engineering, Hanyang University	**PS1-35 D3 Cooling-Rate-Dependent Domain Structures of PMN-PT Single Crystals Observed by Contact-Resonance Piezoresponse Force Microscopy.** J. Sakamoto*, H. Okino, and T. Yamamoto, National Defense Academy	**PS1-43 D9 A Multi-Resonance Acoustic Interfacial Biosensor (MAIB) for Monitoring a Formation Process of Biological Thin Films.** S. J. Kwoun* and R. M. Lec, School of Biomedical Engineering, Science and Health System, Drexel University

PS1-4 A4 Transcranial MRI-Guided Focused Ultrasound-Induced Blood-Brain Barrier Opening in Rats. L. H. Treat*[1,2], N. J. McDannold[2], N. Vykhodtseva[2], and K. Hynynen[2], [1]Harvard-MIT Division of Health Sciences & Technology, [2]Brigham and Women's Hospital/Harvard Medical School

PS1-5 A5 FPGA Based Digital High Frequency Beamformers for Arrays. C.-H. Hu*[1], X.-C. Xu[1], J. T. Yen[1], K. K. Shung[1], and P.-J. Cao[2], [1]Department of Biomedical Engineering and NIH Transducer Resource Center, University of Southern California, [2]Boston Scientific

PS1-6 A6 Ultrasound-Guided HIFU Neurolysis of Peripheral Nerves to Treat Spasticity and Pain. J. L. Foley*[1,2], J. W. Little[3], F. L. Starr III[2], C. Frantz[2], and S. Vaezy[1,2], [1]Department of Bioengineering, University of Washington, [2]Center for Industrial and Medical Ultrasound, Applied Physics Laboratory, University of Washington, [3]Department of Rehabilitation Medicine, University of Washington

PS1-7 A7 Counter-Propagating Lamb Wave Pair for Nondestructive Inspection. T. Hoshimiya and M. Suzuki*, Tohoku Gakuin University

PS1-12 B1 Visualization of In- and Out-of-Plane Vibrations in a Micro-mechanical RF-Resonator. O. Holmgren*[1], K. Kokkonen[1], T. Mattila[2], V. Kaajakari[2], A. Oja[2], J. Kiihamäki[2], J. V. Knuuttila[1], and M. M. Salomaa[1], [1]Materials Physics Laboratory, Helsinki University of Technology, [2]VTT Information Technology

PS1-13 B2 An Ultrasonic Linear Motor using a Ridge Waveguide. M. Tominaga*, J. R. Friend, K. Kaminaga, K. Nakamura, and S. Ueha, Precision and intelligence Laboratory, Tokyo Insutitute of Technology

PS1-15 B4 On Minimizing Bulk Scattering Loss in CRF(DMS) Devices. W. Wang[1], X. Zhang[1], H. Wu[1], Y. Shui*[1], and V. P. Plessky[2], [1]Key Lab. on Modern Acoustics, Nanjing University, [2]GVR Trade SA

PS1-20 B9 Inverse Calculation Method for Piezocomposite Materials Characterisation. G. Férin*[1,2], D. Certon[2], J. Guyonvach[2], and N. Félix[1], [1]VERMON, [2]GIP Ultrasons / LUSSI

PS1-21 B10 Wide Frequency Band and High Intensity Thickness Vibration of Hydrothermal Lead Zirconate Titanate Polycrystalline Film. M. Ishikawa*[1], M. K. Kurosawa[1], and S. Takeuchi[2], [1]Tokyo Institute of Technology, [2]Toin University of Yokohama

PS1-22 B11 Real-Time 3D Ultrasound with Multiple Transducer Arrays. M. P. Fronheiser*, E. D. Light, and S. W. Smith, Deptartment of Biomedical Engineering, Duke University

PS1-23 C6 Ultra-Low Drift Cryogenic Sapphire Microwave Oscillator. P. Y. Bourgeois*[1], Y. Kersalé[1], N. Bazin[1], M. Chaubet[2], and V. Giordano[1], [1]Departement LPMO, Institut FEMTO-ST, UMR 6174, [2]Centre National des Etudes Spatiales

PS1-28 C1 Non-Linear Dielectric Response in {111} and {100} Oriented $0.5Pb(Yb_{1/2}Nb_{1/2})O_3$-$0.5PbTiO_3$ Thin Films. N. Bassiri Gharb* and S. Trolier-McKinstry, The Pennsylvania State University

PS1-29 C2 Piezoelectric Anisotropy-Phase Transition Relations in Perovskite Single Crystals. M. Budimir*, D. Damjanovic, and N. Setter, EPFL

PS1-30 C3 Grain Orientation of New Lead-Free Piezoelectric Ceramic in the System of $(Bi_{1/2}Na_{1/2})TiO3$-$(Bi_{1/2}K_{1/2})TiO_3$-$BaTiO_3$. N. Marandian Hagh*, M. Allahverdi, and A. Safari, Rutgers university

PS1-31 C4 Spatial Resitivity Profiling of Multilayer Capacitors as a Function of Furnace Conditions. C. M. Williams, A. E. Hydrick, H. M. Schulze*, and W. A. Schulze*, Alfred University

PS1-36 D4 Effects of Li2CO3 and Bi2O3 Additives on Sintering Temperature and Piezoelectric Properties of PCW-PMN-PZT Ceramics for Multilayer Piezoelectric Transformer. K. Chung*[1], J. Yoo[2], H. Song[2], Y. Jeong[3], H. Yoon[4], C. Park[2], and D. Lee[1], [1]Inha University, [2]Semyung University, [3]KEPRI, [4]Kyungmoon College

PS1-37 D5 Sol-Gel Derived $Pb(Zr,Ti)O_3$ Thin Films: Residual Stress, Orientation, and Electrical Properties. R. J. Ong*, T. A. Berfield, N. R. Sottos, and D. A. Payne, University of Illinois at Urbana-Champaign

PS1-39 C12 Mechanically-Coupled Micromechanical Resonator Arrays for Improved Phase Noise. S. Lee* and C. T.-C. Nguyen, Univiersity of Michigan

PS1-44 D10 SAW Sensors using Orthogonal Frequency Coding. D. Puccio*[1], D. C. Malocha[1], D. Gallagher[1], and J. H. Hines[2], [1]ECE Dept., University of Central Florida, [2]Microsensor Systems, Inc.

PS1-45 D11 Techniques to Evaluate the Mass Sensitivity of Love Mode Surface Acoustic Wave Biosensors. L. A. Francis*[1,2], J.-M. Friedt[3], R. De Palma[2,4], C. Zhou[2,4], C. Bartic[2], P. Bertrand[1], and A. Campitelli[2], [1]Université catholique de Louvain, [2]Biosensors Group, IMEC, [3]Université de Franche-Comté, [4]Katholiek Universiteit Leuven

Session P1FC-A **OSCILLATORS AND RESONATORS** Chair: M. Driscoll Northrop Grumman, USA	**P1FC-A-8 N10 High Factor Frequency Multiplication in 2.4 GHz VCXO.** D. V. Bogomolov*, Valpey Fisher Corporation	**P1FC-A-16 M8 Further Enhancements to the Analysis of Spectral Purity in the Application of Practical Direct Digital Synthesis.** J. R. Jensen*, S. Cheng, and R. E. Wallis, Johns Hopkins University Applied Physics Laboratory	**P1U-B-4 E10 Optical Observations of Microbubble Behavior at High Ultrasound Frequencies.** D. E. Goertz*[1,2], C. T. Chin[1], M. E. Frijlink[1], M. Versluis[3], N. De Jong[1,3], and A. F. W. van der Steen[1,2], [1]Erasmus MC, [2]Interuniversity Cardiac Inst. Netherlands, [3]Physics of Fluids, Univ. Twente	**P1U-C-4 F4 High Volume Rate 3-D Ultrasound Imaging Using Cross Array Based On Synthetic Transmit Focusing.** K.-S. Kim* and T.-K. Song, Center for Medical Solutions Research, Dept. of EE, Sogang University	**P1U-D-3 F11 A Study of Morphological Edge Enhancement by Double Structuring Element for Ultrasound B-Mode Images.** M. Tsubai*[1], T. Nishimura[1], A. Sasaki[1,2], T. Mitake[2], and S.-I. Umemura[3], [1]Graduate School of Information, Production and Systems, Waseda University, [2]Hitachi Medical Corporation, [3]Hitachi Central Research Laboratory
P1FC-A-1 M1 Thermo-Acoustic Excitation of MEMS. J. M. Parpia*, M. Zalalutdinov, K. L. Aubin, R. Reichenbach, and H. G. Craighead, Cornell University	**P1FC-A-9 N9 An Analytic Approach Used to Design a Low Power and Low Phase Noise CMOS LC Oscillator.** R. Dehghani*, Sharif University of Technology	**P1FC-A-17 M9 Low Flicker-Noise Amplifier for 50 O Sources.** E. Rubiola*[1] and F. Lardet-Vieudrin[2], [1]Université Henri Poincaré - ESSTIN -LPMIA, [2]LPMO Dept, FEMTO-ST	**P1U-B-5 E11 An Acoustic Study of Disruption of Polymer Shelled Bubbles.** P. D. Bevan*[1,2], R. Karshafian[1,2], M. Matsumura[2], G. Tickner[3], and P. N. Burns[1,2], [1]University of Toronto, Department of Medical Biophysics, [2]Sunnybrook & Women's College Health Sciences Centre, [3]Point Biomedical	**P1U-C-5 F5 Development of a Linear Power Amplifier for High Frame Rate Imaging System.** J.-Y. Lu* and J. L. Waugaman, The University of Toledo	**P1U-D-4 F12 Real-Time Respiration Phase Monitoring System using Ultrasonic Bi-Plane Image Data for Proton Beam Therapy.** T. Mochizuki*[1], M. Kunita[1], Y. Toyama[2], S. Murayama[3], and A. Maruhashi[4], [1]Aloka Co., Ltd., [2]JRC Engineering Co., Ltd., [3]Shizuoka Cancer Center Hospital, [4]Kyoto University Research Reactor Institute
P1FC-A-2 M11 The Microcomputer Compensated Crystal Oscillator—Practical Application of Dual-Harmonic Mode Quartz Thermometry. E. Jackson*, Q-Tech Corporation	**P1FC-A-10 M2 Dual Mode SC-cut Crystal Oscillator.** T. Oita*, M. Fukuda, A. Nakamura, T. Ishikawa, and K. Ono, Nihon Dempa Kogyo Co., Ltd.	**P1FC-A-18 M10 Recent Results on Quartz Crystal LD-Cuts Operating in Oscillators.** S. Galliou*, F. Sthal, J. J. Boy, R. Bourquin, and M. Mourey, LCEP, FEMTO-ST, UMR CNRS 6174	**P1U-B-6 E12 Controlled Gas Release from Rigid-Shelled microbubbles.** M. Postema*[1,2], A. Bouakaz[1,2], and N. de Jong[1,3], [1]Thoraxcentre, Erasmus MC, Rotterdam, The Netherlands, [2]Interuniversity Cardiology Institute of The Netherlands, Utrecht, The Netherlands, [3]University of Twente, Enschede, The Netherlands	**P1U-C-6 F6 High Frame Rate Imaging using Parallel Transmission of Coded Focused Fields.** T. Misaridis*[1] and P. Munk[2], [1]National Technical University of Athens, [2]SACLANT Undersea Research Centre	**P1U-D-5 F13 Development of a Dual-Gate Automatic Embolus Detection System.** L. Fan[1], E. Boni[2], P. Tortoli[2], and D. H Evans*[1], [1]University of Leicester, [2]University of Florence
P1FC-A-3 M12 New Analysis on Push-Push FET Oscillators for Output Power Improvement. J. Kwon* and I. S. Kim, KyungHee University	**P1FC-A-11 M0 Miniaturised OCXO: Professional Component for Space Applications.** P. Guillemot*[1], A. Morin[2], and G. Richard[2], [1]CNES (French Space Agency), [2]THALES Microeletronics		**P1U-B-7 E13 In Vitro 40MHz Ultrasonic Characterisation of In-House Lipsomal Microbubble Dispersions Developed for Targeting Atherosclerotic Plaque.** C. M. Moran*[1], J. Ross[2], C. Oliver[2], M. Butler[1], and W. N. McDicken[1], [1]Medical Physics, [2]Tissue Injury and Repair Group	**P1U-C-7 F7 An Efficient 3D Beamformer Implementation for Real-Time 4D Ultrasound Systems Deploying Planar Array Probes.** A. Dhanantwari*[1], S. Stergiopoulos[1], C. Parodi[2,3], F. Bertora[3], P. Pellegretti[3], and A. Questa[3], [1]CANAMET Inc., [2]Department of Biophysical and Electronic Engineering, University of Genoa, [3]Esaote S.p.A	**P1U-D-6 G13 Emboli Sizing in Blood Flow Circulation using Parametric Modeling.** M. Biard*, J.-M. Girault, D. Kouame, and F. Patat, LUSSI CNRS FRE 2448

P1FC-A-4 M13 Low-Voltage Surface Transverse Wave Oscillators for the Next Generation CMOS Technology. I. D. Avramov*, Institute of Solid State Physics

P1FC-A-5 N13 Small Packaged VCSO for 10[Gbit] Ethernet Application. N. Nomura*, M. Itagaki, and Y. Aoyagi, Toyo Communication Equipment Co., Ltd.

P1FC-A-6 N12 New Sub One Inch Ultra Stable Oscillator. L. Couteleau*, TEMEX

P1FC-A-7 N11 A New Small-Dimensions Full PLL System. Y. Vorokhovsky*, G. Gidon, and A. Dobrovolsky, Morion, Inc.

P1FC-A-12 M4 A New Low Profile DOCXO. Y. Vorokhovsky*, S. Anastasyev, and A. Volkov, Morion, Inc.

P1FC-A-13 M5 Phase Noise Reduction in Microwave Bipolar Transistor Amplifiers through Active Feedback. M. J. Luce* and E. S. Ferre-Pikal, University of Wyoming

P1FC-A-14 M6 1/f Noise in Crystal Resonators. V. F. Kroupa*, Institute of Radio Engineering and aelectronics Academy of Sciences of the Czech Republic

P1FC-A-15 M7 Near-Carrier Phase-Noise Characteristics of Narrow Band Colpitts Oscillators. Y. Watanabe*[1], S. Komine[1], S. Goka[1], T. Sato[1], H. Sekimoto[1], and T. Uchida[2], [1]Graduate School of Engineering, Tokyo Metropolitan University, [2]NDK Co., Ltd.

Session P1U-B
CONTRAST AGENTS I
Chair: K. Ferrara
University of California

P1U-B-1 E7 The Short-Pulse Subharmonic Response of Microbubbles Based on a Two-Frequency Approximation. C.-Y. Wu[1,2], M.-T. Lo[1,2], J. Tsao*[1], D.-H. Tsai[2], Y.-C. Chang[2], and D.-R. Su[2], [1]Graduate Institute of Communication Engineering, National Taiwan University, [2]Medical Group, Research Center, Micro-Star Int'l Co., Ltd.

P1U-B-2 E8 Using the Correlation Property of Subharmonic Response as an Index of Cavitation of Microbubbles. M.-T. Lo[1,2], J. Tsao*[1], and S. Lin[2], [1]Graduate Institute of Communication Engineering, National Taiwan University, [2]Medical Group, Research Center, Micro-Star Int'l Co., Ltd.

P1U-B-3 E9 Acoustical Characterization of Submicron Particles of Perflurocarbon in Solution. O. Couture*, E. Cherin, and S. Foster, University of Toronto, Department of Medical Biophysics (Sunnybrook)

Session P1U-C
BEAMFORMING I
Chair: W. Walker
University of Virginia

P1U-C-1 F1 A High Voltage Pulser ASIC for Driving High Frequency Ultrasonic Arrays. G. I. Athanasopoulos*, S. J. Carey, and J. V. Hatfield, UMIST

P1U-C-2 F2 Parallel Beamforming using Synthetic Transmit Beams. T. Hergum*, T. Bjåstad, and H. Torp, Norwegian University of Science and Technology

P1U-C-3 F3 Algorithms of 3-Dimensional Beam Forming for Synthetic Aperture Imaging System using Pulses Coded with Walsh Functions. K. Satoh*[1], Y. Tamura[1], M. Miura[1], C. Ishihara[2], N. Okada[3], and T. Yamasaki[1], [1]Yamagata University, [2]Akishima Laboratories (Mitsui Zosen) Inc., [3]Honda Electronics Co., Ltd.

P1U-C-8 F8 Synthetic Aperture Technique for Echographic Focusing Based on Pulse Compression. E. Biagi, L. Masotti, I. Rossi, and M. Scabia*, Ultrasound and Non Destructive Lab, University of Florence

Session P1U-D
MEDICAL SIGNAL PROCESSING
Chair: R. Chiao
Siemens Med Sols

P1U-D-1 F9 ICA Based Source Separation in Tissue Strain Waves. L. Huang*[1,2], J. Kucewicz[1,2], and K. Beach[1,3], [1]Center for Industrial and Medical Ultrasound, Applied Physics Laboratory, University of Washington, [2]Department of Bioengineering, University of Washington, [3]Department of Surgery, University of Washington

P1U-D-7 G12 Adaptive Noise Reduction Process based on Gray-Level Concentrative Filter for CW Doppler Spectrometer. A. Sasaki*[1], T. Azuma[2], H. Kamada[1], T. Hayashi[1], T. Nishimura[3], and S.-I. Umemura[2], [1]Hitachi Medical Corporation, [2]Hitachi Central Research Laboratory, [3]Graduate School of Information, Wasada University

P1U-D-8 G11 Detection and Analysis of Fetal Movements by Multi-Sensor Doppler (The ACTIFOETUS System). A. Kribéche*[1], S. Benderbous[1], F. Tranquart[1], D. Kouamé[2], Ph. Vince[3], and L. Pourcelot[1], [1]INSERM U619, [2]LUSSI-GIP Ultrasons, [3]Ultrasons Technologies

Session P1U-E **CAVITATION IN THERAPY** Chair: K. Hynynen Harvard University	*Session P1U-F* **TISSUE ELASTOGRAPHY** Chair: P. Delachartre Creatis	**P1U-F-8 H8 Assessment of Bone Fracture and Bone Healing by Ultrasound Assisted Vibrational Method.** A. Alizad*, M. Walch, J. F. Greenleaf, and M. Fatemi, Mayo Clinic College of Medicine	**P1U-G-6 K6 A Statistical Model of Passive Remote SAW Sensing Employing Differential Phase Measurement.** Y. S. Shmaliy*, O. Ibarra-Manzano, and R. Rojas-Laguna, Guanajuato University	**P1U-H-6 I12 SAW Propagation in the Two Domain States of Ferroelectric LiNbO3 Crystal.** J. Nosek*, Technical University of Liberec	**P1FC-I-6 N6 Adaptive OCXO Drift Correction Algorithm.** C. W. T. Nicholls* and G. C. Carleton, Nortel Networks
P1U-E-1 G10 Correlation of Enhanced Acoustic Backscatter to Tissue Damage Produced by Cavitational Ultrasound Therapy. B. C. Tran*, J. B. Fowlkes, and C. A. Cain, University of Michigan	**P1U-F-1 H1 Diagnostic Results for Breast Disease by Real-time Elasticity Imaging System.** T. Matsumura*[1], S. Tamano[1], R. Shinomura[1], T. Mitake[1], M. Yamakawa[2], T. Shiina[2], A. Itoh[3], and E. Ueno[4], [1]Research & Development Center, Hitachi Medical Corporation, [2]Institute of Information Sciences & Electronics, University of Tsukuba, [3]Tsukuba University Hospital, University of Tsukuba, [4]Institute of Clinical Medicine, University of Tsukuba	**P1U-F-9 H9 Computational Aspects of Young's Modulus Reconstruction from Ultrasonic Freehand Scanning.** J. Jingfeng*, T. J. Hall, and E. L. Madsen, University of Wisconsin-Madison	**P1U-G-7 K7 Simulation of Wireless Passive SAW ID-Tags/Sensors using VHDL-AMS.** Q. Fu*, H. Stab, and W.-J. Fischer, Semiconductor and Microsystems Technology Laboratory	**P1U-H-7 I13 Influence of Thin Conducting Layer on Leaky SH-SAW in Piezoelectric Crystal.** B. Zaitsev*, A. Teplykh, and I. Kuznetsova, Institute of Radio Engineering and Electronics of RAS, Saratov Department	**P1FC-I-7 N7 A New Realization Strategy for the Time Scale UTC (PTB).** A. Bauch*, D. Piester, and E. Staliuniene, Physikalisch Technishe Bundesantalt, Germany
P1U-E-2 G9 Resonance Frequency of Microbubbles in Small Blood Vessel. E. Sassaroli*[1,2] and K. Hynynen[1,2], [1]Brigham's and Women Hospital, [2]Harvard Medical School	**P1U-F-2 H2 Hardware Implementation for Receive Beamforming and Transverse Elasticity Imaging.** P. Delachartre*, H. Liebgott, S. Michelet, M. Pernot, and D. Vray, Creatis	*Session P1U-G* **SAW WIRELESS** Chair: R. Weigel Erlangen University	*Session P1U-H* **HIGH COUPLING SAW MATERIALS** Chair: J. Kosinski US Army RCECOM	*Session P1FC-I* **TIME TRANSFER AND CHARACTERIZATION** Chair: R. Wang JPL	**P1FC-I-8 N8 The Establishment of a SADC Time Network.** E. L. Marais*, CSIR - National Metrology Laboratory
P1U-E-3 G8 Involvement of Cavitation in the Appearance of Hyperechoic Regions in Ultrasound Image Visualization of high Intensity Focused Ultrasound Therapy: In-Vivo Results. B. A. Rabkin*[1,2], V. Zderic[1,2], and S. Vaezy[1,2], [1]Deptartment of Bioengineering, University of Washington, [2]Center for Industrial and Medical Ultrasound, Applied Physics Lab., University of Washington	**P1U-F-3 H3 Signal Processing for Ultrasound-based Arterial Pulse Wave Velocity Estimation.** R. T. Hoctor*, A. M. Dentinger, and K. E. Thomenius, GE Global Research	**P1U-G-1 K1 SAW Antenna Duplexer for Trunking Communication.** J. Liu* and S. He, Institute of Acoustics, The Chinese Academy of Sciences	**P1U-H-1 I7 The Characteristics of Leaky Surface Acoustic Wave of Proton-Exchanged Lithium Tantalite.** C.-J. Chung*[1], Y.-C. Chen[1], K.-S. Kao[1], C.-L. Wei[1], and C.-C. Cheng[2], [1]National Sun Yat-Sen University, [2]De Lin Institute of Technology	**P1FC-I-1 N1 A Phase Locked Mechanism for Time Scaling Frequency control System.** S.-Y. Lin*, Telecommunication Laboratories	**P1FC-I-9 O1 Highly-Accurate Real-Time Sytonization using A GPS Single-Frequency Receiver with an Intelligent Atmosphere Forecasting Model.** C.-L. Cheng*[1], F.-R. Chang[1], L.-S. Wang[2], and K.-Y. Tu[3], [1]National Taiwan University, [2]Inst. of Applied Mechanics, National Taiwan University, [3]NSTF Lab., TL, Chunghwa Telecom. Co., Ltd., Taiwan

P1U-E-4 G7 Micro-Capsule Destruction using Ultrasound for Drug Delivery System. D. Koyama*, K. Wataru, and Y. Watanabe, Faculty of Engineering, Doshisha University	**P1U-F-4 H4 Noninvasive Vascular Elastography Based on a New 2D Strain Estimator: Simulations Results.** C. Schmitt*, R. L. Maurice, J.-L. Gennisson, and G. Cloutier, Laboratory of Biorheology and Medical Ultrasonics	**P1U-G-2 K2 On the Design of an FBAR PCS Duplexer in LTCC Chip-Sized Package.** F. M. Pitschi*, J. E. Kiwitt, B. Bader, and K. Ch. Wagner, EPCOS AG	**P1U-H-2 I8 Quasi-Longitudinal Pseudo-Surface Acoustic Waves on Lithium Tantalate.** V. I. Cherednick*[1], M. Yu. Dvoesherstov[1], and K. Bhattacharjee[2], [1]State University, [2]Clarisay	**P1FC-I-2 N2 The Three Cornered Hat Method: An Attempt to Identify Some Clock Correlations.** F. Vernotte*[1], J. Delporte[2], and M. Brunet[2], [1]Observatoire de Besançon, [2]Centre National d'Études Spatiales	*Session P1FC-J* **CHEMICAL SENSORS** Chair: R. Lucklum Otto-Von-Guericke University
P1U-E-5 G6 Testing the Role of Shear and Longitudinal Waves in Kidney Stone Comminution by a Lithotripter Shock Pulse. O. A. Sapozhnikov*[1], R. O. Cleveland[2], M. R. Bailey[3], and L. A. Crum[3], [1]Faculty of Physics, Moscow State University, [2]Department of Aerospace and Mechanical Engineering, Boston University, [3]Center for Industrial and Medical Ultrasound, Applied Physics Laboratory, University of Washington	**P1U-F-5 H5 Tissue Mimicking Phantom for Ultrasonic Elastography with Finely Adjustable Elastic and Echographic Properties.** K.-I. Kawabata*[1], K. Waki[2], T. Matsumura[3], and S.-I. Umemura[1], [1]Central Research Laboratory, Hitachi, Ltd., [2]Development Design Depertment Ultrasound System Division, Hitachi Medical Corporation, [3]Research & Development Center, Hitachi Medical Corporation	**P1U-G-3 K3 Optimized Test PCBs for SAW / FBAR RF Filters.** H. Bilzer[2], F. M. Pitschi*[1], J. E. Kiwitt[1], K. Ch. Wagner[1], and W. Menzel[2], [1]EPCOS AG, [2]Microwave Techniques, University of Ulm	**P1U-H-3 I9 Plate and Gap Acoustic Waves for Highly Sensitive Gas and Liquid Sensors.** M. Yu. Dvoesherstov[1], V. I. Cherednick*[1], and K. Bhattacharjee[2], [1]State University, [2]Clarisay	**P1FC-I-3 N3 A Study on GPS Common-View Observation Data with Multiscale Kalman Filter Algorithm.** X. Ou, X. Han, H. Wang*, H. Zhou, and W. Zhou, Xidian University	**P1FC-J-1 Q1 SAW Sensor for Liquid Chromatography using SH-SAW resonator.** T. Nomura*[1], A. Saitoh[1], and S. Furukawa[2], [1]Shibaura Instotute of Technology, [2]Kyushu Institute of Technology
P1U-E-6 G5 *Ex-Vivo* Study of Cavitation-Enhanced Ultrasound Heating by Combining Low (40kHz) and High (566kHz) Frequency Ultrasound. H.-L. Liu*[1], T.-C. Shih[2], B.-Y. Lu[1], W.-S. Chen[3], and W.-L. Lin[2], [1]Department of Electronic Engineering, Tung-Nan Institute of Technology, Taipei, Taiwan, [2]Institute of Biomedical Engineering, National Taiwan University, Taipei, Taiwan, [3]Department of Rehabilitation, National Taiwan University Hospital, Taipei, Taiwan	**P1U-F-6 H6 Cross-Sectional Elasticity Imaging of Arterial Wall in Short-Axis Plane with Ultrasound.** N. Nakagawa[1], H. Hasegawa[1], H. Kanai*[1], M. Ichiki[2], and F. Tezuka[3], [1]Graduate School of Engineering, Tohoku University, [2]Sendai Hospital of East Railway Company, [3]National Sendai Hospital	**P1U-G-4 K4 Analysis of Parasitic Effects of GHz-range SAW Matched Filters for Wireless Pulse Communication Systems.** T. Sato*, T. Sugiura, and H. Nagasaka, Samsung Yokohama Research Institute	**P1U-H-4 I10 Roundtrips of SAW Along Multiple Routes on a Single Crystal $LiNbO_3$ Ball.** S. Akao*[1], N. Nakaso[1], T. Ohgi[1], and K. Yamanaka[2], [1]Toppan printing Co., Ltd., [2]Department of Materials Processing, Tohoku University	**P1FC-I-4 N4 Some Problems and Their Solutions in Quasi-Parallel MTIE Assessment.** A. Dobrogowski* and M. Kasznia, Poznan University of Technology, Institute of Electronics and Telecommunications	**P1FC-J-2 Q2 Zero TCF ZnO/Quartz SAW Structure for CO_2 Sensing Applications.** A. Talbi, F. Sarry*, M. El Hakiki, O. Elmazria, F. Moreira, and L. Le Brizoual, LPMIA-UMR7040 CNRS-Universite Henri Poincare
P1U-E-7 G4 A Gel Phantom for MR Calibration of Thermal Therapies. S. Lochhead*, M. McDonald, R. Chopra, and M. J. Bronskill, Sunnybrook & Women's College Health Sciences Centre	**P1U-F-7 H7 Nonlinearity Studies in Soft Tissues with the Supersonic Shear Imaging System.** S. Catheline*, J.-L. Gennisson, J. Bercoff, C. Barriére, and M. Fink, Laboratoire Ondes et Acoustique	**P1U-G-5 K5 Withdrawn**	**P1U-H-5 I11 Transverse Acoustic Anisotropy of Obliquely Propagating LSAW in Resonator Structures on $LiTaO_3$ and $LiNbO_3$ Substrates.** N. Naumenko*[1] and B. Abbott[2], [1]Moscow Steel and Alloys Institute, [2]Sawtek Inc	**P1FC-I-5 N5 Instantaneous Frequency Estimation Through the Application of Warblet Transform and Optimal Sampling Strategies.** L. Angrisani[1], M. D'Arco[2], R. Schiano Lo Moriello*[2], and M. Vadursi[2], [1]Universitá di Napoli Federico II, Dipartimento di Informatica e Sistemistica, [2]Universitá di Napoli Federico II, Dipartimento di Ingegneria Elettrica	**P1FC-J-3 Q3 Ammonia Sensing Probe using Shear Horizontal Surface Acoustic Wave Technique.** C.-Y. Shen*, C.-P. Huang, Y.-T. Shen*, K.-C. Hsu, and J.-S. Jeng, Department of Electrical Engineering, I-Shou University

P1FC-J-4 Q4 3-D Finite-Element Simulation Model of SAW Palladium Thin Film Hydrogen Sensor. M. Atashbar*, B. Bazuin, M. Simpeh, D. Banerji, and S. Krishnamurthy, Department of Electrical and Computer Engineering, Western Michigan University

P1U-K-6 J6 Measurement of Draught using Ultrasonic Air Transducers. G. P. P. Gunarathne*, The Robert Gordon University

P1U-L-4 K13 Non Periodic Acoustic Devices Radiating in Semi-Infinite Solids Simulated by a Combination of Finite Element Analysis and a Boundary Element Method. M. Wilm*, S. Ballandras, and V. Laude, Institut FEMTO-ST, Dept LPMO

Session P1U-M
UNDERWATER TRANSDUCERS
Chair: V. Varadan
The Pennsylvania State University

P1U-N-3 I3 Cross-Coupling in a 1-3 Piezoelectric Composite: Simulation and Experiment. M. Wilm*[1], O. Burat[2], J.-F. Gelly[3], F. Lantéri[3], and S. Ballandras[1], [1]Institut FEMTO-ST, Département LPMO, CNRS UMR 6174, [2]Framatome-ANP, Technical Center, [3]GE Parallel Design SAS

P1U-O-4 L4 Net Shape Ceramic Processing as a Route to Ultrafine Scale 1-3 Connectivity Piezoelectric Ceramic-Polymer Composite Transducers. S. Cochran*[1], D. Zhang[2], N. Porch[3], B. Su[3], A. Abrar[1], and K. Kirk[1], [1]Microscale Sensors, [2]Functional Materials Group, [3]Applied Functional Materials Ltd.

P1FC-J-5 Q5 Computational Simulation of Vibration Displacement on Piezoelectric Quartz Crystal using Finite Element Method. C. Kurosawa*[1,2], S. Kurosawa*[1], H. Aizawa[1,3], and T. Horibe[2], [1]National Institute of Advanced Industrial Science and Technology (AIST), [2]Ibaraki University, [3]New Energy and Industrial Technology Development Organization (NEDO)

P1U-K-7 J7 Reciprocity Calibration of Hydrophones at Various Temperatures in the MHz Frequency Range. C. Labuda, J. L. Raymond*, and C. C. Church, National Center for Physical Acoustics, University of Mississippi

P1U-L-5 K12 Transient Cavitation Induced by Periodic Sequence of Tone Bursts. V. Andreev* and V. Aleynikov, Acoustics Dept., Faculty of Physics Moscow State University

P1U-M-1 E1 Miniature Flextensional Piezoelectric Transducers with Rectanglular Geometry for Improved In-Water Acoustic bandwidth and Power. D. C. Markley*[1,2], R. J. Meyer, Jr.[1], R. E. Newnham[2], and A.-C. Hladky-Hennion[3], [1]Applied Research Laboratory, [2]Materials Research Laboratory, [3]IEMN, ISEN

P1U-N-4 I4 Medical Transducer Arrays using Composite Materials for Acoustic Matching Layers—Fabrication and Experiment—. T. Kondo*[1], T. Kitatuji[1], and M. Izumi[2], [1]Tokushima Bunri University, [2]Hitachi Medical Corporation

P1U-O-5 L5 3-3 Connectivity Multilayered Piezoelectric Composites. R. L. O'Leary*, M. Kijowski, and G. Hayward, Centre for Ultrasonic Engineering

Session P1U-K
SENSORS
Chair: J. Vetelino
University of Maine

P1U-K-8 J8 A Localized Acoustic Field Formed in the Vicinity of a Bending-Vibrator End and Its Application to Piezoelectric Sensors. K. Yamada*, D. Yamazaki, and K. Nakamura, Graduate School of Engineering, Tohoku University

P1U-L-6 K11 2D Numerical Simulation of Supercritical Phase Conjugation of Ultrasound in Active Solid Media. O. Bou Matar*[1], V. Preobrazhensky[1,2], and P. Pernod[1], [1]Institut d'Electronique, de Micro-électronique et de Nanotechnologie (IEMN-DOAE UMR CNRS 8520), [2]Wave Research Center of General Physics Institute (RAS)

P1U-M-2 E2 Comparison of Theoretical Prediction and Experimental Performance using FEM for Marine Transducers. J. Lan*, R. H. Tancrell, and S. G. Boucher, Airmar Technology Corporation

P1U-N-5 I5 Optimum Choice of Acoustic Properties of Filling Materials by Optical Measurement. F. P. Branca[1], F. Bini[1], F. Marinozzi[1], and A. Grandoni*[2], [1]University of Rome La Sapienza", [2]Transducer Manufacturing Engineer, Industrial Engineering Group ESAOTE S.p.A

Session P1U-P
BULK ACOUSTIC WAVES
Chair: J. Larson
Agilent

P1U-K-1 J1 Layered Cylindrical Viscosity Sensors. P. Kielczynski*, W. Pajewski, and M. Szalewski, Institue of Fundamental Technological Research

P1U-K-9 J9 Clamp-On Shear Transducers Simplify Guided Torsional and/or Extensional Investigations. L. C. Lynnworth*, Lynnworth Engineering

P1U-L-7 K10 Effect of Combined Stacks as a Heat Pump on the Thermoacoustic Cooling System. S. Sakamoto*, T. Tsujimoto, and Y. Watanabe, Faculty of Engineering, Doshisha University

P1U-M-3 E3 Piezocomposite Transducers for Operation in 15–25 kHz Range. A. Abrar*[1], A. Skea[1], S. Cochran[1], K. J. Kirk[1], D. Choi[2], and M. P. Walsh[2], [1]Microscale Sensors Group, University of Paisley, [2]Piezo Composite Transducers Ltd.

P1U-N-6 I6 3D Finite Element Modeling of Obliquely Oriented Piezocomposite Materials and Transducer Arrays. W. Li*, J. M. Gilmore, and F. J. Bennett, SonoSite, Inc

P1U-P-1 L7 Comparison of Ultrasound and γ-Radiation Influence on Electrophysical Properties of MnHgTe. J. M. Olikh*[1], M. D. Tymochko[1], and V. I. Khivrych[2], [1]Lashkarov's Institute of Semiconductor Physics NAS Ukraine, [2]Institute of Nuclear Researches NASU

P1U-K-2 J2 Apodization and Asymmetry of the Active Area of Acoustic Hydrophone and It's Implications on Ultrasound Exposure. V. Devaraju*, Drexel

Session P1U-L
PHYSICAL ACOUSTICS IV
Chair: K. Liang
Schlumberger-Doll Research

P1U-L-8 K9 Basic Study on Effects of Acoustic Intensity and Sound Pressure on Surface Modification and Dispersion of Diamond Particles. T. Uchida*, A. Hamano, N. Kawashima, and S. Takeuchi, Toin University of Yokohama

P1U-M-4 E4 Monolithic Multimode Transducers Prototyped using Extrusion and Fused Deposition of Ceramics (FDC) techniques. D. C. Markley*[1,4], R. E. Newnham[1], A.-C. Hladky-Hennion[2], J. K. Cochran, Jr.[3], R. J. Meyer, Jr.[4], A. Safari[5], and M. Allahverdi[5], [1]Materials Research Institute, [2]IEMN, ISEN, [3]Materials Science and Engineering Department, [4]Applied Research Laboratory, [5]Department of Ceramic and Materials Engineering

Session P1U-O
COMPOSITE TRANSDUCERS
Chair: H. Kunkel
Philips Ultrasound

P1U-P-2 L8 A 3.8 mm x 3.8 mm x 1.37 mm Hermetic Cell-Band FBAR Duplexer for Handsets. P. Bradley*[1], K. Grannen[1], D. Clark[1], B. Yu[1], and R. Ruby[1], [1]Wireless Semiconductor Division/Agilent Technologies, [2]Personal Systems Division

P1U-K-3 J3 Pulsed Interrogation of the SAW Torque Sensor for Electrical Power Assisted Steering. V. Kalinin*, G. Bown, J. Beckley, and R. Lohr, Transense Technologies plc

P1U-L-1 J10 Second-Harmonic Generation of Lamb Waves in a Solid Layer on a Half Space. M. Deng*[1], P. Wang[2], and X. Lv[2], [1]Department of Physics, Logistics Engineering University, China, [2]College of Automation, Chongqing University of Posts and Telecommunications

P1U-L-9 K8 Acoustoelectric Transient Spectroscopy of Microwave Treated GaAs-Based Structures. O. Y. Olikh*, Kyiv Taras Shevchenko National University

Session P1U-N
TRANSDUCER ARRAY MODELING
Chair: H. Kunkel
Philips Ultrasound

P1U-O-1 L1 A New Low Frequency Piezoelectric Composite Transducer. D. Robertson*, G. Hayward, and A. Gachagan, Centre for Ultrasonic Engineering, Department of Electronic and Electrical Engineering

P1U-P-3 L9 Investigation of Spurious Resonances in Thin Film Bulk Acoustic Wave Resonators. A. Reinhardt*[1,2], V. Laude[1], M. Solal[2], S. Ballandras[1], and W. Steichen[2], [1]FEMTO-ST, LPMO Department, [2]TEMEX Microsonics

P1U-K-4 J4 Thin Film Bulk Acoustic Wave Resonator (TFBAR) Gas Sensor. M. Benetti[1], D. Cannatá[1], A. D'Amico[2], F. Di Pietrantonio[1], V. Foglietti[3], and E. Verona*[1], [1]Istituto di Acustica O.M. Corbino, CNR, [2]Dipartimento di Elettronica, Università di Roma Tor Vergata, [3]Istituto di Fotonica e Nanotecnologie, CNR

P1U-L-2 J12 Principles of Ultrasonic Velocimetry by Means of Nonlinear Interaction of Phase Conjugate Waves. Y. Pylnov*[1,2], O. Bou Matar[1], V. Preobrazhensky[1,3], and P. Pernod[1], [1]Institut d'Electronique, de Microélectronique et de Nanotechnologie (IEMN DOAE UMR CNRS 8520) Ecole Centrale de Lille, [2]Moscow Institute of Radioengineering, Electronics and Automation, [3]Wave Research Center of General Physics Institute RAS

P1U-L-10 J11 Investigating Ultra-Thin Lubricant Layers using Resonant Friction Force Microscopy. W. Arnold*[1], M. Reinstaedtler[1], U. Rabe[1], A. Goldade[2], and B. Bhushan[2], [1]Fraunhofer Institute for Non-Destructive Testing (IZFP), [2]Nanotribology Laboratory for Information Storage and MEMS/NEMS

P1U-N-1 I1 Effect of a Curved Dome on the Effective Focus of an Annular Array — Numerical Simulations and Experimental Measurements. S. P. Näsholm*, T. F. Johansen, and B. A. J. Angelsen, Inst. comp: Department of Circulation and Imaging, Norwegian University of Science and Technology

P1U-O-2 L2 Fabrication and Modeling of Broadband Graded Transducers using Piezoelectric Partial Composites. H. K. Guo*, J. Cannata, Q. F. Zhou, and K. K. Shung, Department of Biomedical Engineering, University of Southern California

P1U-P-4 L10 Properties of AlN Films Grown by Two-Step Deposition and Characteristics of AlN-FBAR Devices. D.-H. Cho*, D.-Y. Kim, B.-H. Kim, J.-B. Lee, J.-P. Jung, and J.-S. Park, Dept. of Electrical Engineering, Hanyang University

P1U-K-5 J5 Ultrasonic Attenuation in Acoustic Touch Panels. M. Takeuchi*[1], T. Gotsu[1], and J. Kent[2], [1]Faculty of Engineering, Tamagawa University, [2]Elo TouchSystems, Inc.

P1U-L-3 J13 Numerical Analysis of Nonlinear Axisymmetrical Acoustic Resonators. C. Vanhille*[1] and C. Campos-Pozuelo[2], [1]ESCET, [2]Instituto de Acùstica

P1U-N-2 I2 Effect of Acoustical Properties of a Lens on the Pulse Electroacoustic Response of a Single Element Transducer at Different Locations in the Radiated Field. P. Marechal[1], F. Levassort[1], L.-P. Tran-Huu-Hue[1], N. Felix[2], and M. Lethiecq*[1], [1]GIP ULTRASONS/LUSSI, [2]VERMON SA

P1U-O-3 L3 Finite Element Analysis of the Thickness Mode Resonance of Piezoelectric 1-3 Fibre Composites. R. Steinhausen, C. Pientschke, W. Seifert, and H. Beige*, Martin-Luther-University Halle-Wittenberg

Session P1FE-Q **THIN FILMS** Chair: J. P. Maria North Carolina State University	**P1FE-Q-8 Z12 Influence of Ca Content on Dielectric Properties of (Ba1-xySrxCay)TiO3 Thin Films.** D. Peng, W. Wu, and Z. Meng*, School of Materials Science and Engineering, Shanghai University	**P1FE-Q-16 Y12 Thickness Effect of LaNiO3 Interlayer on Electric Properties of Pb(Zr,Ti)O3 with Metal Substrates.** L. He, P. Zheng, J. Cheng, and Z. Meng*, School of Material Science and Engineering, Shanghai University			
P1FE-Q-1 Y5 Thermodynamics of Phase Stability and Elasto-dielectric Properties of Paraelectric BST Thin Films under 3D State of Strain. E. K. Akdogan*, W. K. Simon, and A. Safari, Dept. of Ceramic and Materials Eng'g, Rutgers University	**P1FE-Q-9 Z13 The Simulation of Ferroelectric Thin Film Growth by Kinetic Monte Carlo Method.** G. Yu, J. Zhu*, W. Lu, P. Yu, and D. Xiao, Department of Materials Science, Sichuan University, Chengdu 610064, China	**P1FE-Q-17 Y13 180° Domain Structure in Epitaxial $PbTiO_3$ Ferroelectric Films.** S.K. Streiffer*[1], G.B. Stephenson[1], D.D. Fong[1], J.A. Eastman[1], C. Thompson[1,2], O. Auciello[1], and P.H. Fuoss[1], [1]Materials Science Division, Argonne National Laboratory, Argonne, IL, [2]Dept. of Physics, Northern Illinois University, DeKalb, IL			
P1FE-Q-2 Z6 Optical Micro-Scanner Fabricated on Stainless Steel by Aerosol Deposition Method. M. Lebedev* and J. Akedo, National Institute of Advanced Industrial Science and Technology	**P1FE-Q-10 Y6 Preparation and Characterization of PZT(80/20)/PT Ferroelectric Multilayer Thin Films Prepared by Sol-Gel Method.** X. Yuan, D. Xiao, G. Yu, Y. Fang, and J. Zhu*, Sichuan University Material Science Department	**P1FE-Q-18 X13 Electron Backscatter Diffraction Micro-Texture Analysis of Pt and PZT Thin Films for FRAM.** G. Fox*[1], T. Maitland[2], X. Han[2], and M. Vaudin[3], [1]Ramtron International Corp., Colorado Springs, CO, [2]HKL Technology Inc., Danbury, CT, [3]NIST, Gaithersburg, MD			
P1FE-Q-3 Z7 Sol-Gel Derived $Pb(Zr,Ti)O_3$ Thin Films: Residual Stress, Orientation, and Electrical Properties. R. J. Ong*, T. A. Berfield, N. R. Sottos, and D. A. Payne, University of Illinois at Urbana-Champaign	**P1FE-Q-11 Y7 The Effect of Thermal Treatment on PLD-Derived $Ba_{0.8}Sr_{0.2}TiO_3$ Thin Film Capacitor.** C. Lin*, S. Xing, and Z. Song, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences	**P1FE-Q-19 Z5 Ferroelectric Thin Films for Embedded Capacitor Applications.** J.-P. Maria*[1], J. Ihlefeld[1], B. Laughlin[1], L. Jimison[1], M. Losego[1], and W. Borland[2], [1]North Carolina State University, Department of Materials Science and Engineering, Raleigh, NC, [2]Dupont iTechnologies, Durham, NC			

P1FE-Q-4 Z8 Deposition of PZT Thin Films by Hybrid Process Comprising Sol-Gel Method and Laser Ablation for Microscanners. Z. Wang*[1], H. Kokawa[1], J. Tsaur[2], and R. Maeda[2], [1]Department of Materials Processing, Graduate School of Engineering, Tohoku University, [2]National Institute of Advanced Industrial Science and Technology	**P1FE-Q-12 Y8 Fabrication and Characterization of Doped (Ba,Sr)TiO3 Thin Films by an Improved sol-gel Method.** Y. Fang, D. Xiao, X. Yuan, G. Yu, W. Lu, and J. Zhu*, Department of Material Science,Sichuan University	*Session P1FC-R* **THIN FILM BULK ACOUSTIC RESONATORS** Chair: E. Eernisse Quartz Dyne Inc.			
P1FE-Q-5 Z9 The Electrical Characteristics of the $(Ba_{0.7}Sr_{0.3})$ $(Ti_{0.9}Zr_{0.1})O_3$ Thin Film using Oxygen Plasma Surface Treatment. K.-H. Chen*, Y.-C. Chen*, C.-H. Chang, and C.-J. Wang, Department of Electrical Engineering	**P1FE-Q-13 Y9 The Influences of Varied Sputtering Conditions on the Piezoelectric Coefficients of AlN Thin Films.** K.-S. Kao*[1], T.-F. Ou[1], Y.-C. Chen[1], and T.-K. Shing[2], [1]Department of Electrical Engineering, National Sun Yat-Sen University, [2]Microsensor Laboratory, Industrial Technology Research Institute	**P1FC-R-1 Q6 Self-Aligned Lateral Field Excitation Film Acoustic Resonator With Very Large Electromechanical Coupling.** W. Pang*[1], H. Yu[1], G. Feng[1], H. Zhang[1], and E. S. Kim[1], [1]University of Southern California, [2]University of Southern California		
P1FE-Q-6 Z10 Preparation and Characterization of $Pb(Zn_{1/3}Nb_{2/3}O_3$-$PbTiO_3$ Thin Films. H. Maiwa*[1] and N. Ichinose[2], [1]Shonan Institute of Technology, [2]Waseda University	**P1FE-Q-14 Y10 Microstructural and X-Ray Diffraction Investigations of Nanostructured Thin Films of ZnO.** H. Bahadur*[1], A. K. Srivastava[1], R. Kishore[1], and S. Chandra[2], [1]National Physical Laboratory, [2]Center for Applied Research in Electronics, Indian Institute of Tecchnology	**P1FC-R-2 Q7 Bias-Enhanced Deposition of AlN Films and Characterization of AlN-Based Film Bulk Acoustic Resonators.** D.-H. Cho*, D.-Y. Kim, B.-H. Kim, J.-B. Lee, J.-P. Jung, and J.-S. Park, Dept. of Electrical Engineering, Hanyang University		
P1FE-Q-7 Z11 Evaluation of Ba0.5Sr0.5TiO3 as a Buffer Layer for Pb0.3Sr0.7TiO3 Thin Films. B. Ni, D. Peng, W. Wu, and Z. Meng*, School of Materials Science and Engineering, Shanghai University	**P1FE-Q-15 Y11 Processing and Property Studies of High Aspect Ratio Ferroelectric Nanostructures.** B. Srowthi*[1], N. Saldhana[2], M. Li[2], T. Mayer[2], V. Gopalan[1], and S. Trolier McKinstry[1], [1]Materials Science and Engineering and Materials Research Institute, [2]Electrical Engineering Department	**P1FC-R-3 Q8 The Method for Integrating FBAR with Circuitry on CMOS Chip.** S. Po Hsun*[1], C. Yung Chung[2], F. Chi Ming[3], C. Pei Yen[4], and C. Pei Zen[3], [1]ERSO,Industrial Technology Research Institute, [2]Institute of Electronic Engineering,Chung Yuan Christian University, [3]Institute of Applied Mecahnicas, National Taiwan University, [4]Chung-Shan Institute of Science and Technology		

	Session U1-C **CONTRAST AGENTS - FUNDAMENTALS** Chair: N. De Jong Erasmus	*Session U2-C* **BEAMFORMING I** Chair: K. Thomenius GE	*Session U3-C* **CMUT MODELING** Chair: Y. Roh Kyungpook National University	*Session U4-C* **BAW RESONATOR ANALYSIS, MAGNETIC INTERACTIONS** Chair: K. Lakin TFR Technologies, Inc.	*Session U5-C* **DMS FILTER** Chair: C. Ruppel EPCOS AG	*Session U6-C* **BAW SENSORS** Chair: J. Vetelino University of Maine
	510AC	**510BD**	**511AB**	**513AB**	**512C-H**	**512A-F**
10:30 a.m.	**U1-C-1 (Invited) Contrast Agents.** P. N. Burns*, Depts. Medical Biophysics and Radiology, University of Toronto	**U2-C-1 Spatial and Temporal Stability of Tissue Induced Aberration.** J. J. Dahl*[1], M. S. Soo[2], and G. E. Trahey[1], [1]Duke University, [2]Duke University Medical Center	**U3-C-1 A Simple Distributed Model for c-MUT.** F. Patat*, D. Certon, and F. Teston, GIP Ultrasons/LUSSI, CNRS FRE 2448	**U4-C-1 Application of a DC Bias to Reduce Acceleration Sensitivity in Quartz Resonators.** M. Patel* and Y.-K. Yong, Rutgers University	**U5-C-1 DMS-Filters with Reduced Resistive Losses.** G. Kovacs* and W. Sauer, EPCOS AG	**U6-C-1 Electrode Optimization for a Lateral Field Excited Acoustic Wave Sensor.** L. A. French[1], C. York*[1], M. Meissner[2], G. Bernhardt[1], M. Pereira da Cunha[1], and J. F. Vetelino[1], [1]Laboratory for Surface Science and Technology, [2]Institute for Micro- and Sensor Systems, Sensors & Measurement Technology Group
10:45 a.m.		**U2-C-2 A New Adaptive Imaging Technique using Optimal Aperture Size.** M.-L. Li* and P.-C. Li*, Department of Electrical Engineering, National Taiwan University	**U3-C-2 Dynamic FEM Analysis of Multiple CMUT Cells in Immersion.** B. Bayram*, G. G. Yaralioglu, A. S. Ergun, and B. T. Khuri-Yakub, Stanford University	**U4-C-2 Dedicated Finite Elements for Electrode Thin Films on Quartz Resonators.** S. Srivastava*[1], Y.-K. Yong[1], M. Tanaka[2], and T. Imai[2], [1]Rutgers University, [2]Seiko Epson, Inc.	**U5-C-2 A Low-Loss and Wide-Band DMS filter using Pitch-Modulated IDT & Reflector Structures.** O. Kawachi*[1], T. Yamaji[1], Y. Kaneda[1], M. Tajima[1], S. Mitobe[1], Y. Ebata[1], S. Inoue[2], and K.-Y. Hashimoto[3], [1]Fujitsu Media Devices Limited, [2]Fujitsu Laboratories Ltd., [3]Department of Electronic and Mechanical Engineering, Chiba University	**U6-C-2 Kinetic Reaction Monitoring of Acidified Milk Gels with a Quartz Resonator.** C. Ould Ehssein*[1], S. Serfaty[1], P. Griesmar[1], E. Caplain[1], L. Martinez[1], and M. Gindre[2], [1]ECIME, [2]LIP

11:00 a.m.	**U1-C-2 Microbubble Surface Modes.** M. Versluis*[1], P. Palanchon[2], D. Goertz[2], S. van der Meer[1], C. T. Chin[2], D. Lohse[1], and N. de Jong[1,2], [1]University of Twente, [2]Erasmus MC	**U2-C-3 High Resolution Ultrasonic Brain Imaging: Non Invasive Adaptive Focusing Based on Twin-Arrays.** F. Vignon*, J.-F. Aubry, M. Tanter, and M. Fink, Laboratoire Ondes et Acoustique, ESPCI, Université Paris VII, U.M.R. C.N.R.S. 7587, 10 rue Vauquelin, 75005 Paris, France	**U3-C-3 Analytical Calculation of Collapse Voltage of CMUT Membrane.** A. Nikoozadeh*, B. Bayram, G. G. Yaralioglu, and B. T. Khuri-Yakub, Stanford University	**U4-C-3 Optimization of Frame-Like Film Bulk Acoustic Resonators for Suppression of Spurious Lateral Modes using Finite Element Method.** J.-H. Lee*, C.-M. Yao, K.-Y. Tzeng, C.-W. Cheng, and Y.-C. Shih, National Center for High-performance Computing	**U5-C-3 (Invited) Evolution of the SAW Transducer for Communication Systems.** D. C. Malocha*, ECE Dept., University of Central Florida	**U6-C-3 Wideband Gelation Monitoring by Quartz Microbalance in Pulse Mode.** E. Caplain*[1], C. Ould Ehssein[1], L. Martinez[1], S. Serfaty[1], P. Griesmar[1], and M. Gindre[2], [1]ECIME, [2]LIP UMR CNRS 7623
11:15 a.m.	**U1-C-3 Air Bubble Oscillations in an Ultrasound Field: Theoretical and Optical Results.** P. Palanchon*[1], A. Bouakaz[1,2], and N. de Jong[1,2], [1]Erasmus Medical Center, [2]Interuniversity Cardiology Institute Netherlands	**U2-C-4 Resolution Improvement of Point Targets through Real-Time Phase Aberration Correction: In Vivo Results.** S. A. McAleavey*, J. J. Dahl, and G. E. Trahey, Duke University	**U3-C-4 Modeling and Design of cMUTs using Higher Order Vibration Modes for Harmonic Imaging.** N. Hall*, J. McLean, and F. L. Degertekin, G.W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology	**U4-C-4 Prediction of BAW Resonator Performance using Experimental and Numerical Methods.** R. Thalhammer*, J. Kaitila, R. Aigner, and S. Marksteiner, Infineon Technologies		**U6-C-4 Use of a Quartz Crystal Resonator to Study the Cell Adhesion Process on Ocular Bioactive Polymers.** D. Le Guillou-Buffello[1], M. Gindre[1], V. Migonney[2], and P. Laugier*[1], [1]Laboratoire d'imagerie parametrique CNRS-UMR 7623, Université Pierre et Marie Curie, [2]Laboratoire de Biomateriaux et Polymeres de Specialite CNRS UMR 7052, Institut Galilée, Université Paris-13
11:30 a.m.	**U1-C-4 Novel Method of Micro Bubble Manipulation by Self Organization in Ultrasonic Wave.** Y. Yamakoshi*, Faculty of Engineering, Gunma University	**U2-C-5 Refocusing Dual-mode Ultrasound Arrays in the Presence of Strongly Scattering Obstacles.** H. Yao and E. Ebbini*, University of Minnesota	**U3-C-5 (Invited) Accurate Modeling of CMUTs.** R. Lerch[1], M. Kaltenbacher*[1], M. Hofer[1], and H. Landes[2], [1]University of Erlangen, [2]WisSoft	**U4-C-5 Excitability of Ultrasound Generated by Magnetostriction.** V. J. Sánchez-Morcillo*, J. Redondo, V. Espinosa, and F. Camarena, Departamento de Física Aplicada, Escuela Politécnica Superior de Gandía, Universidad Politécnica de Valencia	**U5-C-4 Experimental Results for a Longitudinally Coupled 5-IDT Resonator Filter with Distributed Gaps.** J. Meltaus*[1], V. P. Plessky[2], S. Härmä[1,2], and M. M. Salomaa[1], [1]Helsinki University of Technology, Materials Physics Laboratory, [2]GVR Trade SA	**U6-C-5 Sensitivity Enhancement of QCM Biosenor with Polymer Treatment.** M. Atashbar*[1], B. Bejcek[2], A. Vijh[1], and S. Singamaneni[1], [1]Department of Electrical and Computer Engineering, Western Michigan University, [2]Department of Biological Sciences, Western Michigan University
11:45 a.m.	**U1-C-5 Monitoring the Pulse-to-Pulse Evolution of Microbubble Clouds using Light Scattering.** J. Guan and T. Matula*, University of Washington	**U2-C-6 Synthetic Aperture Angular Scatter Imaging.** D. A. Guenther*[1], K. Ranganathan[1], K. W. Rigby[2], and W. F. Walker[1], [1]University of Virginia, [2]General Electric		**U4-C-6 Simulation of Magnetostatic Soliton Generation and Propagation in Thin YIG Films using Equivalent Circuit Technique.** T. Koike*[1], R. Marcelli[2], and G. Bartolucci[3], [1]Tamagawa University, [2]CNR-PSM, Rome Section, Microwave Microsys-tems Technology, [3]University of Roma "Tor Vergata"		**U6-C-6 Quartz Thickness Shear Mode Resonator as a Functional Biosensor for Monitoring Living Cell Behavior under Controlled Biological Environments.** F. Li*[1], Q.-M. Wang[1], and J. H.-C. Wang[2], [1]University of Pittsburgh, [2]University of Pittsburgh

	Session FE1-C **THIN FILM II** Chair: N. Setter EPFL			*Session FC1-C* **MINIATURE ATOMIC CLOCKS** Chair: E. Rubiola LPMIA	*Session FC2-C* **MANUFACTURING TECHNOLOGY** Chair: M. Nusbaum Saronix Corporation	
	513CD			**511CF**	**511DE**	
10:30 a.m.	**FE1-C-1 Improvement of Ultra-Thin Pb(Zr,Ti)O3 Films by Controlling Interface with Novel Metal Electrode for High-Density Ferroelectric Memory Application by MOCVD.** J.-M. Koo*, S. Kim, S. Shin, C. R. Cho, J. K. Lee, J. H. Lee, S. H. Park, Y. J. Cho, and Y. Park, Samsung Advanced Institute of Technology			**FC1-C-1 (Invited) A Microfabricated Atomic Frequency Reference.** S. Knappe*[1], L.-A. Liew[2], P. Schwindt[1,3], V. Shah[1,3], J. Moreland[2], L. Hollberg[1], and J. Kitching[1], [1]Time and Frequency Division, National Institute of Standards and Technology, [2]Electromagnetics Division, National Institute of Standards and Technology, [3]Department of Physics, University of Colorado	**FC2-C-1 (Invited) Lattice Damages in Quartz Crystal Blanks — Influence on the Resonator Properties and on the X-Ray Measurement.** E. Seydel*[1], H. Berger[2], G. Hildebrandt[2], and H. Bradaczek[2], [1]VITA-CHEMIE GmbH, [2]EFG-International	
10:45 a.m.	**FE1-C-2 Enhanced Retention Property of Pb(Zr,Ti)O3 Thin Film By Applying PbTiO3 Seed Layer.** B.-J. Bae*, K.-M. Lee, S.-D. Nam, J.-E. Lim, C.-M. Lee, S.-O. Park, U.-I. Chung, and J.-T. Moon, Process Development Team, Semiconductor R&D Division, Samsung Electronics Co					

11:00 a.m.	**FE1-C-3 Artificial Ferroelectricity in Paraelectric Superlattices.** T. Tsurumi*, T. Harigai, D. Tanaka, H. Kakemoto, and S. Wada, Tokyo Institute of Technology			**FC1-C-2 Practical Realization of a Passive Coherent Population Trapping Frequency Standard.** J. Vanier*[1,2], M. Levine[1], S. Kendig[1], D. Janssen[1], and M. Delaney[1], [1]Kernco Inc, [2]Physics Dept. University of Montreal	**FC2-C-2 The Technique Development of Crystals and Oscillators in China and their Market Situation.** W. Zhou*, H. Wang, J. Yu, and L. Bai, Xidian University	
11:15 a.m.	**FE1-C-4 Epitaxial $BiScO_3$ Thin Films.** S. Trolier-McKinstry*[1], M. Biegalski[1], D. Schlom[1], J. Wang[2], I. Takeushi[2], and R. Ramesh[2], [1]Materials Research Institute, Penn State, [2]University of Maryland			**FC1-C-3 Narrow Linewidth Coherent Population Trapping Signals in Small Vapor Cells for CHIP Scale Atomic Clock Application.** M. Zhu*[1], L. S. Cutler[1], J. E. Berberian[1], J. F. DeNatale[2], P. A. Stupar[2], and C. Tsai[2], [1]Agilent Laboratories, [2]Rockwell Scientific Co.	**FC2-C-3 Multistage Chemical Etching for High-Precision Adjustment of Resonance Frequencies in UHF Fundamental Quartz Resonators.** H. Iwata*[1,2], [1]Toyo Communication Equipment Co., Ltd., [2]Graduate School of Engineering, Tohoku University	
11:30 a.m.	**FE1-C-5 Low Temperature AlN Thin Films Growth for Integrated Circuit Compatible Surface and Bulk Acoustic Wave Devices.** M. B. Assouar*, O. Elmazria, M. El Hakiki, and P. Alnot, LPMI UMR 7040 CNRS, Université Henri Poincaré			**FC1-C-4 All Optical Atomic Clock on a Chip.** D. Strekalov, A. Savchenkov, N. Yu, A. Matsko, and L. Maleki*, Jet Propulsion Laboratory	**FC2-C-4 Process Monitoring Via Self-Sensing Transducers.** J. Wallaschek*[1], M. Brökelmann[1], and H. Hesse[2], [1]Heinz Nixdorf Institut, University of Paderborn, [2]Hesse & Knipps GmbH	
11:45 a.m.	**FE1-C-6 Effect of 3-D State of Strain on the Elasto-Dielectric Properties of Paraelectric BST Thin Films on $NdGaO_3$.** W. K. Simon*, E. K. Akdogan, and A. Safari, Rutgers University - Dept. of Ceramic and Materials Engineering					

	Session U1-D **CONTRAST AGENTS - CHARACTERIZATION** Chair: P. Burns University of Toronto	*Session U2-D* **VASCULAR ELASTICITY I** Chair: K. Nightingale Duke University	*Session U3-D* **CMUT APPLICATIONS** Chair: C. Daft Sensant Corp.	*Session U4-D* **THIN FILM BAW RESONATORS AND FILTERS** Chair: J. Vig US Army	*Session U5-D* **SAW DEVICES AND PROPAGATION** Chair: P. Smith McMaster University	
	510AC	**510BD**	**511AB**	**513AB**	**512C-H**	
1:30 p.m.	**U1-D-1 New Contrast Imaging Method using Double Frequency Exposure.** A. Bouakaz*[1,2] and N. de Jong[1,2], [1]Erasmus Medical Center, [2]Interuniversity Cardiology Institute Netherlands	**U2-D-1 Cinical Evaluation of 3D Intravascular Ultrasound Palpography for Vulnerable Plaque Detection.** A. F. W. van der Steen*[1,2], J. A. Schaar[1,2], F. Mastik[1], C. L. de Korte[1], and P. W. Serruys[1], [1]Biomedical Engineering Thorax Centre Erasmus Medical Centre Rotterdam The Netherlands, [2]Interuniversity Cardiology Institute of the Netherlands	**U3-D-1 (Invited) Medical Imaging with Capacitive Micromachined Ultrasound Transducer (cMUT) Arrays.** D. M. Mills*, GE Global Research Center, Niskayuna, NY	**U4-D-1 Wide Bandwidth Thin Film BAW Filters.** K. M. Lakin*, TFR Technologies, Inc.	**U5-D-1 Performances of Short Reflectors on 128° $LiNbO_3$.** S. Lehtonen*[1], V. P. Plessky[1,2], C. S. Hartmann[3], and M. M. Salomaa[1], [1]Helsinki University of Technology, [2]GVR Trade SA, [3]RF SAW, Inc.	
1:45 p.m.	**U1-D-2 The Resonance Frequency of Individual Bubbles of Sonovue.** S. van der Meer*[1], M. Versluis[1], C. T. Chin[2], D. Lohse[1], and N. de Jong[1,2], [1]University of Twente, [2]Erasmus MC	**U2-D-2 Assessment of Vulnerable Coronary Plaque by Intravascular Elasticity Imaging.** T. Shiina*[1], N. Nitta[2], H. Endo[1], and M. Yamagishi[3], [1]Institute of Information Sciences and Electronics, Univ. of Tsukuba, [2]Institute for Human Science and Biomedical Engineering, National Institute of Advanced Industrial Science and Technology, [3]National Cardiovascular Center		**U4-D-2 Narrow Band Bulk Acoustic Wave Resonators and Filters.** H.-P. Loebl*[1], R. F. Milsom[1], C. Metzmacher[1], A. Tuinhout[2], and P. Lok[2], [1]Philips Research Laboratories, [2]Philips Discrete Semiconductors, MSI	**U5-D-2 Calculation of the SAW-Induced Stress Distributions in an Electrode of a SAW-Device on $LiTaO_3$.** F. Kubat*[1], W. Ruile[2], U. Rösler[2], and L. Reindl[1], [1]University of Freiburg, [2]Epcos AG	

2:00 p.m.	**U1-D-3 Experimental and Theoretical Contrast Agent Microbubble Collapse Threshold.** A. Y. Ammi*[1], J. Mamou[2], S. L. Bridal[1], and W. D. O'Brien, Jr[2], [1]Laboratoire d'Imagerie Parametrique CNRS UMR 7623, [2]Bioacoustics Research Laboratory, Department of Electrical and Computer Engineering, University of Illinois	**U2-D-3 Young's Modulus Reconstruction for Assessing Vulnerable Atherosclerotic Plaque Composition *In Vivo*.** R. A. Baldewsing*[1], J. A. Schaar[1,2], F. Mastik[1], C. W. J. Oomens[3], and A. F. W. van der Steen[1,2], [1]Biomedical Engineering, Thoraxcenter, Erasmus Medical Center Rotterdam, [2]Interuniversity Cardiology Institue of the Netherlands (ICIN), [3]Materials Technology, Biomedical Engineering, Eindhoven University of Technology	**U3-D-2 Integrated Ultrasonic Imaging Systems Based on CMUT Arrays: Recent Progress.** O. Oralkan*[1], X. Zhuang[1], I. O. Wygant[1], D. Yeh[1], A. Nikoozadeh[1], A. S. Ergun[1], M. Karaman[2], and B. T. Khuri-Yakub[1], [1]E. L. Ginzton Laboratory, Stanford University, [2]Isik University	**U4-D-3 Single-To-Balanced Filters for Mobile Phones using Coupled Resonator BAW Technology.** G. G. Fattinger*, J. Kaitila, W. Nessler, and R. Aigner, Infineon Technologies AG	**U5-D-3 A Novel Piezoelectric Interdigited Transducer for the Excitation of High Frequency Surface Acoustic Wave** W. Daniau*[1], A. K. S. Kumar[2], P. Paruch[2], D. Marré[3], L. Pellegrino[3], T. Tybell[4], S. Ballandras[1], and J.-M. Triscone[2], [1]Institut FEMTO-ST, [2]DPMC, University of Geneva, [3]INFM, Research Unit of Genoa, [4]Department of Physical Electronics	
2:15 p.m.	**U1-D-4 Acoustic Detection of Controlled LIOB Bubble Creation in Tissue-Mimicking Gelatin Phantoms.** C. Tse*[1], M. J. Zohdy[1], J. Y. Ye[2], T. B. Norris[2], L. P. Balogh[3], K. W. Hollman[1], and M. O'Donnell[1], [1]University of Michigan, Biomedical Engineering Department, [2]University of Michigan, Center for Ultrafast Optical Science, [3]University of Michigan, Center for Biologic Nanotechnology	**U2-D-4 Non-Invasive High-Frequency Vascular Ultrasound Elastography: In-vitro Phantom Investigations.** R. L. Maurice*[1], M. Daronat[1], S. F. Foster[2], and G. Cloutier[1], [1]University of Montreal Hospital, [2]Sunny Brook and Women's College Health Sciences Centre	**U3-D-3 A cMUT Linear Array Used as Echographic Probe: Fabrication, Characterization, and Images.** G. Caliano*[1], R. Carotenuto[3], E. Cianci[2], V. Foglietti[2], A. Caronti[1], and M. Pappalardo[1], [1]Universitá degli Studi Roma Tre - Dip. di Ingegneria Elettronica, [2]Istituto di Fotonica e Nanotecnologie - CNR, [3]Universitá degli Studi "Mediterranea" di Reggio Calabria - Dipartimento I.M.E.T.	**U4-D-4 A Novel Design Technique & the Demonstration of a 2.0 mm x 1.6 mm Chip-on-Board PCS Tx Band Pass Filter with Steep Low and High Frequency Rolloffs Having High Rejection in the PCS Rx & Image Bands.** D. Feld*, P. Bradley, B. Yu, and D. Lee, Agilent Technologies	**U5-D-4 Fast FEM/BEM Computation of SAW Harmonic Admittance and Slowness Curves.** V. Laude*[1], A. Reinhardt[1], S. Ballandras[1], A. Khelif[1], and M. Solal[2], [1]FEMTO-ST, [2]TEMEX	
2:30 p.m.	**U1-D-5 (Invited) U2: Combined Ultrasonic Microscopy and Ultrafast Optics for Molecular Imaging and Therapy.** M. O'Donnell*[1], C. Tse[1], M. Zohdy[1], T. Erpelding[1], and K. Hollman[1], [1]Biomedical Engineering Department, [2]Electrical Engineering & Computer Science Department, [3]Internal Medicine Department	**U2-D-5 Estimation of 2D Displacement and Strain Field in High Frequency Ultrasound Based Elastography.** M. Vogt*, C. Perrey, and H. Ermert, Institute of High Frequency Engineering, Ruhr-Universitaet Bochum, Germany	**U3-D-4 High-Frequency CMUT Arrays for High-Resolution Medical Imaging: Preliminary Results.** O. Oralkan*, S. T. Hansen, A. S. Ergun, and B. T. Khuri-Yakub, E. L. Ginzton Laboratory, Stanford University	**U4-D-5 3.8mm x 3.8mm PCS-CDMA Duplexer Incorporating Thin Film Resonator Technology.** H. Heinze*, E. Schmidhammer, C. Diekmann, and T. Metzger, EPCOS AG	**U5-D-5 SAW Delay Lines on Single Crystal GaN Films on Si and Sapphire: Acoustic Parameter Extraction.** A. Peczalski*, J. Detry, P. Bauhahn, V. Buiculescu, M. Gologanu, and C. Cobianu, Honeywell	
2:45 p.m.		**U2-D-6 Arterial Elastic Modulus Reconstruction from *In-vivo* Strain Image using Arterial Pressure Equalization.** K. Kim*[1], W. F. Weitzel[2], J. M. Rubin[3], H. Xie[1], X. Chen[1], and M. O'Donnell[1], [1]Department of Biomedical Engineering, University of Michigan, [2]Department of Internal Medicine, University of Michigan, [3]Department of Radiology, University of Michigan	**U3-D-5 CMUT Ring Arrays for Forward-looking Intravascular Imaging: Preliminary Results.** O. Oralkan*, S. T. Hansen, A. S. Ergun, and B. T. Khuri-Yakub, E. L. Ginzton Laboratory, Stanford University	**U4-D-6 New Electrode Materials for Low-loss and High-Q FBAR Filters.** T. Yokoyama*[1], T. Nishihara[1], S. Taniguchi[1], M. Iwaki[1], T. Miyashita[2], and Y. Satoh[1], [1]Fujitsu Laboratories Ltd., [2]Fujitsu Media Devices Limited	**U5-D-6 RF-SAW Filters on Pyro-Suppressed Wafers.** K. A. Vetelino*, P. Welsh, M. Aguirre, and B. P. Abbott, Sawtek Inc.	

	Session FE3-D **PIEZOELECTRIC DEVICES** Chair: A. Akdogan Rutgers University	*Session FE1-D* **SINGLE CRYSTALS** Chair: J. Yamashita Toshiba Corporation		*Session FC1-D* **ENHANCING MICROWAVE STANDARD PERFORMANCE** Chair: E. Burt JPL	*Session FC2-D* **APPLICATIONS, JITTER, AND MINIATURE OSCILLATORS** Chair: M. Frerking Innovative Technology Products	
	512A-F	**513CD**		**511CF**	**511DE**	
1:30 p.m.	**FE3-D-1 (Invited) Theoretical Study of the Influence of the Electromechanical Constants and Non Linear Mechanical Losses of Various Piezoelectric Materials on their Performances in Power Transducers.** P. Gonnard*, LGEF INSA	**FE1-D-1 (Invited) Stress Dependent Electromechanical Properties of High Coupling Crystals.** A. Amin*, Naval Sea Systems Command		**FC1-D-1 Large Enhancement of CPT Signals in Frequency Standards.** Y.-Y. Jau*[1], E. Miron[2], A. Post[1], N. Kuzma[1], and W. Happer[1], [1]Princeton University, [2]NRCN	**FC2-D-1 Mechanically-Coupled Micromechanical Resonator Arrays for Improved Phase Noise.** S. Lee* and C. T.-C. Nguyen, University of Michigan	
1:45 p.m.				**FC1-D-2 High Pressure CPT Signals using Intensity Modulated Light.** A.B. Post*, Y.-Y. Jau, N.N. Kuzma, M.V. Romalis, and W. Happer, Princeton University	**FC2-D-2 The Calculation of Frequency Source Requirements for Digital Communications Systems.** V. S. Reinhardt*, Boeing Satellite Systems	

2:00 p.m.	**FE3-D-2 Characterization and Modeling of Local Deformation Response in Stress-Biased Piezoelectric Actuators.** N. Navapan[1], R. Schwartz[1], and D. Stutts*[2], [1]University of Missouri-Rolla, [2]University of Missouri-Rolla	**FE1-D-2 Broadband, High Power Sonar Arrays using Ferroelectric Single Crystals.** H. C. Robinson*[1], J. M. Powers[2], and M. B. Moffett[3], [1]NUWC Division Newport, [2]EDO Corporation, [3]Anteon Corporation		**FC1-D-3 Buffer Gas Experiments in Mercury (Hg^+) Ion Clocks.** S. K. Chung*, J. D. Prestage, R. L. Tjoelker, and L. Maleki, Jet Propulsion Laboratory	**FC2-D-3 The Performance of the Anti-Jitter Circuit with Enhanced Feedback ('ef-ajc').** M. J. Underhill*[1,2] and J. Brodrick[2], [1]University of Surrey, [2]Toric Limited	
2:15 p.m.	**FE3-D-3 Limitation of the Degradation Effect in Piezoelectric Multilayer Actuators with Ceramic Layer Thickness Below 50 µm.** M. Laurent*[1], H. Bödinger[1], T. Steinkopff[1], K. Lubitz[1], C. Schuh[1], S. Wagner[2], M. J. Hoffmann[2], H. Murmann-Biesenecker[3], and A. J. Schmid[3], [1]SIEMENS AG CT MM2, [2]Institute for Ceramics in Mechanical Engineering, [3]Argillon GmbH	**FE1-D-3 Role of the Mn-Doping on Structural and Electromechanical Properties of 0.93PZN-0.07PT Single Crystals.** C. Augier*[1,2], M. Pham Thi[1], H. Dammak[2], P. Gaucher[2], and O. Lacour[3], [1] Thales Research & Technology France, [2]Ecole Centrale de Paris, [3]Thales Underwater Systems		**FC1-D-4 Laser-Pumped, Vapor-Cell Atomic Clock Employing a High Buffer-Gas Pressure Resonance Cell.** J. Camparo*[1], J. Coffer[1], and J. Townsend[1,2], [1]The Aerospace Corporation, [2]University of Southern California	**FC2-D-4 Direct Mounting of Quartz Crystal on a CMOS PLL Chip.** H. Kim*[1], J. Lim[2], K. Choi[2], D. Kenny[3], and T. Jackson[1], [1]Department of Electrical Engineering, The Pennsylvania State University, [2]Department of Computer Science & Engineering, The Pennsylvania State University, [3]Saronix East Development Center	
2:30 p.m.	**FE3-D-4 Low-frequency, Highly-sensitive Magneto-electric Laminate Composite for Anomaly Detection.** D. Viehland*, S. Dong, and J. F. Li, Virginia Tech	**FE1-D-4 Application of Pb[$(Zn_{1/3}Nb_{2/3})_{0.91}Ti_{0.09}$]$O_3$ Single Crystal with Giant k_{31} Mode to Piezoelectric Bimorph.** T. Ogawa*, M. Sakai, and T. Yamada, Shizuoka Institute of Science and Technology		**FC1-D-5 (Invited) Methods for Reducing Microwave Resonance Asymmetry in Coherent-Population-Trapping Based Frequency Standards.** L. S. Cutler*, M. Zhu, and J. E. Berberian, Agilent Laboratories	**FC2-D-5 Jitter Analysis of Digital Frequency Dividers in Communication Systems.** A. Fahim*, Qualcomm Inc.	
2:45 p.m.	**FE3-D-5 Temperature Dependance of a Piezoelectric Sensor.** E. P. Gnanamanickam*[1], J. P. Sullivan[1], and J. Brosch[2], [1]School of Aeronautics and Astronautics, Purdue University, [2]Piezotechnologies	**FE1-D-5 Observation of Hierarchial Domain Structures in PMN-x\%PT Crystals by Piezo-force Microscopy.** D. Viehland*, F. M. Bai, and J. F. Li, Virginia Tech			**FC2-D-6 2.4 and 2.5 GHz Miniature, Low-Noise Oscillators Based on Surface Transverse Wave Resonators and a SiGe Sustaining Amplifier.** C. E. Hay*[1], R. J. Kansy[2], and M. E. Harrell[1], [1]Q-DOT, Inc., [2]RF Monolithics, Inc.	

Session P2FC-A
PHYSICAL SENSORS
Chair: R. Lucklam
University of Magdeburg

P2FC-A-1 O3 Development of SAW Pressure Sensor using ZnO/Si Structure. A. Talbi*, F. Sarry, L. Lebrizoual, O. Elmazria, and P. Alnot, Laboratoire de Physique des Milieux Ionisés et Applications

P2FC-A-2 O5 Measurement of Silicone Rubber Hardness by Use of a Quartz-Crystal Tuning-Fork Tactile Sensor. H. Itoh*, K. Mihara, Y. Yamada, and K. Ishikawa, Faculty of Engineering, Shinhsu University

P2FC-A-3 O7 Experimental Study of Quartz Crystal Gyro Sensor using Double-Ended Tuning Fork Resonator. K. Sato*[1], A. Ono[1], and Y. Tomikawa[2], [1]Toyo Communication Equipment Co., Ltd., Japan, [2]Yamagata University, Japan

P2FC-B-4 O8 A Method for the Fast Analysis of Vibrations of Mindlin First-order Plates for Resonator Design Applications. J. Wang*, T. Bian, and W. Zhao, Department of Engineering Mechanics and Material Science, School of Engineering, Ningbo University

P2FC-B-5 O9 Optimization of the SAW Filter Design by Immune Algorithm. S. Goto* and T. Kawakatsu, Murata Mfg. Co., Ltd.

Session P2FC-C
CRYSTAL AND MICROWAVE RESONATORS
Chair: B. Oulmet
LCEP

P2FC-C-1 P2 Proposal of the Frequency Measurement Method for GHz Band Crystal Units. M. Koyama* and T. Sato, Nihon Dempa Kogyo Co., Ltd.

P2FC-C-6 P7 Experimental Study on Mode-Coupling Strength in At-Cut Quartz Resonators with Multi-Stepped Bi-Mesa Structure. S. Goka*, Y. Mase, H. Sekimoto, Y. Watanabe, and T. Sato, Tokyo Metropolitan University

P2FC-C-7 P1 Experimental Study of Temperature Effects in Vibrating Beam and Thickness-Shear Resonators of GaPO4 Machined by Ultrasound Milling. L. Delmas, F. Sthal*, E. Bigler, J. J. Boy, and R. Bourquin, FEMTO-ST, UMR CNRS 6174, Laboratoire de Chronométrie, Electronique et Piézoélectricité, Ecole Nationale Supérieure de Mécanique et des Microtechniques

Session P2FE-D
SINGLE CRYSTAL
Chair: S. Rhee
Fraunhofer - IBMT

P2FE-D-1 U10 Growth of Pb(In1/2Nb1/2)O3-PbTiO3 Crystals by the Solution Bridgman Method. Z. Duan, G. Xu*, X. Wang, and D. Yang, Shanghai Institute of Ceramics

P2FE-D-6 V12 Phase Transformations After a Prior Electric Field Poling in $Pb(Mg_{1/3}Nb_{2/3})_{1-x}Ti_xO_3$ Crystals. F.-T. Wang*[1], C. Tu[1], R. R. Chien[2], and V. H. Schmidt[2], [1]Dept. of Physics, Fu Jen University, [2]Dept. of Physics, Montana State University

P2FE-D-7 V11 Phase Transition Behavior for PMN-PT Single Crystals in the Morphotropic Phase Boundary Region. A. Sehilioglu[1], P. D. Han[2], and D. A. Payne[1], [1]University of Illinois, [2]H.C. Materials Corp., Urbana, IL

Session P2FE-E
PIEZOELECTRIC MATERIALS AND DEVICES
Chair: E. Prasad
BM HiTech

P2FE-E-1 V1 Dielectric Properties of The SFE (Pb1-xLax)(ZryTi1-y)1-x/4O3 Ceramics Under Hydrostatic Pressures and DC Bias Field. B. Zhang, Z. Xu, Y. Feng, and J. Wang, Electronic Material Research Laborator (EMRL),Key Laboratory of Education Ministry

P2FE-E-6 X1 Enhanced Piezoelectric Properties of Potassium Niobate Single Crystals by Domain Engineering. S. Wada[1], K. Muraoka[1], H. Kakemoto[1], T. Tsurumi*[1], and H. Kumagai[2], [1]Tokyo Institute of Technology, [2]Asahi Techno Glass

P2FE-E-7 X2 $(K,Na)NbO_3$-$SrTiO_3$ Lead-Free Relaxors. J. Holc*, V. Bobnar, M. Hrovat, J. Bernard, B. Malic, and M. Kosec, Jozef Stefan Institute

P2FE-E-8 X3 A High-Power Piezoelectric Transformer using in DC/DC Converters. J. Du*, J. Hu, and K. J. Tseng, Nanyang Technological University

P2FE-E-9 X4 Designing a Radial Mode Laminated Piezoelectric Transformer for High Power Applications. P. Laoratanakul*[1], S. Manuspiya[2], and K. Uchino[2], [1]National Metal and Materials Technology Center (MTEC), [2]International Center for Actuators and Transducers (ICAT)

P2FE-E-14 V6 Complex Rare-Earth Substituted Lead Titanate Piezoceramics. E. Dimitriu*[1], F. Craciun[2], P. Verardi[2], V. Ciupina[1], and G. Prodan[1], [1]Interdisciplinary Research Institute for Micro and Nanostructure, University "Ovidius", [2]Istituto di Acustica "O.M. Corbino"

Session P2FC-F
PIEZOELECTRIC MATERIALS
Chair: E. Eernisse
Quartzdyne Inc

P2FC-F-1 P8 Piezoelectricity in Poled Silica Films by Super-Lattice Structure with Tetravalent Metal Dopants. S. Noge*, M. Shiroishi, and T. Uno, Kanagawa Institute of Technology

P2FC-F-2 P9 Influence Electron and γ-Irradiation on Piezoelectric and Elastic Properties of Langasite Crystals. Y. Pisarevsky*[1], V. Skuratov[2], A. Blagov[1], and B. Mill[1], [1]Institute of Crystallogrphy RAS, [2]Joint Institute of Nuclear Reserch

Session P2FC-B
RESONATOR ANALYSIS AND MODE IMAGING
Chair: E. Eernisse
Quartzdyne Inc

P2FC-C-2 P3 Cavity Designs for a Space Hydrogen Maser. J. G. Hartnett*[1], M. E. Tobar[1], P. Stanwix[1], T. Morikawa[2], D. Cross[3], and O. Piquet[3], [1]School of Physics, The University of Western Australia, [2]Communications Research Laboratory, Japan, [3]IRCOM, France

P2FE-D-2 U11 Low Symmetry Mono-Domain $Pb[(Zn_{1/3}Nb_{2/3})_{0.91}Ti_{0.09}]O_3$ Single Crystal with Giant Electromechanical Coupling Factor of k_{31} Mode. T. Ogawa*, M. Sakai, and T. Yamada, Shizuoka Institute of Science and Technology

P2FE-E-2 V7 Phenomenological and Structual Studies of the Morphotropic Phase Boundary in Lead Zinc Niobate (PZN)-Lead Titanate(PT). T. Yamamoto*, H. Oka, and H. Okino, National Defense Academy

P2FE-E-10 V2 Driving of 35W (T5) Fluorescent Lamp by the Electronic Ballast using Piezoelectric Transformer. E. Jang*[1], L. Hwang[1], J. Yoo[1], K.-H. Chung[1], I. S. Lee[2], Y. Jeong[3], and H. Jeong[4], [1]Semyung Uiversity, [2]Chungju University, [3]KEPRI, [4]Juseong College

P2FC-F-3 P10 Silver Tantalum Niabote, $Ag(Ta_{0.5}Nb_{0.5})O_3$, Thin Films on (111)Pt/Ti/SiO_2/(100)Si and (001)$SrRuO_3$ / (001)$LaAlO_3$ Substrates by Chemical Solution Deposition. M. B. Telli*[1], M. Biegalski[1], S. Trolier-McKinstry[1], D. I. Woodward[2], and I. M. Reaney[2], [1]Materials Research Institute, The Pennsylvania State University, [2]Department of Engineering Materials, University of Sheffield

P2FC-B-1 O2 Vibration Modes Analysis by X-ray Topography in Quartz and Langasite Resonators. I. Mateescu*[1], B. Capelle[2], J. Detaint[2], G. Johnson[3], and C. Bran[1], [1]National Institute of Materials Physics, [2]University "Pierre et Marie Curie", [3]Sawyer Research Products

P2FC-C-3 P4 Dual Mode Crystal Resonator With Lateral Field Excitation. A. Lepetaev and A. Kosykh*, Omsk State Technical University

P2FE-D-3 U12 TGS Crystals with Non-Uniform Distribution of the Impurity. V. N. Shut* and I. F. Kashevich, Institute of Technical Acoustics NAS Belarus

P2FE-E-3 V8 Harmonic Analysis of the Polarization and Strain Response in Lead Zirconate Titanate-based Ceramics. S. Srilomsak and W. A. Schulze*, Alfred University

P2FE-E-11 V3 The Transverse Strain Response of Electroactive Polymer Actuators. G. Yang*[1], W. Ren[1], B. K. Mukher[1], and J. P. Szabo[2], [1]Department of Physics, Royal Military College of Canada, [2]DRDC Atlantic

P2FC-F-4 P11 Measurements of the Viscosity Tensor Components of Langatate. G. Mansfeld*[1], S. Alekseev[1], V. Kludzin[2], Y. Pisarevskii[3], and V. Veretin[1], [1]Institute of radioengineering and electronics RAS, [2]St.Petersbug State University of aerospace instrumentation, [3]Institute of Crystallografy RAS

P2FC-B-2 O4 An Analysis Of Lateral Field Excitation Convex Piezoelectric Resonators Of Thickness-Shear Vibrations. S. S. Nedorezov[1], O. Y. Shmaliy*[1], and Y. S. Shmaliy*[2], [1]Ukrainian Engineering-Pedagogical Academy, [2]Guanajuato University

P2FC-C-4 P5 Thermal Transient Effect of Y-Cut Langanite and Langatate. Y. Kim*, US Army CERDEC

P2FE-D-4 U13 Growth of Silver Lithium Niobate Single Crystals and Their Piezoelectric Properties. S. Wada, A. Saito, S. Uraki, H. Kakemoto, and T. Tsurumi*, Tokyo Institute of Technology

P2FE-E-4 V9 The Isovalent Substitution at B-site of Modified $Bi_{0.5}Na_{0.5}TiO_3$ Piezoelectrics. A. Thanaboonsombut, S. Danwittayakul, P. Setasuwan*, and N. Vaneesorn, National Metal and Materials Technology Center

P2FE-E-12 V4 Electroactive Polymer Based Microfluid Pump. F. Xia, S. Tadigadapa, and Q. M. Zhang*, The Pennsylvania State University

P2FC-F-5 P12 Changes in Defects under External Influence in Langasite. A. Dubovskiy*[1], G. Kuz'micheva[2], E. Domoroshchina[1], S. Stepanov[1], and A. Tsegleev[1], [1]Russian Research Institute for Mineral Syntesis, [2]Lomonosov State Academy of Fine Chemical Technology

P2FC-B-3 O6 In-Plane Mode Shape Visualization of Piezoelectric Resonators using Stroboscopic Laser Irradiation. Y. Watanabe*, K. Tsuno, S. Goka, T. Sato, and H. Sekimoto, Graduate School of Engineering, Tokyo Metropolitan University

P2FC-C-5 P6 Study of Frequency-Temperature Characteristics of Quartz with Various Cut Angle and Metal Thickness of Electrode. M.-H. Chung*[1], S. T. Wang[1], and A. C. S. Huang[2], [1]Department of Electrical Engineering, I-Shou University, [2]ftech Corporation

P2FE-D-5 V13 Pyroelectric Properties of (1-x)$Pb(Mg_{1/3}Nb_{2/3})O_3$-x$PbTiO_3$ and (1-x)$Pb(Zn_{1/3}Nb_{2/3})O_3$-x$PbTiO_3$ Single Crystals Measured using a Dynamic Method. M. Davis*, D. Damjanovic, and N. Setter, Swiss Federal Institute of Technology-EPFL

P2FE-E-5 V10 Piezoelectric Relaxation and Large Anisotropy of Modified Lead Titanate Ceramics. A. Barzegar*, D. Damjanovic, and N. Setter, Swiss Federal Institute of Technology Lausanne - EPFL

P2FE-E-13 V5 Development of Bimorph Vibrator using Lead Free BNT Piezoelectric Film Deposited by Hydrothermal Method. T. Hasegawa[1], N. Kawashima[1], M. Ishikawa[1,2], M. Kurosawa[2], and S. Takeuchi*[1], [1]Toin University of Yokohama, [2]Tokyo Institute of Technology

P2FC-F-6 P13 Radiation Induced Glow Peaks in Ge-Doped Cultured Quartz Crystals. H. Bahadur*, National Physical Laboratory

P2FC-F-7 Q13 Point Defects in Quartz Crystals and Their Radiation Response—A Review. H. Bahadur*, National Physical Laboratory

Session P2U-H
CONTRAST AGENTS II
Chair: N. De Jong
Erasmus University

Session P2U-I
BEAMFORMING II
Chair: J. Hossack
University of Virginia

P2U-I-8 F8 An Alternative Frequency Domain Beamforming. F. Bertora*[1], C. Parodi[1], P. Pellegretti[1], A. Questa[1], and A. Trucco[2], [1]Esaote, [2]Dept. of Biophysical and Electronic Engineering, University of Genoa

P2U-J-6 G12 Generation of Regional Strain Inside Object using Acoustic Radiation Forces. Y. Nishio*, N. Hashimoto, H. Hasegawa, and H. Kanai, Graduate School of Engineering, Tohoku University

P2U-K-6 G8 Accuracy of the Resonance Ultrasound Method in Determination of the Acoustic Phase Shifts in Plastic Plates at Oblique Angles of Incidence. J. Aarnio*[1], G. T. Clement[2], and K. Hynynen[1,2], [1]Department of Applied Physics, University of Kuopio, [2]Department of Radiology, Harvard Medical School, Brigham and Women's Hospital

Session P2FC-G
MANUFACTURING TECHNOLOGY
Chair: B. Tysinger
Agilent Technologies

P2U-H-1 E7 Gaussian Integration Technique to Predict Backscatter Characteristics from Multiple Microbubbles with Wide Size Distribution using a Modified Rayleigh-Plesset Model. H. Zheng*[1] and R. Shandas[1,2], [1]University of Colorado at Boulder, [2]The Children's Hospital, Division of Cardiology

P2U-I-1 F1 Very Small Size Beamformer with 1.5bit ADCs for Hand-Held Ultrasound Imaging Systems. J.-J. Kim* and T.-K. Song, Center for Medical Solutions Research, Dept. of EE, Sogang University

P2U-I-9 F9 Pre-Amplifier Arrays for Intra-Oral Ultrasound Probe Receiving Electronics. L. L. Lay*, S. J. Carey, C. M. Gregory, and J. V. Hatfield, UMIST

P2U-J-7 G11 Mechanical Characterization of the Vitreous Body with Acoustic Radiation Force. F. Viola*[1], C. Toth[2], and W. Walker[1], [1]University of Virginia, [2]Duke University

P2U-K-9 G9 Evaluation of Ultrasonic Texture and Spectral Parameters for Coagulated Tissue Characterization. S. Siebers*[1], M. Schwabe[1], U. Scheipers[1], C. Welp[2], J. Werner[2], and H. Ermert[1], [1]Institute of High Frequency Engineering, Ruhr-University Bochum, [2]Institute of Biomedical Engineering, Ruhr-University Bochum

P2FC-G-1 O10 Quartz Resonator of Plano-Plano Type in Two-Steps Shape. Y. Nagaura*[1], K. Nagaura*[1], and Z.-I. Nagaura*[1,2], [1]NagauraLab., [2]Kyushu University

P2U-H-2 E8 Multiple Scattering of Ultrasound in Suspensions of Contrast Agent Particles: Simulations and Experimental Results. E. Stride*, Department of Mechanical Engineering, University College London

P2U-I-2 F2 A Method for Simultaneous Multi-Zone Focusing Along Multiple Scan Lines using Orthogonal Codes and Its Application to Multi-Dimensional Array Imaging. B.-H. Kim* and T.-K. Song, Center for Medical Solutions Research, Electronic Engineering, Sogang University

Session P2U-J
TISSUE CHARACTERIZATION: VESSELS
Chair: K. Thomenius
GE R&D

Session P2U-K
ULTRASOUND THERAPY
Chair: L. Crum
University of Washington

Session P2U-L
BIOEFFECTS
Chair: W. O'Brien
University of Illinois

P2FC-G-2 O11 Manufacturing Method and Electrical Characteristics of Shock-Tolerant Grooved Type Quartz Resonators in Two-Steps Convex-Lens Shape with Bend Phenomenon. Y. Nagaura*[1,2], K. Nagaura*[1], and Z.-I. Nagaura*[1,3], [1]Nagaura Lab. Co., Inc., [2]Sinshu University, [3]Kyushu University

P2U-H-3 E9 Ultrasound Signals and Images Simulation of Phantoms with Contrast Agent. B. Durning*[1], J. Laval[1], H. Torp[2], and C. Cachard[1], [1]Creatis, UMR 5515 CNRS, U 630 INSERM, Université Claude Bernard Lyon1, [2]Department of Circulation and Medical Imaging, NTNU, Norway

P2U-I-3 F3 Optimized Filters for Dynamic RF Echo Blending in Multiple Focal Zone Imaging. W. G. Wilkening*[1,2], B. Brendel[1,2], C. Hansen[1,2], and H. Ermert[1,2], [1]Institute of High Frequency Engineering, Ruhr-Universitaet Bochum, [2]Ruhr Center of Excellence for Medical Engineering (KMR)

P2U-J-1 F10 Ultrasonic Measurement of Change in Elasticity of Brachial Artery due to Flow-Mediated Dilatation for Evaluation of Endothelial Function. M. Sugimoto*, H. Hasegawa, and H. Kanai, Graduate School of Engineering, Tohoku University

P2U-K-1 G3 Automated HIFU Treatment Planning and Execution based on 3D Modeling of the Prostate, Urethra, and Rectal Wall. R. Seip*[1], R. F. Carlson[1], W. Chen[1], N. T. Sanghvi[1], K. A. Dines[2], M. A. Penna[3], and R. Pfile[4], [1]Focus Surgery, Inc., [2]XDATA Corporation, [3]Dept. of Mathematical Sciences, Indiana University, [4]CoEval Systems LLC

P2U-L-1 E1 The Effect of Tissue Type and Exposure Parameters on Controlled Ultrasound Tissue Erosion. M. A. Cooper*[1], Z. Xu[1], J. B. Fowlkes[2], A. P. Advincula[3], and C. A. Cain[1], [1]University of Michigan, Biomedical Engineering, [2]University of Michigan, Radiology, [3]University of Michigan, Obstetrics and Gynecology

P2FC-G-3 O12 State-of-the-Art in the Design and Manufacture of Low Acceleration Sensitivity Resonators. R. B. Haskell*[1], J. E. Buchanan[2], P. E. Morley[1], B. B. Desai[2], M. A. Esmiol[1], M. E. Martin[2], and D. S. Stevens[1], [1]Vectron International Hudson, [2]Vectron International Cinox

P2U-H-4 E10 Contrast Agent Detection through Low Frequency Manipulation of High Frequency Scattering Properties. R. Hansen* and B. A. J. Angelsen, Department of Circulation and Medical Imaging

P2U-I-4 F4 Arbitrary Waveform Coded Excitation using Bipolar Square Wave Pulsers. S.-W. Huang[1,2] and P.-C. Li*[1,2], [1]Department of Electrical Engineering, National Taiwan University, [2]National Health Research Institutes

P2U-J-2 F11 Blood Coagulation and Clot Formation Studies using High Frequency Ultrasounds. C.-C. Huang* and S.-H. Wang, Department of Biomedical Engineering, Chung Yuan Christian University

P2U-K-2 G4 Intravascular Ultrasound Ablation Catheter for Treating Atrial Fibrillation. S. H. Wong*, G. C. Scott, S. M. Conolly, G. Narayan, and D. H. Liang, Stanford University

P2U-L-2 E2 Microbubble Potentiated Changes in Cell Permeability and Viability. R. Karshafian*, P. D. Bevan, and P. N. Burns, Department of Medical Biophysics, University of Toronto, Sunnybrook & Women's College Health Sciences Centre

P2FC-G-4 O13 Development of Thin Film Getters for Assuring High Reliability and Long Lifetime to Crystal Oscillators. M. Moraja*[1], M. Amiotti[1], A. Conte[1], and H. Florence[2], [1]SAES Getters S.p.A., [2]SAES Getters USA Inc.

P2U-H-5 E11 Design and Implementation of FM-Coded Harmonics. T. Misaridis*, N. Uzunoglu, and N. Uzunoglu, National Technical University of Athens

P2U-I-5 F5 A New Performance Analysis Metric for Medical Ultrasound. K. Ranganathan* and W. F. Walker, University of Virginia

P2U-J-3 F12 Classification of Venous Thrombosis Combining Ultrasound Elastography and Tissue Characterization. S. Siebers*[1], B. Geier[2], M. Vogt[1], U. Scheipers[1], A. Mumme[2], and H. Ermert[1], [1]Institute of High Frequency Engineering, Ruhr-University Bochum, [2]Division of Vascular Surgery, Department of Surgery, Ruhr-University Bochum

P2U-K-3 G5 B-Scan Imaging and Thermal Lesion Monitoring using Miniaturized Image-Treat Ultrasound Arrays. I. R. S. Makin*[1], T. D. Mast[1], W. Faidi[1], M. M. Runk[1], P. G. Barthe[2], and M. H. Slayton[2], [1]33 South Sycamore Street, Mesa, AZ [2]Guided Therapy Systems

P2U-L-3 E3 Correlation of the Exposed-Cell Mortality with the Transient Cavitation Noise *in vitro*. J.-L. Mestas[1], L. Alberti[2], S. Chesnais[1], J.-Y. Blay[2], and D. Cathignol*[1], [1]INSERM, [2]Centre Léon Bérard

P2FC-G-5 O14 Novel Design Method of High Frequency Quartz Resonators in Grooved-Type and Concavo Convex Shape. Y. Naguara*[1,2], K. Naguara*[1], Z.-I. Naguara*[1], 1Naguara Lab. Co. Inc., Shinsyu University

P2U-H-6 E12 Contrast Enhanced Flow Imaging with Phase-Coded Pulse Sequences. W. G. Wilkening*[1,3], B. Brendel[1,3], V. Uhlendorf[2,3], and H. Ermert[1,3], [1]Institute of High Frequency Engineering, Ruhr-Universitaet Bochum, [2]Research Laboratories of Schering AG, [3]Ruhr Center of Excellence for Medical Engineering (KMR)

P2U-I-6 F6 Transcranial Ultrasound Focus Reconstruction with Amplitude Correction. J. White*[1,3], G. T. Clement[1,2], and K. Hynynen[1,2], [1]Brigham and Women's Hospital, [2]Harvard Medical School, [3]The Pennsylvania State University

P2U-J-4 F13 Segmentation of Three-Dimensional Intravascular Ultrasound Images using Spectral Analysis and a Dual Active Surface Model. J. D. Klingensmith*, A. Nair, B. D. Kuban, and D. G. Vince, The Cleveland Clinic Foundation

P2U-K-4 G6 Ultrasound Therapy System and Ablation Results Utilizing Miniature Imaging/Therapy Arrays. P. G. Barthe*[1], M. H. Slayton[1], P. M. Jaeger[1], I. R. S. Makin[2], T. Douglas Mast[2], W. Faidi[2], M. M. Runk[2], and L. A. Gallagher[2], [1]Guided Therapy Systems, [2]Ethicon Endo-Surgery

P2U-L-4 E4 A Study on Premature Ventricular Contractions Caused by Ultrasound Exposure with Microbubbles using Cultured Cardiac Myocytes. N. Kudo*, G. Yokoyama, M. Ikebuchi, K. Okada, K. Kawahara, and K. Yamamoto, Graduate School of Engineering, Hokkaido University

P2U-H-7 E13 Removing Local Motion from Ultrasonic Images using Non-Affine Registration for Contrast Quantification. E. A. Gardner*[1], T. S. Sumanaweera[1], M. N. Woelmer[1], E. Leen[2], and R. W. Steins[1], [1]Siemens Medical Solutions, Ultrasound Division, [2]Glasgow Royal Infirmary

P2U-I-7 F7 Beam Steering in Pulsed Doppler Ultrasound Velocity Estimation. A. H. Steinman*[1], E. Y. L. Lui[1], K. W. Johnston[2], and R. S. C. Cobbold[1], [1]University of Toronto, [2]University of Toronto

P2U-J-5 G13 Development of Bone-Mimicking Phantom and Measurement of Its Acoustic Impedance by Interference Method. M. Yoshizawa*[1], H. Ushioda[1], and T. Moriya[2], [1]Tokyo Metropolitan College of Technology, [2]Department of Electrical Engineering, Tokyo Metropolitan University

P2U-K-5 G7 External Ultrasonic Valvuloplasty for the Treatment of Superficial Venous Insufficiency : A Feasibility Study. S. Pichardo*[1], R. Milleret[2], O. Pichot[3], L. Curiel[1], and J-Y. Chapelon[1], [1]French Institute of Health and Medical Research U556, [2]Vascular Surgery Department of Saint Jean Clinic, [3]Vascular Medicine Department of University of Grenoble

P2U-L-5 E5 Effects of Low Intensity Ultrasound on the Conduction Property of Neural Tissues. S.-H. Wang*, Y.-L. Yen, and P.-H. Tsui, Department of Biomedical Engineering, Chung Yuan Christian University

P2U-L-6 E6 Quantification of Acoustic Exposure during Cataract Surgery. M. E. Schafer* and L. B. Arbisser, Sonic Tech, Inc

P2U-M-7 I7 Comparison of Wavefront Distortion in the Breast Between Optoacoustic Imaging and Ultrasonic Imaging. D.-H. Huang* and P.-C. Li, Department of Electrical Engineering, National Taiwan University

Session P2U-O
TRANSDUCER AND TRANSDUCER MATERIALS
Chair: B. Sinha
Schlumberger-Doll Research

P2U-P-3 J3 Velocity Dispersion of Nano-, Poly-, and Amorphous-Silicon Thin Films. I. Hadjoub, A. Doghmane*, and Z. Hadjoub, Université Badji Mokhtar -Annaba, Laboratoire des Semi-Conducteurs, Dépt. Physique

P2U-Q-3 J10 Balanced Wideband Three-Transducer Low-Loss SAW Filters using Tapered IDTs with Impedance Conversion. S. A. Doberstein*, ONIIP

P2U-R-3 K5 $LiNbO_3$ Ultrasonic Transducers with an Inverted-Domain Layer for Radiation into a Solid Medium. K. Nakamura[1], H. Koyama*[1], S. Odakura[1], K. Yamada[1], and S. Saito[2], [1]Graduate School of Engineering, Tohoku University, [2]Faculty of Marine Science and Technology, Tokai University

Session P2U-M
DEVICES AND TOMOGRAPHY
Chair: M. Kolios
University of Toronto

P2U-M-8 I8 Simulations of Optoacoustic Wave Propagation in Light-Absorbing Media using the Finite Difference Time-Domain Method. D.-H. Huang*, C.-K. Liao, C.-W. Wei, and P.-C. Li, Department of Electrical Engineering, National Taiwan University

P2U-O-1 I9 Temperature-Compensation Factor for Measurement of Concentration in Solution using Ultrasonic Light Diffraction Effect. K. Ikeda*, Shinshu University

P2U-P-4 J4 Temperature Effect on the Characteristics of Surface Acoustic Wave on SiO_2 Thin Films. C.-C. Cheng[1], C.-J. Chung[2], K.-S. Kao*[2], and Y.-C. Chen[2], [1]Department of Electronic Engineering, De Lin Institute of Technology, [2]Department of Electrical Engineering, National Sun Yat-Sen University

P2U-Q-4 J11 Extended P-Matrix Model to Calculate Imbalance Characteristics of CRF Filters. V. I. Grigorievsky*[1] and V. P. Plessky[2], [1]Institute of Radioengineerg and Electronics RAS, [2]GVR Trade SA

P2U-R-4 K6 A Linear Systems Model of the Thickness Mode Piezoelectric Transducer Containing Dual Piezoelectric Zones. Y. Estanbouli*, G. Hayward, S. N. Ramadas, and J. C. Barbenel, Strathclyde University

P2U-M-1 I1 Ultrasound Research Platform. W. G. Scott*, R. M. Schmitt, and R. D. Irving, Winprobe Inc.

Session P2FC-N
FREQUENCY STANDARDS
Chair: R. Wang
JPL

P2U-O-2 I10 Non-Destructive Evaluation of Thin ZnO Shear Wave Transducer by Brillouin Scattering. K. Shintani*, T. Yanagitani, M. Matsukawa, and T. Ootani, Faculty of engineering, Doshisha University

P2U-P-5 J5 Approach to On-wafer Controllable Trimming of SAW Filters. S. Zhgoon*[1], K. Bhattacharjee[2], J. Flowers[2], and A. Shvetsov[1], [1]MPEI, [2]Clarisay

P2U-Q-5 J12 Modeling of Electromagnetic and Acoustical Properties of RF SAW Filters from On-Chip Layout Including all Electrodes and Comparison with Experimental Data. S. Zhgoon*[1], K. Bhattacharjee[2], A. Loseu[2], and J. Rao[2], [1]MPEI, [2]Clarisay

P2U-R-5 K7 10 MHz Ultrasound Linear Array Catheter for Endobronchial Imaging. O. Cladé*[1], F. Trancart[2], and D. Dinet[1], [1]VERMON, [2]University Hospital- Bretonneau

P2U-M-2 I2 Superresolution Ultrasound for Imaging and Microscopy. G. T. Clement*[1,2] and K. Hynynen[1,2], [1]Harvard Medical School, [2]Brigham and Women's Hospital

P2FC-N-1 R1 A High-Resolution Frequency Standard Comparator Based on a Special Phase Comparison Approach. H. Zhou*, W. Zhou*, Z. Xuan, H. Wang, and C. Liu, Xidian University

P2U-O-3 I11 Cylinder-Sphere 3-DOF Ultrasonic Motor and Its Control. W. Huang*, C. Zhao, and F. J. Zhan, Nanjing University of Aeronautics & Astronautics

P2U-P-6 J6 Bonding Method of Semiconductor Devices on Piezoelectric Substrate using Laser Enhanced Flip-Chip Technology. K. Koh*, C. Kanashiro, and K. Hohkawa, Kanagawa Institute of Technology

P2U-Q-6 J13 21 Channel SAW Channelizer Filter Bank. S. He*, W. Wang, S. Li, and Y. Liang, Institute of Acoustics, The Chinese Academy of Sciences

P2U-R-6 K8 200 MHz Self-Focused ZnO MEMS Ultrasonic Transducers for Biomedical Imaging. C. Sharp*[1], G. H. Feng[2], Q. Zhou[1], E. S. Kim[2], and K. Shung[1], [1]Department of Biomedical Engineering and NIH Transducer Resource Center, University of Southern California, [2]Department of Electrical Engineering Electrophysics, University of Southern California

P2U-M-3 I3 Radial Radon Transform for Electrode Localization in Biological Tissue. M. Barva*[1,2], J.-M. Marí[2], J. Kybic[1], and C. Cachard[2], [1]Czech Technical University, Faculty of Electrical Engineering, Dept. of Cybernetics, Center for Machine Perception, [2]CREATIS,UMR 5515 CNRS, U 630 INSERM, Université Claude Bernard Lyon 1, France

P2FC-N-2 R2 Frequency Standards and Time Metrology in Romania. C. Mandache*[1], O. Gheorghiu[1], L. Giurgiu[3], A. Niculescu[2], T. Acsente[1], B. Mihalcea[1], and O. Stoican[1], [1]National Institute for Laser, Plasma and Radiation, Plasma Laboratory, [2]National Institute of Metrology, [3]Faculty of Physics, University of Bucharest

P2U-O-4 I12 2-D Numerical Simulation of Acoustic Wave Phase Conjugation in Active Medium. P. Voinovich[1], A. Merlen[2], V. Preobrazhensky[3], and P. Pernod*[4], [1]A.F.Ioffe Physico-Tekhnical Institute, St.Petersburg, Russia, [2]Laboratoire de Mecanique de Lille, Villeneuve d'Ascq, France, [3]Wave Research Center of General Physics Institute, Moscow, Russia, [4]Institute d'Electronique et Microelectronique du Nord, Villeneuve d'Ascq, France

P2U-P-7 J7 Fabrication of SAW Devices Based on SEM-Based EB Lithography for Lab Use. H. Hatakeyama*, K.-Y. Hashimoto, T. Omori, and M. Yamaguchi, Dept. EME, Chiba University

P2U-Q-7 K13 Ultra Wide Bandwidth SAW Matched Filter with Chirp Signal Chips. K. Hohkawa*, C. Kaneshiro, and K. Koh, Electric & Electrical Engineering, Kanagawa Institute of Technology

P2U-R-7 K9 Fabrication of Dome-Shaped-Diaphragm-Transducer Array for High Frequency Biomedical Image Application. G. H. Feng*, E. S. Kim, C. Sharp, Q. F. Zhou, and K. K Shung, University of Southern California

P2U-M-4 I4 Focused Array Transducer for Optoacoustic Tomography. I. Pelivanov, V. Kozhushko, T. Khokhlova*, A. Zharinov, and A. Karabutov, International Laser Center of Moscow State University

P2FC-N-3 R3 Frequency-Locked Loop between a H-Maser and a Cs Clock. J. Saalaoui*[1], M. Addouche[1], F. Lardet-Vieudrin[2], V. Giordano[2], and E. Rubiola[3], [1]Observatoire de Besançon, [2]Laboratoire de Physique et Métrologie des Oscillateurs (LPMO), [3]LPMIA

Session P2U-P
THIN FILMS AND DEVICES
Chair: D. Malocha
University of Central Florida

Session P2U-Q
SAW FILTERS
Chair: S. Malocha
University of Central Florida

Session P2U-R
HIGH FREQUENCY APPLICATIONS
Chair: Q. Zhang
The Pennsylvania State University

P2U-M-5 I5 Tomographic Reconstruction of Sound Velocity Distribution in the Breast using Linear Arrays: Experimental Results. S.-W. Huang*[1,2] and P.-C. Li[1,2], [1]Department of Electrical Engineering, National Taiwan Univeristy, [2]National Health Research Institutes

P2FC-N-4 R4 Recent Experimental Aspects of Russian Caesium Fountain. Y. Domnin*, G. Yolkin, A. Novoselov, L. Kopylov, Y. Malychev, V. Barychev, and V. Pal'chikov, Institute of Metrology for Time and Space at National Research Institute for Physical-Technical and Radiotechnical Measurements

P2U-P-1 J1 Observation of the Wave Propagating into Substrate. S. Matsuda*, A. Miyamoto, S. Wakana, and A. Ito, Ultrasonics

P2U-Q-1 J8 Genetic Optimization Algorithms in the Design of Longitudinally Coupled SAW Filters. J. Meltaus*[1], V. P. Plessky[2], P. Hämäläinen[3], and M. M. Salomaa[1], [1]Helsinki University of Technology, Materials Physics Laboratory, [2]GVR Trade SA, [3]Helsinki University of Technology, Telecommunications Software and Multimedia Laboratory

P2U-R-1 K1 High Frequency Ultrasonic Needle Transducers For Retinal Doppler. E. J. Gottlieb*, J. Cannata, and K. Shung, University of Southern California

P2U-R-9 K11 Fabrication of Sol-Gel Modified Piezoelectric Thick Films for high Frequency Ultrasonic Applications. Q. F. Zhou*[1], K. K. Shung[1], and Y. Huang[2], [1]Deaprtment of Biomedical Engineering and NIH Transducer Research Center, University of Southern California, [2]Chemat Technology Inc.

P2U-M-6 I6 A New Approach Towards Ultrasonic Transmission Tomography with a Standard Ultrasound System. M. Ashfaq* and H. Ermert, Institute of High Frequency Engineering

P2FC-N-5 R5 NIM4# Cesium Atomic Fountain Primary Frequency Standard: Performance and Evaluation. T. Li*, M. Li*, P. Lin, B. Huang, J. Qian, Y. Gan, P. Wang, M. Xin, W. Chen, C. Shi, N. Liu, and X. Zhao, National Institute of Metrology (NIM)

P2U-P-2 J2 A Model for the Accurate Determination of the Electromechanical Coupling Factor of Thin Film SAW Devices on Non-Insulating Substrates. E. Iborra, L. Vergara*, J. Sangrador, M. Clement, A. Sanz-Hervás, and J. Olivares, Dpto. Tecnología Electrónica, Universidad Politécnica de Madrid

P2U-Q-2 J9 Design of High Selectivity Low-Loss Ladder Filters. V. S. Orlov*, A. L. Schwartz, V. B. Chvets, A. O. Kustova, and E. I. Fedorov, Moscow Radiocommunication Research Institute

P2U-R-2 K4 PVdF Array Characterisation for High Frequency Ultrasonic Imaging. S. J. Carey*[1], C. M. Gregory[1], M. P. Brewin[2], M. J. Birch[2], and J. V. Hatfield[1], [1]University of Manchester Institute of Science and Technology, [2]Barts and The London NHS Trust

P2U-R-10 K2 Ultra-Fine Piezoelectric Composite For High Frequency Ultrasonic Transducers. J. Yin*, M. Lukacs, K. A. Harasiewicy, and F. S. Foster, Imaging Research, Sunnybrook & Women's College Health Science Centre, University of Torornto

P2U-R-11 K3 A 20-40 MHZ Ultrasound Transducer for Intravascular Harmonic Imaging. H. J. Vos[1,2], M. E. Frijlink[2], E. Droog*[2,3], D. E. Goertz[2,4], G. Blacquiere[2], A. Gisolf[1], and A. F. W. Van der Steen[2,4], [1]Delft University of Technology, [2]Erasmus Medical Center Rotterdam, [3]Netherlands Organisation for Applied Scientific Research (TNO/TPD), [4]Interuniversity Cardiology Institute of the Netherlands

Session P2FC-S
OSCILLATORS, SYNTHESIZERS AND NOISE
Chair: M. Driscoll
Northrop Grumman Corporation

P2FC-S-1 R6 The Noise Conversion Method for Oscillatory Systems. Y. S. Shmaliy*, Guanajuato University

P2FC-S-2 T2 Experimental Investigation of Phase Noise in High-Efficiency Class-E Amplifiers. S. Romisch*[1] and M. D. Weiss[2], [1]Scriptl, LLC, [2]Division of Engineering, Colorado School of Mines

P2FC-S-3 T3 Thêo1 Confidence Intervals. T. N. Tasset*[1], D. A. Howe[1], and D. Percival[2], [1]National Institute of Standards and Technology, [2]Applied Physics Laboratory, University of Washington

P2FC-S-4 T4 Application of Dual-Mixer Time-Difference Multiplication in Accurate Time-Delay Measurement. R. Barillet*[1], J. Cermak[2], J.-Y. Richard[1], and L. Sojdr[2], [1]Observatoire de Paris, [2]Institute of Radio Engineering and Electronics, Czech Academy of Sciences

P2FC-S-5 T5 Modeling Phase and Amplitude Noise in Heterojunction Bipolar Transistor Amplifiers. E. S. Ferre-Pikal*, K. Asirvatham, and S. Sengupta, University of Wyoming

P2FC-S-6 T6 Double Temperature Compensated Crystal Oscillator. W. Zhou*, H. Jiang, Z. Xuan, Y. Liu, and J. Yu, Xidian University

P2FC-S-7 T7 Withdrawn

P2FC-S-8 T8 Optimization of Drive-Level in High Stability Low-Noise OCXOs. I. Abramzon*, V. Tapkov, and S. Baranushkin, Maxic Crystal Ltd

P2FC-S-9 T9 Colpitts-Type Oscillator for High Frequency Application. N. Nomura*[1], T.-L. Chou[2], Y. Aoyagi[1], and Y. Sekine[2], [1]Toyo Communication Equipment Co., Ltd., [2]Nihon University

P2FC-S-10 R7 A New Oscillator Circuit Effective in Frequency Range 100MHz to 1GHz. T. Adachi*[1], M. Kawagishi[1], S. Izumiya[1], N. Nomura[2], and Y. Aoyagi[2], [1]Yokohama National University, [2]Toyo Communication Equipment Co., Ltd

P2FC-S-11 R8 Symbolic Analysis of Quartz Crystal Oscillators. N. Ratier*[1], R. Brendel[1], D. Gillet[1], F. Chirouf[1], and J. Delporte[2], [1]FEMTO-ST/LPMO, [2]CNES

P2FC-S-12 R9 Progress on 10 Kelvin Cryo-Cooled Sapphire Oscillator. R. T. Wang*, G. J. Dick, and W. A. Diener, Jet Propulsion Laboratory

P2FC-S-13 R10 Rotating Michelson-Morley Experiment Based on a Dual Cavity Cryogenic Sapphire Oscillator. M. E. Tobar*, P L. Stanwix, J. Winterflood, E. N. Ivanov, M. Sulsi, J. G. Hartnett, and F. van Kann, School of Physics, The University of Western Australia, 35 Stirling Hwy, Crawley 6009 WA

P2FC-S-14 R11 Whispering Gallery Traveling Wave Interferometer for Low Phase Noise Applications. D. P. Tsarapkin* and N. A. Shtin, Moscow Power Engineering Institute (Technical University)

P2FC-S-15 R12 Low-Power, Low-Jitter Direct Digital Synthesizer with Analog Interpolation. A. Fahim*, Qualcomm, Inc

P2FC-S-16 R13 Direct Digital Synthesizer Clock Frequency Versus Temperature Dependency Compensation using Two Look-Up Tables. V. Stofanik*[1], A. Sam[2], I. Balaz[3], and M. Minarik[3], [1]Institute of Physics Slovak Academy of Sciences, [2]Dar es Salaam Institute of Technology, [3]Department of Radio and Electronics, FEI SUT

Oral Sessions continue next page

	Session U1-E **BLOOD FLOW I** Chair: T. Thomas Siemens Medical	*Session U2-E* **HEART CHARACTERIZATION** Chair: J. Miller Washington University	*Session U3-E* **ULTRASOUND MEMS TECHNOLOGY** Chair: F. Levent Degertekin Georgia Institute of Technology	*Session U4-E* **PHYSICAL ACOUSTICS I** Chair: S. Zeroug Schlumberger-Doll Research	*Session U5-E* **NDE AND IN-PROCESS MONITORING** Chair: D. Yuhas Industrial Measurement Systems Inc.	*Session U6-E* **BONE CHARACTERIZATION** Chair: K. Wear FDA
	510AC	**510BD**	**511AB**	**513AB**	**512C-H**	**512A-F**
10:30 a.m.	**U1-E-1 (Invited) Decomposition of Flow Signals into Basis Functions: Performance Advantages, Disadvantages, and Computational Complexity.** H. Torp* and L. Løvstakken, Norwegian University of Science and Technology	**U2-E-1 Ultrasonic Strain and Strain Rate Imaging for the Assessment of Regional Myocardial Function in Mice.** J. D'hooge*[1,2], D. Thijs[2], K. Sipido[2], P. Claus[2], B. Bijnens[2], J. Thoen[3], F. Van de Werf[2], G. R. Sutherland[2], and P. Suetens[1], [1]Dept. of Electrical Engineering; Catholic University of Leuven; Leuven; Belgium, [2]Dept. of Cardiology; Catholic University of Leuven; Leuven; Belgium, [3]Dept. of Physics; Catholic University of Leuven; Leuven; Belgium	**U3-E-1 Microfabricated Ultrasonic Transducers Monolithically Integrated with High Voltage Electronics.** C. Daft*, D. Da Graca, S. Calmes, K. Patel, and I. Ladabaum, Sensant Corp	**U4-E-1 Combined Radiation Pressure Field in a Dual-Frequency Ultrasound System.** J. S. Thierman*[1], G. T. Clement[2], and K. Hynynen[2], [1]Harvard-MIT HST Program, [2]Brigham and Women's Hospital, Harvard Medical School	**U5-E-1 Observation and Control of Solidification Processes by Ultrasonic Pulse-Echo Technique.** A. Drevermann*, C. Pickmann, and G. Zimmermann, ACCESS e.V.	**U6-E-1 Axial Transmission Techniques for Bone Assessment: An In Vitro Comparative Study.** M. Muller[1], P. Moilanen[2,3], M. Talmant[1], V. Kilappa[2,3], P. Nicholson[3], J. Timonen[2], S. Cheng[3], and P. Laugier*[1], [1]Laboratoire d'Imagerie Paramétrique UMR 7623, [2]Department of Physics, University of Jyväskylä, [3]Dept of Health Sciences, University of Jyväskylä
10:45 a.m.		**U2-E-2 Automatic Detection and Tracking of Left Ventricular Landmarks.** A. H. Torp*[1], S. I. Rabben[1], A. Støylen[2], H. Ihlen[3], K. Andersen[3], L.-Å. Brodin[4], and B. Olstad[5], [1]GE Vingmed Ultrasound, [2]Dept. of Circulation and Medical Imaging, Norwegian University of Science and Technology, [3]Rikshospitalet University Hospital, [4]Huddinge University Hospital, [5]Dept. of Computer and Information Science, Norwegian University of Science and Technology	**U3-E-2 A Novel Method for Fabricating Capacitive Micromachined Ultrasonic Transducers with Ultra-Thin Membranes.** L. L. Liu*[1], O. M. Mukdadi[1], C. F. Herrmann[1], R. A. Saravanan[1], J. R. Hertzberg[1], S. M. George[1], V. M. Bright[1], and R. Shandas[1,2], [1]University of Colorado, [2]Department of Pediatric Cardiology, The Children's Hospital	**U4-E-2 Perfectly Matched Layer for FDTD Computations in Piezoelectic Crystals.** F. Chagla*, C. Cabani, and P. Smith, McMaster University	**U5-E-2 Ultrasonic In-Situ Monitoring of Solidification and Melting Behaviors of an Aluminum Alloy.** I. Ihara*, D. Burhan, and Y. Seda, Nagaoka University of Technology	**U6-E-2 Application of the Kramers-Krönig Relations to Measurements of Attenuation and Dispersion in Cancellous Bone.** K. R. Waters*[1], B. K. Hoffmeister[2], and J. A. Javarone[2], [1]National Institute of Standards and Technology, Materials Reliability Division, [2]Rhodes College, Department of Physics

11:00 a.m.	**U1-E-2 Comparision between Doppler Optical Coherence Tomography and High Frequency Ultrasound Speckle Variance Flow Imaging.** V. X. D. Yang*[1,2], A. Needles[3], D. Vray[4], S. Lo[2], M. L. Gordon[2], S. Foster[3], B. C. Wilson[2], and I. A. Vitkin[2], [1]MD-PhD program, University of Toronto, [2]Ontario Cancer Institute, University Health Network, [3]Sunnybrook and Women's College Health Sciences Center, [4]CREATIS	**U2-E-3 A Model Based Approach to Estimate Contractile Force Development using Myocardial Velocity Imaging: A Validation Study During Alterations in Contractility and Heart Rate.** M. Mc Laughlin*[1], P. Claus[1], P. Mehwald[1], M. Marciniak[1], J. D'hooge[1,2], G. Sutherland[1], and B. Bijnens[1], [1]Department of Cardiology, [2]Medical Image Computing, Department Electrical Engineering	**U3-E-3 CMUTs with Dual Electrode Structure for Improved Transmit and Receive Performance.** J. McLean* and F. L. Degertekin, Georgia Institute of Technology	**U4-E-3 Numerical and Experimental Study of the Resonant Behavior of N Elastic Shells Embedded in Water.** P.-Y. Le Bas* and P. Pareige, LAUE UMR CNRS 6068	**U5-E-3 Real-time Monitoring of Fabrication Process of Microfluidic Plastic Devices using Miniature Ultrasonic Sensors.** Y. Ono*[1], C.-C. Cheng[2], M. Kobayashi[2], C.-K. Jen[1], and N. Nardini[1], [1]IMI, National Research Council Canada, [2]Dept. of ECE, McGill University	**U6-E-3 Ultrasonic Wave Dispersion and Attenuation in a Periodically Two-Layered Medium.** L. Yu*[1], L. H. Le[2], and M. D. Sacchi[3], [1]Department of Radiology and Diagnostic Imaging, University of Alberta, [2]Division of Imaging Sciences, Capital Health and Department of Radiology and Diagnostic Imaging, University of Alberta, [3]Department of Physics
11:15 a.m.	**U1-E-3 Limitations of Dual Frequency Measurements for Embolus Classification.** D. H. Evans*, University of Leicester	**U2-E-4 Viscoelasticity Measurement of Heart Wall in In Vivo.** H. Kanai*, Graduate School of Engineering, Tohoku University	**U3-E-4 Optimized Membrane Configuration Improves CMUT Performance.** Y. Huang*, E. O Hæggström, X. Zhuang, A. S. Ergun, and B. T. Khuri-Yakub, Edward L. Ginzton Laboratory, Stanford University	**U4-E-4 Elastic Waves in Deviated Boreholes in Formations with Triaxial Stresses.** B. K. Sinha*[1] and Q. H. Liu[2], [1]Schlumberger-Doll Research, [2]Duke University	**U5-E-4 Super-Resolution *In Situ* Ultrasonic Monitoring of Chemical Reactions.** A. N. Kalashnikov*[1], K. L. Shafran[2], R. E. Challis[1], C. C. Perry[2], M. E. Unwin[1], and A. K. Holmes[1], [1]The University of Nottingham, [2]Nottingham Trent University	**U6-E-4 Characterization of Human Femoral Trabecular Bone In Vitro using Transmission and Backscatter Ultrasound Measurements.** F. Jenson, F. Padilla, and P. Laugier*, Laboratoire d'Imagerie Parametrique CNRS - Universite Paris 6
11:30 a.m.	**U1-E-4 Implantable Doppler System for Self-monitoring Vascular Grafts.** D. Vilkomerson* and T. Chilipka, DVX, LLC	**U2-E-5 A New Method for Two-Dimensional Myocardial Strain Estimation by Ultrasound: An In-Vivo Comparison with Sonomicrometry.** S. Langeland*[1], J. D'hooge[1,2], H. A. Leather[3], P. Claus[1], G. R. Sutherland[1], P. F. Wouters[3], and B. Bijnens[1], [1]Dept. of Cardiology. KULeuven, [2]Dept. of Electrical Engineering. KULeuven, [3]Dept. of Anaesthesiology. KULeuven	**U3-E-5 Pzt-Driven, Micromachined, Two-Dimensional Membrane Arrays.** S. M. Ardanuc* and A. Lal, SonicMEMS Laboratory	**U4-E-5 Influence of Periodical Stiffeners on the Acoustic Response of a Finite Cylindrical Shell.** R. Lietard*[1], D. Decultot[1], G. Maze[1], and M. Tranvan-Nhieu[2], [1]LAUE UMR CNRS 6068, [2]Thales Underwater Systems	**U5-E-5 Evaluation of Ultra-Low Expansion Glasses by the Line-Focus-Beam Ultrasonic Material Characterization System.** J. Kushibiki*, M. Arakawa, K. Suzuki, and T. Maruyama, Tohoku University	**U6-E-5 Acoustic Microscopy for Detection of Osteoporotic Bone Properties.** J. Brandt*, A. Franke, and K. Raum, Martin-Luther-Universität, Orthopädische Klinik
11:45 a.m.	**U1-E-5 High Frequency B-mode Ultrasound Blood Flow Estimation in the Microvasculature.** D. Vray*[1], A. Needles[2], V. X. D. Yang[3], and S. Foster[2], [1]Creatis, [2]Sunnybrook and Women's College Health Sciences Center, [3]Ontario Cancer Institute	**U2-E-6 A New Multifrequency Transducer for Microemboli Detection and Classification.** P. Palanchon*[1], A. Bouakaz[1,2], J. Klein[1], and N. de Jong[2], [1]Erasmus Medical Center, [2]Interuniversity Cardiology Institute Netherlands	**U3-E-6 Micromachined Piezoelectric Heterostructure using Epitaxial $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ Film on Si for Ultrasound Transducers.** K. J. Choi*[1], D. M. Kim[1], R. R. Das[1], C. B. Eom[1], V. Vaithyanathan[2], and D. G. Schlom[2], [1]Department of Materials Science and Engineering, University of Wisconsin-Madison, [2]Department of Materials Science and Engineering, Penn State University	**U4-E-6 Propagation of Nonlinear Acoustic Signals through Inhomogeneous Moving Media.** V. A. Khokhlova*[1], P. Blanc-Benon[2], M. V. Averianov[1], and R. O. Cleveland[3], [1]Department of Acoustics, Faculty of Physics, M. V. Lomonosov Moscow State University, [2]Laboratoire de Mécaniuqe des Fluides et d'Acoustique, UMRS CNRS 5509, Ecole Centrale de Lyon, [3]Dept. of Aerospace and Mechanical Engineering, Boston University	**U5-E-6 Transmission of Acoustic Waves Through Piezoelectric Plate: Modelling and Experiment.** Emmanuel Le Clezio*[1] and Alexander Shuvalov[2], [1]Laboratoire UltraSons Signaux et Instrumentation de L'Universite Francois Rabelais, FRE-CNRS 2448, [2]Laboratoire de Mecanique Physique de L'Universite Bordeaux 1, UMR-CNRS 5469 [a]Laboratoire de Mecanique Physique de L'Universite Bordeaux 1, UMR-CNRS 5469	**U6-E-6 Impact of Material and Structural Bone Properties on 1-MHz Velocity Measurement in Human Forearms.** E. Bossy[1,2], M. Talmant[1], F. Peyrin[3,4], L. Akrout[1], P. Cloetens[3], and P. Laugier*[1], [1]Laboratoire d'Imagerie Parametrique, [2]Dept of Aerospace and Mechanical Engineering, [3]CREATIS, and [4]European Synchrotron Radiation Facility

	Session FE1-E **RELAXORS** Chair: T. Takenaka Science University of Tokyo			*Session FC1-E* **OPTICAL STANDARDS AND APPLICATIONS** Chair: J. Ye University of Colorado	*Session FC2-E* **CHEMICAL SENSORS** Chair: J. Hines Microsensor Systems, Inc.	
	513CD			**511CF**	**511DE**	
10:30 a.m.	**FE1-E-1 Optical Properties of Epitaxial PLZT Thin Films Fabricated by a Sol-Gel Method.** M. Ishii*, K. Satoh, M. Kato, and K. Kurihara, Fujitsu Laboratories Ltd.			**FC1-E-1 The Optical Local Oscillator Problem: A 40 dB Reduction of Vibrational Sensitivity via a New Optical Cavity Design.** J. L. Hall[1], M. Notcutt[1], L.-S. Ma[2], and J. Ye[1], [1]JILA, University of Colorado and National Institute of Standards, Boulder Colorado, USA, [2]also affiliated with International Bureau des Poids et Mesures, Sèvres, France, and East China Normal University, Shanghai, China	**FC2-E-1 Design Considerations for High Sensitivity Guided SH-SAW Chemical Sensor for Detection in Aqueous Environments.** Z. Li*[1], Y. Jones[2], J. Hossenlopp[2], R. Cernosek[3], and F. Josse[1], [1]Department of Electrical and Computer Engineering, Marquette University, [2]Department of Chemistry, Marquette University, [3]Micro-Analytical Systems Dept., Sandia National Laboratories	
10:45 a.m.	**FE1-E-2 Relaxor Ferroelectricity in Epitaxial $SrTiO_3$ Thin Films on $DyScO_3$ Substrates.** M. D. Biegalski*[1], J. Haeni[1], W. Chang[2], S. W. Kirchoefer[2], D. G. Schlom[1], and S. Trolier-McKinstry[1], [1]Materials Research Institute, Pennsylvania State University, [2]Navy Research Labs			**FC1-E-2 (Invited) Noise Properties of Femtosecond Lasers and Photodetectors at Infrared Frequencies.** E. N. Ivanov*[1], S. A. Diddams[2], and L. Hollberg[2], [1]University of Western Australia, [2]National Institute of Standards and Technology	**FC2-E-2 Macroscale and Microscale Resonant Sensors for the Detection of Illicit Substances.** R. A. McGill[1], S. Stepnowski[1], E. Houser[1], D. Simonson[1], D. DiLella[1], V. Nguyen[2], R. Chung[2], I. Voiculescu[3], E. Sokolovski[4], J. Stepnowski[4], T. Thundat[5], D. Hedden[5], and S. Ross[6], [1]Naval Research Laboratory, Code 6365, Washington, D.C. 20375-5345, [2]Geo-Centers Inc., Rockville, MD, [3]George Washington University, Washington, DC, [4]Nova Research, Inc., Alexandria, VA, [5]Oak Ridge National Laboratory, Life Sciences Division, Oak Ridge, TN, [6]Dstl Porton Down, Salisbury, UK	

11:00 a.m.	**FE1-E-3 Dielectric Relaxation in Ferroelectrics with Diffuse Phase Transition.** X. Wang*, Department of Materials Physics, School of Science, Xi'an Jiaotong University				**FC2-E-3 Strong-Axis Bending Mode Vibrations for Resonant Microcantilever (Bio)Chemical Sensors in Gas or Liquid Phase.** I. Dufour*[1], S. Heinrich[2], and F. Josse[3], [1]IXL Laboratory, CNRS UMR5818, [2]Department of Civil and Environmental Engineering, Marquette University, [3]Microsensor Research Laboratory and Department of Electrical and Computer Engineering, Marquette University	
11:15 a.m.	**FE1-E-4 Electrostrictive Properties in Pr Doped $(Ba,Sr)(Ti,Al)O_3$ Ceramics.** W. Xu-Sheng*[1], Y. Hiroshi[1], N. Keiko[2], and X. Chao-Nan[1,2], [1]PRESTO, Japan Science and Technology Agency, [2]National Institute of Advanced Industrial Science and Technology			**FC1-E-3 "Magic" Wavelengths for Optical Frequency Standards on Cold Atoms.** V. Ovsiannikov[1] and V. Pal'chikov*[2], [1]Department of Physics, Voronezh State University, [2]Institute of Metrology for Time and Space at National Research Institute for Physical-Technical and Radiotechnical Measurements	**FC2-E-4 A Multi-Resonance Acoustic Interfacial Biosensor (MAIB) for Monitoring a Formation Process of Biological Thin Films.** S. J. Kwoun* and R. M. Lec, School of Biomedical Engineering, Science and Health System, Drexel University	
11:30 a.m.	**FE1-E-5 Monolithic Bulk Electro- and Acousto-Optic Devices Based on Domain Inverted Ferroelectrics.** H. W. J. Gnewuch*[1], C. N. Pannell[2], and J. H. Lehman[3], [1]School of Physical Sciences, University of Kent, [2]Gooch and Housego Group, Optronic Laboratories, Inc., [3]NIST/815.01			**FC1-E-4 Frequency Transfer of Optical Standards Through a Fiber Network using 1550-nm Mode-Locked Sources.** K. Holman*, D. Jones, and J. Ye, JILA, NIST and University of Colorado	**FC2-E-5 An Acoustic Wave Sensor for Measuring Soot Caused Lubricating Oil Thickening.** C. Zhang*, The Lubrizol Corporation, OH	
11:45 a.m.				**FC1-E-5 Application of Mode-Locked Lasers to Nanotechnology.** L. Arissian[1,2] and J. C. Diels*[1,2], [1]University of New Mexico, [2]Center of High Technology Materials	**FC2-E-6 Resonant Properties of Ceramic Resonators Coated with Plasma Polymerized Styrene Film.** S. Kurosawa*[1], H. Aizawa[1,2], M. Matsumoto[1], J.-W. Park[1,3], H. Kaida[4], H. Sakaguchi[4], and J. Inoue[4], [1]National Institute of Advanced Industrial Science and Technology (AIST), [2]New Energy and Industrial Technology Development Organization (NEDO), [3]The University of Tokyo, [4]Murata Mfg. Co., Ltd.	

	Session U1-F **BLOOD FLOW II** Chair: H. Routh Philips Research	*Session U2-F* **CELLS AND CARDIAC** Chair: M. Sherar University of Toronto	*Session U3-F* **TRANSDUCER MODELING** Chair: R. Lerch University of Erlanger	*Session U4-F* **PHYSICAL ACOUSTICS II** Chair: H. Engan Norwegian University of Science and Technology	*Session U5-F* **ACOUSTIC IMAGING** Chair: L. Kessler Sonoscan Inc.	*Session U6-F* **THERAPY: THERMAL ABLATION** Chair: L. Crum University of Washington
	510AC	**510BD**	**511AB**	**513AB**	**512C-H**	**512A-F**
1:30 p.m.	**U1-F-1 Quantitative Real-Time Blood Flow Estimation With Intravascular Ultrasound in the Presence of In-Plane Flow.** F. J. de Ana* and M. O'Donnell, University of Michigan	**U2-F-1 Towards Understanding the Nature of High Frequency Backscatter from Cells and Tissues: An Investigation of Backscatter Power Spectra from Different Concentrations of Cells of Different Sizes.** M. C. Kolios[1,3], G. J. Czarnota[2,3], A. E. Worthington[2], A. Giles[2], A. S. Tunis[*2,3], and M. D. Sherar[2,3], [1]Department of Mathematics, Physics and Computer Science, Ryerson University, [2]Princess Margaret Hospital / University Health Network, [3]Department of Medical Biophysics, University of Toronto	**U3-F-1 The Effect of Pillar Misalignment on the Underwater Performance of High Frequency Multilayer 1-3 Piezocomposite Transducers with Acoustic Matching and Backing Layers.** J. F. Saillant[*1,2], S. Cochran[1], R. Berriet[2], G. Fleury[2], and K. Kirk[1], [1]University of Paisley, [2]Imasonic.SA	**U4-F-1 Guiding, Bending and Filtering of Acoustic Waves in a Two Dimensional Phononic Band Gap Materials.** A. Kkhelif[*1], S. Benchabane[1], A. Choujaa[1], B. Djafari-Rouhani[2], and V. Laude[1], [1]Institut FEMTO-ST, CNRS UMR 6174, [2]LDSMM, University of Lille	**U5-F-1 (Invited) Ultrasonic Imaging of Fingerprints using Acoustic Impediography.** R. M. Schmitt*, W. G. Scott, and R. D. Irving, Crossmatch Technologies	**U6-F-1 MRI-Based Thermometry and Thermal Dosimetry during Focused Ultrasound Thermal Ablation of Uterine Leiomyomas.** N. McDannold*, C. Tempany, E. Stewart, F. A. Jolesz, and K. Hynynen, Harvard Medical School and Brigham & Women's Hospital
1:45 p.m.	**U1-F-2 ECG-Triggered Retrospective Colour Flow Imaging.** R. Williams*, A. Needles, A. Duckett, E. Cherin, and F. S. Foster, Sunnybrook and Women's College Health Sciences Centre	**U2-F-2 Evaluation of the Layered Structure of Aortic Valve Cusps using High-Frequency Ultrasound.** Q. Qiu[*1,2], J. D. Buyze[1,2], D. R. Boughner[2,3], and J. C. Lacefield[1,2], [1]the University of Western Ontario, [2]Robarts Research Institute, [3]London Health Sciences Centre	**U3-F-2 Application of Optimization Techniques to Finite Element Analysis of Piezoelectric Devices.** P. Reynolds* and V. Pereyra, Weidlinger Associates, Inc.	**U4-F-2 Measuring Permeability of Porous Materials via Acoustic Transmitted Waves.** Z. E. A. Fellah[*1], N. Sebaa[2], W. Lauriks[2], C. Depollier[3], and J. Y. Chapelon[1], [1]INSERM, Lyon, [2]Katholieke Universiteit Leuven, [3]Laboratoire d'Acoustique de l'Universite du Maine		**U6-F-2 Cavitation Enhances Treatment Depth when Combined with Thermal Effect using a Plane Ultrasound Transducer: An *In Vivo* Study.** C. Goldenstedt*, D. Melodelima, F. Mithieux, S. Chesnais, Y. Theillère, and D. Cathignol, INSERM Unit 556

2:00 p.m.	**U1-F-3 Clutter-Free Doppler Detection of Signed Velocity based on Legendre Series Expansion.** S.-I. Umemura*[1], T. Azuma[1], and T. Hayashi[2], [1]Hitachi Central Research Laboratory, [2]Hitachi Medical Corporation	**U2-F-3 The Response of Regional Integrated Backscatter Levels and Regional Strain to Inotropic Stimulation and Acute Ischemia.** J. D'hooge*[1,2], S. Coenen[2], O. Turschner[2], P. Claus[2], M. McLaughlin[2], P. Mehwald[2], M. Marciniak[2], C. Dommke[2], B. Bijnens[2], G. R. Sutherland[2], and P. Suetens[1], [1]Medical Image Computing; Dept. of Electrical Engineering; Catholic University of Leuven; Leuven; Belgium, [2]Dept. of Cardiology; Catholic University Leuven; Leuven; Belgium	**U3-F-3 Inverse Calculation Method for Piezocomposite Materials Characterisation.** G. Férin*[1,2], D. Certon[2], J. Guyonvach[2], and N. Félix[1], [1]VERMON, [2]GIP Ultrasons / LUSSI	**U4-F-3 (Invited) Material Property Measurement in Hostile Environments using Laser Acoustics.** K. L. Telschow*, Idaho National Engineering and Environmental Laboratory	**U5-F-2 Hamster Kidney Cell Elastic Properties Evaluated using Ultrasonic Atomic Force Microscopy.** A. Ebert*, J. Du, X. Wang, M. Salerno, W. Scheuchenzuber, and B. Tittmann, The Pennsylvania State University	**U6-F-3 Feasibility of MRI-Guided Transurethral Thermal Therapy for Prostate Cancer.** R. Chopra*, S. N. Baker, V. Choy, S. Lochhead, and M. J. Bronskill, Sunnybrook and Women's College Health Sciences Centre
2:15 p.m.	**U1-F-4 Real-Time Simultaneous Assessment of Wall Distension and Wall Shear Rate in Carotid Arteries.** G. Bambi, T. Morganti, S. Ricci, F. Guidi, and P. Tortoli*, University of Florence	**U2-F-4 Silicon Based Ultrasonic Microprobes for Cardiac Signal Recording.** X. Chen*[1], A. Lal[1], M. Riccio[2], and R. Gilmour[2], [1]Sonic MEMS Lab, Cornell University, [2]Biomedical Sciences, College of Veterinary Medicine at Cornell University	**U3-F-4 Modeling of the Temperature Increase in Ultrasonic Transducers.** V. Loyau, G. Feuillard*, and L. P. Tran Hue Huu, Lussi-GIP Ultrasons, FRE CNRS 2448		**U5-F-3 Multi-Frequency Ultrasonic NDE for Early Defect Recognition and Imaging.** K. Pfleiderer*, J. Aufrecht, I. Solodov, and G. Busse, Institute for Polymer Testing and Polymer Science (IKP)-Nondestructive Testing (ZFP), Stuttgart University	**U6-F-4 Detection of Imaging Acoustic Signals for Synchronizing a Commercial Ultrasound Imager with a High Intensity Focused Ultrasound Therapy System.** N. R. Owen*, M. R. Bailey, P. Kaczkowski, and L. A. Crum, Center for Industrial and Medical Ultrasound, University of Washington
2:30 p.m.	**U1-F-5 Complex Blind Source Separation for Adaptive Time Domain-Based Phase Filtering.** C. M. Gallippi* and G. E. Trahey, Duke University Biomedical Engineering	**U2-F-5 (Invited) Mechanical Properties of Single Cells—Measurement Possibilities using Time Resolved Scanning Acoustic Microscopy.** R. M. Lemor*[1], E. C. Weiss[1], P. Zinin[2], and G. Pilarczyk[1], [1]Fraunhofer Institute for Biomedical Technology, [2]School of Ocean and Earth Science and Technology	**U3-F-5 A Method for the Measurement of the *k* Factor in Lossy Piezoelectric Materials.** N. Lamberti*[1], A. Iula[2], and M. Pappalardo[2], [1]Dipartimento d'Ingegneria dell'Informazione ed Ingegneria Elettrica - Università di Salerno, [2]Dipartimento di Ingegneria Elettronica - Universitàdi Roma III	**U4-F-4 Forward Modeling for Ultrasonic Leaky-Lamb Wave-Based Imaging Through a Highly Contrasting Steel Cylindrical Layer.** S. Zeroug*, Schlumberger-Doll Research	**U5-F-4 3D Ultrasonic Imaging and Contour Detection in Metal Sheet Hydroforming.** O. Keitmann-Curdes*[1], K. Hensel[1], P. Knoll[2], H. Meier[2], and H. Ermert[1], [1]Institute of High Frequency Engineering, Ruhr-Universitaet Bochum, [2]Department of Mechanical Engineering, Ruhr-Universitaet Bochum	**U6-F-5 Temperature Rise Measured Non-Invasively During Thermal Therapy using Correlated Backscattered Ultrasound.** P. J. Kaczkowski* and A. Anand, University of Washington
2:45 p.m.	**U1-F-6 Real-time Blood Motion Imaging - A 2D Blood Flow Visualization Technique.** L. Løvstakken*[1], S. Bjærum[2], D. Martens[2], and H. Torp[1], [1]Department of Circulation and Medical Imaging, Norwegian University of Science and Technology, [2]GE Vingmed Ultrasound AS		**U3-F-6 FEA and Experimental Characterization of Langevin Transducers with Comparable Longitudinal and Lateral Dimensions.** A. Iula*[1], D. Cerro[1], N. Lamberti[2], and M. Pappalardo[1], [1]University Roma Tre, [2]University of Salerno	**U4-F-5 Measurement of Static and Dynamic Radiation Force on Spheres.** S. Chen*[1], G. Silva[2], R. R. Kinnick[1], M. Fatemi[1], and J. F. Greenleaf[1], [1]Mayo Clinic College of Medicine, [2]Universidade Federal de Alagoas	**U5-F-5 Optimized Algorithm for Synthetic Aperture Imaging.** T. Stepinski* and F. Lingvall, Uppsala Univetsity, Signals & Sytems	**U6-F-6 Noninvasive Localized Ultrasonic Measurement of Tissue Properties.** H. Yao, R. Griffin, and E. Ebbini*, University of Minnesota

	Session FE1-F **MATERIALS CHARACTERIZATION** Chair: A. Kholkin University of Aveiro			*Session FC1-F* **MICROWAVE OSCILLATORS** Chair: J. Searls Poseidon Scientific Instruments Pty. Ltd.	*Session FC2-F* **PHYSICAL SENSORS** Chair: J. Vig US Army CECOM	
	513CD			**511CF**	**511DE**	
1:30 p.m.	**FE1-F-1 (Invited) Temperature- and Electric-Field-Dependent Phase Transformations in (001)-Oriented PMN-40%PT Single Crystal.** R. R. Chien[1], V. H. Schmidt*[1], C.-S. Tu[2], and L.-W. Hung[2], [1]Department of Physics, [2]Department of Physics			**FC1-F-1 High Power Microwave Oscillators with Interferometric Signal Processing.** E. N. Ivanov*, M. E. Tobar, and J. Torrealba, UWA	**FC2-F-1 Study on the Interaction of Solid Particles with Surfaces under Different Ambient Conditions using Piezoelectric Sensors.** Q. Zhang*, R. Lec, and K. Pourrezaei, Drexel University	
1:45 p.m.				**FC1-F-2 (Invited) A Review of Sapphire Whispering Gallery Mode Oscillators Including Technical Progress and Future Potential of the Technology.** D. Green[1], C. McNeilage[1], M. Mossammaparast[1], P. Stockwell[1], E. Ivanov[2], and J. Searls*[1], [1]Poseidon Scientific Instruments, [2]School of Physics, University of Western Australia	**FC2-F-2 Detection of Nanoparticles with QCR Sensors.** R. Lucklum*, B. Schlatt, U. Hempel, and P. Hauptmann, Otto-von-Guericke-University, IMOS	

2:00 p.m.	**FE1-F-2 Non-Linear Dielectric Response in {111} and {100} Oriented $0.5Pb(Yb_{1/2}Nb_{1/2})O_3$-$0.5PbTiO_3$ Thin Films.** N. Bassiri Gharb* and S. Trolier-McKinstry, The Pennsylvania State University				**FC2-F-3 Measurements of Particles in Liquid using a Surface Acoustic Wave Sensors.** T. Oyama[1], J. Kondoh*[1,2], and S. Shiokawa[3], [1]Graduate School of Science and Technology, Shizuoka University, [2]Faculty of Engineering, Shizuoka University, [3]A&R Center for Surface Wave Technology	
2:15 p.m.	**FE1-F-3 Conversion of 45° Rotated X-Cut $KNbO_3$ Plates to Y-Cut Plates by Compression.** K. Nakamura, N. Chiba, and S. Ito*, Graduate School of Engineering, Tohoku University			**FC1-F-3 Photonic Microwave Oscillator using Mode-locked Laser as the High Q Frequency Discriminator.** N. Yu*, E. Salik, and L. Maleki, Jet Propulsion Laboratory	**FC2-F-4 An Acoustic Tweezer for Manipulation of Micro-and Nanoparticles.** R. M. Lec*, G. Yang, and Q. Zhang, Drexel University	
2:30 p.m.	**FE1-F-4 Evaluation of Ferroelectric Domain Structure by Ultrasonic Atomic Force Microscopy.** T. Tsuji*[1,2], H. Ogiso[2], J. Akedo[2], Y. Kawakami[3], S. Saito[1], K. Fukuda[1], and K. Yamanaka[1], [1]Tohoku University, [2]National Institute of Advanced Industrial Science and Technology, [3]NEC Tokin Cooperation			**FC1-F-4 Non-Interferometric Carrier Suppressed Cavity Oscillator.** C. W. Nelson* and B. Riddle, National Institute of Standards and Technology	**FC2-F-5 Techniques to Evaluate the Mass Sensitivity of Love Mode Surface Acoustic Wave Biosensors.** L. A. Francis*[1,2], J.-M. Friedt[3], R. De Palma[2-4], C. Zhou[2,4], C. Bartic[2], P. Bertrand[1], and A. Campitelli[2], [1]Université Catholique de Louvain, [2]Biosensors Group, IMEC, [3]Université de Franche-Comté, [4]Katholiek Universiteit Leuven	
2:45 p.m.	**FE1-F-5 The Direct Piezoelectric Effect in $[001]_c$-Poled Relaxor-Ferroelectric Single Crystals: Contrasting Longitudinal and Transverse Modes.** M. Davis*, D. Damjanovic, and N. Setter, Swiss Federal Institute of Technology-EPFL			**FC1-F-5 Pound Circuit - Induced Frequency Sensitivities in Ultra-Stable Cryogenic Oscillators.** J. Dick*, Jet Propulsion Laboratory, California Institute of Technology	**FC2-F-6 Love - Mode Surface Acoustic Wave Liquid Sensors using a Polyimide Waveguide Layer.** A. Turton*, D. Bhattacharyya, and D. Wood, School of Engineering, University of Durham	

	Session U1-G **TISSUE ELASTICITY II** Chair: M. O'Donnell University of Michigan	*Session U2-G* **HIGH FREQUENCY AND MICE** Chair: S. Foster University of Toronto	*Session U3-G* **MEDICAL TRANSDUCERS** Chair: M. Schafer Sonic Tech Inc.	*Session U4-G* **PHYSICAL ACOUSTICS III** Chair: J. Brown JB Consulting	*Session U5-G* **SAW SENSORS** Chair: M. Da Cunha University of Maine	*Session U6-G* **TISSUE CHARACTERIZATION** Chair: P. Laugier LIP
	510AC	**510BD**	**511AB**	**513AB**	**512C-H**	**512A-F**
3:30 p.m.	**U1-G-1 *In Vivo* Prostate Elastography: Preliminary Results.** S. K. Alam*[1], E. J. Feleppa[1], A. Kalisz[1], S. Ramchandran[1], R. D. Ennis[2], F. L. Lizzi[1], C.-S. Wuu[2], and J. Ketterling[1], [1]Riverside Research Institute, [2]New York Columbia Presbyterian Medical Center	**U2-G-1 Comparison of 3D Deformable Models For in vivo Measurements of Mouse Embryo from 3D Ultrasound Images.** B. Qiu*[1], P. Clarysse[1], M. Janier[1,2], J. Montagnat[1], and D. Vray[1], [1]Centre de Recherche et d'Applications en Traitement de l'Image et du Signal(CREATIS), [2]ANIMAGE	**U3-G-1 (Invited) Clinical Application and Technical Challenges for Intracardiac Ultrasound Imaging.** S. Bolorforosh*, J. Bartlett-Roberto, D. Tasker, and T. Proulx, Siemens Medical Solutions USA Inc., Ultrasound Division	**U4-G-1 A Variational Principle for the Equations of Viscopiezoelectricity.** P. C. Y. Lee* and N. P. Edwards, Department of Civil & Environmental Engineering, Princeton University	**U5-G-1 Global SAW Tag RFID Systems.** C. Hartmann*, P. Brown, P. Hartmann*, J. Bellamy, L. Claiborne, and W. Bonner, RF SAW, Inc.	**U6-G-1 High Resolution Ultrasonography of Retinal Degeneration in Rat.** C. Jolly[1], J.-C. Jeanny[2], F. Behar-Cohen[2], P. Laugier*[1], and A. Saied[1], [1]Laboratoire d'Imagerie Parametrique CNRS-Paris VI UMR 7623, [2]Physiologie des maladies oculaires, Innovations theapeutiques INSERM U598
3:45 p.m.	**U1-G-2 Acoustic Radiation Force Impulse Imaging of In Vivo Breast Masses.** K. Nightingale*, A. Congdon, M. Scott Soo, and G. Trahey, Duke University	**U2-G-2 Ultrasound B-Mode 360 Degree Tomography in Mice.** P. Hoskins*, T. Anderson, S. Meagher, T. McGillivray, S. Hammer, and N. McDicken, University of Edinburgh		**U4-G-2 Piezoelectric Devices for Extreme-Temperature Applications.** H. J. Whitehouse*, A. M. Leese de Escobar, and M. Pereira da Cunha, [1]Linear Measurements, Inc, [2]SPAWAR Systems Center, [3]Dept. of Electrical and Computer Engineering, University of Maine	**U5-G-2 Dual Configuration High Temperature Hydrogen Sensor on LGS SAW devices.** J. A. Thiele* and M. Pereira da Cunha, Dept. of Electrical and Computer Eng., University of Maine	**U6-G-2 High Frequency Ultrasound in Monitoring Liver Suitability for Transplantation.** R. Vlad*[1], M. C. Kolios[1,3], G. J. Czarnota[1,2], A. Giles[1,2], M. D. Sherar[1,2], and J. W. Hunt[1,2], [1]Department of Medical Biophysics, University of Toronto, [2]Ontario Cancer Institute, [3]Department of Mathematics, Physics and Computer Science, Ryerson University

4:00 p.m.	**U1-G-3 Bubble-Based Acoustic Radiation Force for Monitoring Intraocular Lens Elasticity.** T. N. Erpelding*[1], K. W. Hollman[1], T. Juhasz[1,2], and M. O'Donnell[1], [1]University of Michigan, Biomedical Engineering Department, [2]University of Michigan, Center for Ultrafast Optical Science	**U2-G-3 Comparison and Validation of High Frequency Ultrasound Detection Techniques in a Mouse Model for Renal Tumors.** E. Jouannot*[1], J. P. Duong-Van-Huyen[3], K. Bourahla[4], M. Lelievre-Pegorier[2], P. Laugier[1], and L. Bridal[1], [1]Laboratoire d'Imagerie Parametrique CNRS Universite Paris 6, [2]INSERM U356, [3]Laboratoire d'Anatomie Pathologique HEGP, [4]Service de Biophysique Hotel-Dieu	**U3-G-2 Real-Time 3-D Transesophageal Echocardiography.** E. C. Pua* and S. W. Smith, Duke University	**U4-G-3 Revisiting the Stokes Relations in a Time Reversal Cavity: Suppression of Intra-Plate Echoes Induced by an Ultrasonic Fabry Perot.** F. Vignon*, J.-F. Aubry, M. Tanter, G. Montaldo, and M. Fink, Laboratoire Ondes et Acoustique, ESPCI, Université Paris VII, U.M.R. C.N.R.S. 7587, 10 rue Vauquelin, 75005 Paris, France	**U5-G-3 A Theoretical Study of Love Wave Sensors Mass Loading and Viscoelasticity Sensitivity in Gas and Liquid Environments.** P. Mazein*[1], D. Rebiére[1], C. Déjous[1], F. Josse[2], and J. Pistré[1], [1]Laboratoire IXL (ENSEIRB - CNRS UMR5818 - Université Bordeaux 1), [2]Microsensor Research Laboratory and Department of Electrical and Computer Engineering, Marquette University	**U6-G-3 New Developments in Tissue-Type Imaging (TTI) for Guiding Prostate biopsies and for Planning and Monitoring Treatment of Prostate Cancer.** E. J. Feleppa*[1], J. Ketterling[1], P. Lee[1], S. Urban[1], A. Kalisz[1], C. R. Porter[2], G. Kutcher[3], and F. Arias-Mendoza[3], [1]Riverside Research Institute, [2]Virginia Mason Medical Center, [3]Columbia University
4:15 p.m.	**U1-G-4 Abdominal Acoustic Radiation Force Impulse (ARFI) Imaging.** G. Trahey*[1,2] and B. Fahey[1], [1]Biomedical Engineering Department, Duke University, [2]Department of Radiology, Duke University	**U2-G-4 Performance of a 50 MHz Annular Array Based Imaging System.** J. A. Brown*[1,2], C. E. Morton[1], S. Foster[2], and G. R. Lockwood[1], [1]Queen's University, [2]Sunnybrook Health Sciences Centre	**U3-G-3 3D Ultrasound Imaging System using Fresnel Ring Array & High Voltage Multiplexer IC.** S. Tamano*[1], T. Kobayashi[2], S. Sano[2], K. Hara[3], J. Sakano[3], and T. Azuma[4], [1]Research & Development Center, Hitachi Medical Corporation, [2]Ultrasound Department, Hitachi Medical Corporation, [3]Hitachi Research Laboratory, Hitachi, Ltd., [4]Central Research Laboratory, Hitachi, Ltd.	**U4-G-4 2D Pseudo-Array using an Ultrasonic One Channel Time-Reversal Mirror.** N. Quieffin*, S. Catheline, R. K. Ing, and M. Fink, laboratoire ondes et acoustique	**U5-G-4 SAW Sensor for Anti-Human-Immuno-Globulin G Molecule Detection.** Y. R. Roh*, D. W. Lim, and Y. J. Hur, Kyungpook National University	**U6-G-4 The Intensity Reflection Coefficient: A New Method for Blood Tissue Characterization.** A. Amararene* and G. Cloutier, Laboratory of Biorheology and Medical Ultrasonics, Research Center, Notre-Dame Hospital
4:30 p.m.	**U1-G-5 High Frequency Elastography for In-Vivo Study of the Mechanical Behavior of Skin.** Y. Mofid*[1], F. Ossant[1,3], C. Imberdis[2], and F. Patat[1,3], [1]LUSSI, [2]LMARC, [3]Bretonneau University Hospital	**U2-G-5 High-Resolution Ultrasound Imaging of Muscle Dynamics and Effects of Fatigue.** R. S. Witte*, D. E. Dow, R. Olafsson, Y. Shi, and M. O'Donnell, University of Michigan	**U3-G-4 Real-Time 3D Ultrasound with Multiple Transducer Arrays.** M. P. Fronheiser*, E. D. Light, and S. W. Smith, Deptartment of Biomedical Engineering, Duke University	**U4-G-5 (Invited) What are the Limits of Energy Focusing in Sonoluminescence?** S. Putterman*, C. Camara, B. Kappus, C.-K. Su, and E. Kirilov, University of California	**U5-G-5 Ball SAW Hydrogen Sensor with Amplitude and Delay Time Response.** A. Mizukami*[1], D. Y. Sim[3], I. Satoh[4], T. Miyagishi[4], H. Tanaka[4], T. K. Fukiura[4], H. Kazato[4], S. Akao[2], T. Ohgi[2], N. Nakaso[2], H. Watanabe[1], T. Mihara[1], and K. Yamanaka[1], [1]Tohoku University, [2]Toppan Printing Co., Ltd., [3]Ball Semiconductor Inc., [4]Yamatake Corp	**U6-G-5 Attenuation Compensated Spectral Slopes during the Kinetics of Rouleau Formation for Porcine Blood Backscattering in Couette Flow at 25-60 MHz.** F. Yu*[1], A. Amararene[1], D. Savéry[1], F. S. Foster[2], and G. Cloutier[1], [1]LBMU - University of Montreal, [2]Sunnybrook Health Science Centre
4:45 p.m.	**U1-G-6 Acoustic Radiation Force Impulse (ARFI) Imaging of the Gastrointestinal Tract.** M. L. Palmeri*[1], K. D. Frinkley[1], R. C. Bentley[2], and K. R. Nightingale[1], [1]Duke University, [2]Duke University Medical Center	**U2-G-6 High Frequency Ultrasound Signal Statistics from Mouse Mammary Tissue During Involution.** A. S. Tunis*[1,2], A. Giles[2], D. Spurrell[2], D. McAlduff[2], M. Hariri[1,2], R. Khokha[1,2], G. J. Czarnota[2,3], M. D. Sherar[1,2], J. W. Hunt[1,2], and M. C. Kolios[1,3], [1]Department of Medical Biophysics, University of Toronto, [2]Ontario Cancer Institute/Princess Margaret Hospital, University Health Network, [3]Department of Math, Physics & Computer Science, Ryerson University	**U3-G-5 Advances in Two Dimensional Arrays for Real Time 3d Intravascular Ultrasound.** E. D. Light* and S. W. Smith, Duke University		**U5-G-6 Ultrasonic Measurement of Molar Fractions in Gas Mixtures by Orthogonal Signal Correction.** J. E. Carlson* and P.-E. Martinsson, EISLAB, Dept. of Computer Science and Electrical Engineering, Lule' University of Technology	**U6-G-6 High Frequency Ultrasound Characterization of the Coagulation Process of Whole Blood.** F. Ossant*[1,2], R. Libgot[1], P. Coupé[1], P. Lermusiaux[2], and F. Patat[1,2], [1]LUSSI FRE 2448 CNRS, [2]Bretonneau University Hospital

	Session FE1-G **MODELING, THEORY, AND DOMAINS** Chair: D. Damjanovic EPFL			*Session FC1-G* **MICROWAVE AND MEMS RESONATORS - THEORY AND FABRICATION** Chair: R. Eiller US Army CECOM	*Session FC2-G* **PANEL DISCUSSION - MANUFACTURING TECHNOLOGY** Chair: G. Johnson Sawyer Research Products	
	513CD			**511CF**	**511DE**	
3:30 p.m.	**FE1-G-1FEM Modeling of Electro-Elastic Field in Ferroelectric Crystal with Domain Boundaries.** J. Novak*, J. Maryska, and J. Fousek, Faculty of Mechatronics and Interdisciplinary Engineering Studies, Technical University of Liberec			**FC1-G-1 (Invited) Design of Distributed Bragg Resonators with Cylindrical Symmetry.** M. E. Tobar*[1], J.-M. le Floch[1,2], J. G. Hartnett[1], and D. Cros[2], [1]School of Physics, The University of Western Australia, 35 Stirling Hwy, Crawley, WA, 6009, Australia, [2]Institut de Recherche en Communications Optiques et Microondes, Faculte Des Sciences, 123 Avenue A. Thomas, 87060 Limoges Cedex, France	**FC2-G-1 New Materials Panel Discussion.** B. Tysinger*[1] and G. R. Johnson[2], [1]Agilent Technologies, Inc., [2]Sawyer Research Products, Inc.	
3:45 p.m.	**FE1-G-2 Piezoelectric Anisotropy-Phase Transition Relations in Perovskite Single Crystals.** M. Budimir*, D. Damjanovic, and N. Setter, EPFL					

4:00 p.m.	**FE1-G-3 Modeling and Experiments of Local Stresses, Electric Fields, and Ferroelectric Domain Switching at Individual Grain Boundaries in PZT.** B. D. Huey*[1,2], E. Garcia[2], A. Scotch[2], M. Vaudin[2], S. Hong[3], and J. Blendell[2], [1]University of Connecticut, Institute of Materials Science, [2]NIST Ceramics Division, [3]Samsung Advanced Institute of Technology			**FC1-G-2 Piezo-Controlled Frequency Agile Microwave Dielectric Devices.** Y. Poplavko*, National Technical University of Ukraine		
4:15 p.m.	**FE1-G-4 Complex Lattice Quasicontinuum Theory and Its Application to Ferroelectrics.** O. Kowalewsky*, J. Knap, and M. Ortiz, California Institute of Technology			**FC1-G-3 Frequency Tuning of Vibrating Micro-Electro-Mechanical Resonators and Filters Via Laser Trimming.** M. Abdelmoneum*[1] and C. Nguyen[2], [1]Radiation Laboratory, University of Michigan Ann Arbor, [2]DARPA		
4:30 p.m.	**FE1-G-5 Modelling of the Poling Process in Functionally Graded Materials.** R. Steinhausen*, A. Z. Kouvatov, C. Pientschke, H. T. Langhammer, and H. Beige, Martin-Luther-University Halle-Wittenberg			**FC1-G-4 Bridged Micromechanical Filters.** S.-S. Li*, M. U. Demirci, Y.-W. Lin, Z. Ren, and C. T.-C. Nguyen, University of Michigan		
4:45 p.m.						

Session P3FC-A **FREQUENCY STANDARDS** Chair: R. Wang JPL	*Session P3FC-B* **SENSOR TECHNOLOGY** Chair: R. Lucklam University of Magdeburg	**P3U-C-3 E3 NSPUDT Structures with Inclined Reflectors on Langasite.** S. Zhgoon*[1], A. Shvetsov[1], S. Sakharov[2], V. Semenov[2], and S. Dobershtein[3], [1]MPEI, [2]Fomos Materials, [3]ONIIP	**P3U-D-4 E10 FEUDT Periodic Cell with Different Width Electrodes.** S. V. Biryukov*[1,2] and M. Weihnacht[1], [1]Leibniz Institute for Solid State and Materials Research Dresden, [2]Mints Radiotechnical Institute	**P3U-E-6 F10 Considerations on Coupling-of-Modes Equations for Shear Horizontal Type SAW.** K. Hirota* and Y. Yamamoto, NRS Technologies Inc	**P3FE-F-6 W12 Effects of Li2CO3 and Bi2O3 Additives on Sintering Temperature and Piezoelectric Properties of PCW-PMN-PZT Ceramics for Multilayer Piezoelectric Transformer.** K. Chung*[1], J. Yoo[2], H. Song[2], Y. Jeong[3], H. Yoon[4], C. Park[2], and D. Lee[1], [1]Inha University, [2]Semyung University, [3]KEPRI, [4]Kyungmoon College
P3FC-A-1 S2 Performance of PARCS Testbed Cesium Fountain Frequency Standard. D. G. Enzer* and W. M. Klipstein, Jet Propulsion Laboratory	**P3FC-B-1 Q9 Single Board Impedance Analyzer and Transient Analysis of QCR Sensor Response.** R. Schaefer, S. Doerner, R. Lucklum*, and P. Hauptmann, Otto-von-Guericke-University	**P3U-C-4 E4 Propagation Characteristics of Shear-Horizontal-Type Surface Acoustic Wave on Langasite with Au or Ta_2O_5 Thin Film.** S. Kakio, M. Nozawa*, and Y. Nakagawa, University of Yamanashi	**P3U-D-5 E11 Low Loss SAW Double-Mode Structure Suppressing Spurious Radiation.** T. Shiba*[1], S. Oosawa[1], J. Hamasaki[1], Y. Fujita[1], and T. Chiba[2], [1]Hitachi Media Electronics Co., Ltd., [2]Meisei University	**P3U-E-7 F9 The Improvement on the COM Parameters Extraction and Device Simulation for Leaky Surface Wave Devices.** X. Zhang, W. Wang, H. Wu, and Y. Shui*, Key lab. on Modern Acoustics, Nanjing University	**P3FE-F-7 W13 Withdrawn**
P3FC-A-2 S3 Adiabatic Passage in Two-Level Caesium Atom: Application to Frequency Control in Atomic Fountain. V. Pal'chikov*, Y. Domnin, G. Yolkin, A. Novoselov, and V. Barychev, Institute of Metrology for Time and Space at National Research Institute for Physical-Technical and Radiotechnical Measurements	**P3FC-B-2 Q10 Methodology of Design of Electronic Circuit Oscillators for QCM Sensors in Liquid Media.** L. Rodriguez-Pardo*[1], J. Fariña[1], C. Gabrielli[2], H. Perrot[2], and R. Brendel[3], [1]Dpto. T. Electrónica, IEA Barriç de la Maza, Univ. Vigo, Spain, [2]Lab. Interfaces et Systèmes Electrochimiques, CNRS, Paris, France, [3]Lab. Physique et Métrologie des Oscillateurs, CNRS, Besanèon, France	**P3U-C-5 E5 Temperature Compensated Langasite Family Compound $Ca_3NbGa_3Si_2O_{14}$ Crystal for SAW Applications.** M. Adachi*, R. Sato, and T. Karaki, Toyama Prefectural University	*Session P3U-E* **SAW PROPAGATION THEORY** Chair: B. Potter Vectron International	*Session P3FE-F* **MATERIALS PROCESSING** Chair: D. P. Williams Sandia National Laboratory	**P3FE-F-8 X11 Investigation of the Formation Mechanism of Perovskite Phase in (1-x)PST-xPT ceramics Prepared by One-Step-Sintering-Method.** J. Zhu*, D. Lan, D. Xiao, J. Cao, X. Yue, X. Yuan, W. Lu, and W. Zhang, Department of Materials Science, Sichuan University
P3FC-A-3 S4 Power Dissipation in a Vertically-Integrated Chip-Scale Atomic Clock. J. Kitching*[1], S. Knappe[1], L.-A. Liew[1], P. Schwindt[1,2], V. Shah[1,2], J. Moreland[1], and L. Hollberg[1], [1]NIST, [2]The University of Colorado	**P3FC-B-3 Q11 Miller Oscillators for High Sensibility Quartz Crystal Microbalance Sensors in Damping Media.** L. Rodriguez-Pardo*[1], J. Fariña[1], C. Gabrielli[2], H. Perrot[2], and R. Brendel[3], [1]Dpto. T. Electronica, IEA Barrie de la Maza, Univ. Vigo, Spain, [2]Lab. Interfaces et Systemes Electrochimiques - CNRS, Paris, France, [3]Lab. Physique et Metrologie des Oscillateurs, CNRS, Besanèon, France	**P3U-C-6 E6 Theoretical Calculation of SAW Characteristics of the GdYCOB Single Crystals.** T. Nishida*, H. Shimizu, H. Takeda, S. Okamura, and T. Shiosaki, Materials Sci., Nara Institute of Science and Technology	**P3U-E-1 E12 The Basic Scattering Theorem.** B. V. Sveshnikov*, Nizhny Novgorod State University	**P3FE-F-1 W4 Grain Orientation of New Lead-Free Piezoelectric Ceramic in the System of $(Bi_{1/2}Na_{1/2})TiO3-(Bi_{1/2}K_{1/2})TiO_3-BaTiO_3$.** N. Marandian Hagh*, M. Allahverdi, and A. Safari, Rutgers university	**P3FE-F-9 X12 Optical Properties of Single Crystal Sm2(MoO4)3.** J. Y. Sohn*[1], S. D. Lee[2], and Y. S. Yu[1,3], [1]Research institute of Basic Science, Dongeui University, [2]Department of Physics, Kyungnam University, [3]Electronic Ceramics Center, Dongeui University

P3FC-A-4 S5 The PHARAO Time and Frequency Performance Verification System. P. Guillemot*[1], J.-F. Dutrey[1], J.-F. Vega[1], M. Chaubet[1], D. Chebance[1], C. Sirmain[1], G. Santarelli[2], D. Chambon[2], P. Laurent[2], C. Locke[3], E. Ivanov[3], M. Rousselet[4], and T. Potier[5], [1]CNES (French Space Agency), [2]BNM - SYRTE, [3]University of Western Australia, [4]RFPA, [5]THALES Airborne Systems

P3FC-A-5 S6 A Frequency Standard Based on Expanding Cold Atom Cloud. S. T. Müller, M. S. Santos, D. V. Magalhães*, A. Bebeachibuli, and V. S. Bagnato, University of São Paulo - USP

P3FC-A-6 S7 The 133CS Fountain Frequency Standard in Brazil. D. V. Magalhães*, M. S. Santos, A. Bebeachibuli, S. T. Müller, and V. S. Bagnato, University of São Paulo - USP

P3FC-A-7 S1 An Examination of the Müssbauer Effect as the Basis for a Time/Frequency Standard. E. Potenziani II and J. Kosinski*, US Army RDECOM

P3FC-B-4 Q12 Electronic Circuit System of High Sensitivity Mass Detection for QCM-Biosensor. M. Koyama*[1], K. Akaike[1], H. Aizawa[2], and S. Kurosawa[2], [1]Nihon Dempa Kogyo Co., Ltd., [2]National Institute of Advanced Industrial Science & Technology (AIST)

Session P3U-C
MODERN SAW MATERIALS
Chair: K. Hashimoto
Chiba University

P3U-C-1 E1 SAW Substrate with Excellent Temperature Stability Suitable for Duplexer of US-PCS. M. Kadota*, T. Nakao, N. Taniguchi, E. Takata, and M. Mimura, Murata Mfg. Co., Ltd.

P3U-C-2 E2 All-Langasite-Packaged Surface Acoustic Wave Pressure sensors. T. Han*, X. Ji, and W. Shi, Shanghai Jiaotong University

Session P3U-D
SAW TRANSDUCERS
Chair: P. Smith
McMaster University

P3U-D-1 E7 Novel Approaches to the Electromagnetic Design of CSP RF-Filters with Improved Selectivity. J. E. Kiwitt, M. Pitschi*, and K. Wagner, EPCOS AG

P3U-D-2 E8 Scanning Window Technique in SPUDT Optimization. E. Bausk* and R. Taziev, Institute of Semiconductor Physics

P3U-D-3 E9 Investigation of Single-Finger Interdigital Transducers as Programmable Reflectors. Q. Fu*, W.-J. Fischer, and H. Stab, Semiconductor and Microsystems Technology Laboratory

P3U-E-2 E13 Universal Functions for the Analysis of Electromagnetic Interactions in SAW Devices. A. Baghai-Wadji*, Vienna University of Technology

P3U-E-3 F13 SAW Propagation in Complex Periodic Systems of Strips. E. J. Danicki*, Polish Academy of Sciences

P3U-E-4 F12 Fast Method of Solution for Mixed Electrostatic Problem in Periodic Arrays. D. Vadim*, Dunzow Vadim

P3U-E-5 F11 Numerical Modeling of One-Port Resonators Based on Harmonic Admittance. S. Malocha*[1], B. P. Abbott[1], and N. Naumenko[2], [1]Sawtek, Inc, [2]Mosow Steel and Alloys Institute

P3FE-F-2 W8 PZT Thick Films by Direct-Write Technology. M. Allahverdi* and A. Safari, Rutgers University

P3FE-F-3 W9 Templated Grain Growth of $Bi_{0.5}Na_{0.5}TiO_3$ with Seeds of the Same Material. P. Setasuwon*, N. Vaneesorn, A. Thanaboonsombut, and S. Kijamnajsuk, National Metal and Materials Technology Center

P3FE-F-4 W10 Molding of High Aspect Ratio Ferroelectric Microstructures. I. Mina*[1], B. Srowthi[1], N. Saldhana[2], T. Mayer[2], and S. Trolier McKinstry[1], [1]Materials Science and Engineering and Materials Research Institute, [2]Electrical Engineering

P3FE-F-5 W11 Electrophoretic Deposition of BaTiO3 Films from Aqueous Suspensions. J. Zhao, X. Wang, T. Liu*, and L. Li, Tsinghua University

P3FE-F-10 W5 Templated Grain Growth (TGG) of PMN-PT Textured Components by Layered Manufacturing (LM). R. Brennan*, M. Allahverdi, and A. Safari, Rutgers University

P3FE-F-11 W6 Influence of Processing Conditions on the Morphotropic Phase Boundary and Ferroelectric Properties of $Pb(Zn_{1/3}Nb_{2/3})O_3$-$Pb(Ni_{1/3}Nb_{2/3})O_3$-$Pb(Zr_xTi_{1-x})O_3$ Solid Solutions. D. Cann[1], X. Tan[1], N. Vittayakorn[2], G. Rujijanagul[2], and T. Tunkasiri[2], [1]Materials Science and Engineering Department, Iowa State University, Ames, IA 50011, USA, [2]Department of Physics, Faculty of Science, Chiang Mai University, Chiang Mai 50200, THAILAND

P3FE-F-12 W7 Reduced Temperature Synthesis of $Pb_3MgNb_2O_9$. M. A. Kurata and D. A. Payne, Department of Materials Science and Engineering and Frederick Seitz Materials Research Laboratory, University of Illinois at Urbana-Champaign, Urbana, Illinois

Session P3FE-G **TUNABLE/RF** Chair: R. R. Neurgaonkar Rockwell Scientific Co.	*Session P3FE-H* **MATERIALS CHARACTERIZATION** Chair: V. H. Schmidt Montana State University	*Session P3FE-I* **DOMAINS SWITCHING** Chair: D. Viehland Virginia Tech			
P3FE-G-1 S8 Optimization of High Tunability Barium Strontium Titanate Thin Films Grown by RF Magnetron Sputtering. N. K. Pervez*[1], P. J. Hansen[2], and R. A. York[1], [1]Department of Electrical and Computer Engineering, University of California, [2]Materials Department, University of California	**P3FE-H-1 X5 About the Determination of the Electromechanical Coupling Factor of the Ferroelectric Plate Vibrating in Thickness-Shear Mode.** L. Burianova* and J. Nosek, Technical University of Liberec	**P3FE-I-1 T11 Pulse Electric Field Induced Phase Transition Behaviors of La-Doped Pb(Zr,Sn,Ti)O3 Antiferroelectric Ceramics.** Z. Xu*, Y. Feng, X. Wei, and X. Yao, Electronic Materials Research Laboratory, Xi'an Jiaotong University	**P3FE-J-3 U3 Thermal Fields and Thermal Stresses in Semiconducting Barium Titanate.** V. N. Shut*, S. R. Syrtsov, E. L. Gavrilenco, and A. V. Gavrilov, Institute of Technical Acoustics NAS Belarus	**P3FE-K-4 U7 $Pb_{0.5}Ca_{0.5}TiO_3$ Thin Films as an Alternative Material for Varactors and DRAMs.** J. Mendiola*[1], R. Jimenez[1], P. Ramos[2], C. Alemany[1], and M. L. Calzada[1], [1]Instituto de Ciencia de Materiales (CSIC, [2]Dpto. de Electrónica, Universidad de Alcalá	**P3U-L-4 F4 A New Flexible Digital Research Platform Based on a Standard US Scanner: Results and Applicative Perspectives.** P. Pellegretti*[1], F. Bertora[1], A. Questa[1], C. Parodi[1], and S. Curletto[2], [1]Esaote, [2]Dept. of Biophysical ane Electronic Enginnering, University of Genoa
P3FE-G-2 S9 Reversible Dielectric Nonlinearity and Mechanism of Tunability for. X. Wei* and X. Yao, Electronic Materials Research Laboratory, Xi'an Jiaotong University	**P3FE-H-2 X6 Direct Strain-Field Hysteresis Measurements in PZT Films Via Scanning Force Microscopy.** I. K. Bdikin[1], V. V. Shvartsman[1], N. Vyshatko[1], A. L. Kholkin*[1], J. M. Herrero[2], and C. Zaldo[2], [1]Dept. of Ceramics and Glass Engineering, CICECO, University of Aveiro, [2]Instituto de Ciencia de Materiales de Madrid, Consejo Superior de Investigaciones Cientificas	**P3FE-I-2 T12 Cooling-Rate-Dependent Domain Structures of PMN-PT Single Crystals Observed by Contact-Resonance Piezoresponse Force Microscopy.** J. Sakamoto*, H. Okino, and T. Yamamoto, National Defense Academy	**P3FE-J-5 W2 Residual Strain and Ferroelectric Behaviours of $Pb_{0.7}La_{0.2}TiO_3$-Based Perovskite.** H.P. Soon*, J.M. Xue, and J. Wang, National University of Singapore	**P3FE-K-6 U9 Evaluation of Sol-Gel Derived BST Thin Films for Embedded Capacitor Application.** G. Xing*[1], Q. Zou[1], H. Xu[2], and G. Himer[1], [1]Division of Materials Development, Energenius Inc., [2]VLSI Group, University of Toronto	**P3U-L-6 F6 A Real-time Clinical Ultrasound Contrast Dosimeter with Adaptive Algorithms.** F-M. Wang*, R. Karshafian, and P. N. Burns, Department of Medical Biophysics, University of Toronto
P3FE-G-3 S10 An Investigation of BST:$MgTiO_3$ and X7R:$MgTiO_3$ Based Ceramics for Microwave Applications. R. Kurchania*[1], A. J. Bell[1], T. Chakraborty[2], and I. C. Hunter[2], [1]Institute for Materials Research, [2]Institute of Microwaves & Photonics, School of Electronic & Electrical Engineering, University of Leeds, Leeds LS2 9JT, UK	**P3FE-H-3 X7 Nonlinear Piezoresponse in Ferroelectric Thin Films Studied by Scanning Force Microscopy.** V. V. Shvartsman[1], J. M. Herrero[2], C. Zaldo[2], N. A. Pertsev[3], and A. L. Kholkin*[1], [1]Dept. of Ceramics and Glass Engineering, CICECO, University of Aveiro, [2]Instituto de Ciencia de Materiales de Madrid, Consejo Superior de Investigaciones Cientificas, [3]A. F. Ioffe Physico-Technical Institute RAS	**P3FE-I-3 T13 Local Switching Properties of Dense Nanocrystalline $BaTiO_3$ Ceramics by AFM Piezoresponse Investigations.** C. Harnagea*[1], V. Buscaglia[2], M. T. Buscaglia[2], M. Viviani[2], P. Nanni[3], A. Testino[3], L. Mitoseriu[3,4], M. Nygren[5], and Z. Zhao[5], [1]Institut National de la Recherche Scientifique - Energie, Materiaux et Telecommunications, [2]Institute for Energetics & Interfaces - CNR, [3]University of Genoa, [4]Al. I. Cuza University, [5]University of Stockholm	**P3FE-J-6 W3 Electronic Structure of Piezoelectric $PbTiO_3$ in Cubic and Tetragonal Phases.** S. M. Hosseini*[1], A. Kompany[1], and T. Molarooy[1], [1]Dept. of Physics, Ferdowsi University of Mashhad, [2]Dept. of Physics, Ferdowsi University of Mashhad, [3]Dept. of Physics, Ferdowsi University of Mashhad	**P3FE-K-7 T10 Spatial Resitivity Profiling of Multilayer Capacitors as a Function of Furnace Conditions.** C. M. Williams, A. E. Hydrick, H. M. Schulze*, and W. A. Schulze*, Alfred University	**P3U-L-7 F7 Automated Detection of the Aortic Valve Closure Event in Tissue Velocity Images.** S. Aase*[1], C. Bjork Ingul[1], S. Frigstad[2], and H. Torp[1], [1]NTNU - Dept of Circulation & Medical Imaging, [2]GE Vingmed Ultrasound

P3FE-G-4 S11 Dielectric Behaviour of Composite Films of Nickel-Zinc Ferrite and Barium Titanate in Low Frequency and Microwave Frequency Range. N. Gupta*, S. C. Kashyap, and D.C. Dube, Indian Institute of Technology, Delhi

P3FE-H-4 X8 Thickness Dependence of the Microscopic and Macroscopic Piezoelectric Properties of Lead Zirconate Titanate Thin Films. J. Perez[1], V. V. Shvartsman[1], P. M. Vilarinho[1], A. L. Kholkin*[1], J. M. Herrero[2], and C. Zaldo[2], [1]Dept. of Ceramics and Glass Engineering, CICECO, University of Aveiro, [2]Instituto de Ciencia de Materiales de Madrid, Consejo Superior de Investigaciones Cientificas

P3FE-I-4 T14 *In-Situ* Domain Observation of $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ Single Crystals Near the Curie Temperature using Contact-Resonance Piezoresponse Force Microscope. H. Okino*, J. Sakamoto, and T. Yamamoto, National Defense Academy

Session P3FE-K
CAPACITORS AND DIELECTRICS
Chair: D. McCauley
Ferreoelectric Material Systems

Session P3U-L
MEDICAL SIGNAL PROCESSING II
Chair: C. Hall
Philips Research

P3U-L-8 F8 Implementation of Digital Synthetic Aperture Technique for a High Frequency Annular Array. S. N. Ramachandran*[1], J. A. Ketterling[1], F. L. Lizzi[1], O. Aristizabal[2], and D. H. Turnbull[2], [1]Riverside Research Institute, [2]Skirball Inst of Biomolecular Med, NYU School of Medicine

P3FE-G-5 S12 Design of a Si MMIC Compatible Ferroelectric Varactor Shunt Switch for Microwave Switching Applications. F. Ahamed* and G. Subramanyam, University of Dayton

P3FE-H-5 X9 Analytical Modeling of Apparent d33 Piezoelectric Coefficient Measured by the Direct Quasistatic Method for Different Boundary Conditions. A. Barzegar*, D. Damjanovic, and N. Setter, EPFL-Swiss Federal Institute of Technology Lausanne

Session P3FE-J
MODELING AND THEORY
Chair: D. Viehland
Virginia Tech

P3FE-K-1 U4 Dielectric Behavior of Calcium Copper Titanium Oxide under High Electric Field. M.-J. Pan* and B. A. Bender, Naval Research Laboratory

P3U-L-1 F1 Filtering of Chirped Ultrasound Echo Signals with the Fractional Fourier Transform. M. J. Bennett*[1], S. McLaughlin[1], T. Anderson[2], and N. McDicken[2], [1]University of Edinburgh, [2]University of Edinburgh

Session P3U-M
TISSUE CHARACTERIZATION
Chair: J. Greenleaf
Mayo Clinic

P3FE-G-6 S13 Influence of Stacking Periodicity on the Dielectric Tunability Properties of (Ba1-xSrx)TiO3 Multialayers Films. D. Peng, W. Wu, and Z. Meng*, School of materials Science and Engineering, Shanghai University

P3FE-H-6 X10 Complex Rare-Earth Substituted Lead Titanate Piezoceramics. E. Dimitriu, F. Craciun*, P. Verardi*, V. Ciupina, and G. Prodan, Interdisciplinary Research Institute for Micro and Nanostructure, University "Ovidius", Constanta, Romania, Istituto di Acustica "O.M. Corbino", Area di Ricerca Tor Vergata, Via del Fosso del Cavaliere 100, I-00133, Rome, Italy

P3FE-J-1 U1 Numerical Model of Influence of External Electric Loading on Electro-Elastic Field in Ferroelectrics. J. Královcova* and J. Maryka, Technical University of Liberec

P3FE-K-2 U5 Size Effect of Barium Titanate Based Ceramics Sintered in Reducing Atmospheres. X. Wang*, H. Wen, R. Chen, H. Zhou, and L. Li, Tsinghua University

P3U-L-2 F2 The Use of Chirp Overlapping Properties for Improved Target Resolution in Ultrasonic Ranging Systems. F. Devaud*, G. Hayward, and J. J. Soraghan, University of Strathclyde

P3U-M-1 G1 Causal Transient Propagation in Media with Classical or Power-Law Loss. R. S. C. Cobbold*, N. V. Sushilov, and A. Weathermon, University of Toronto

P3FE-J-2 U2 A Fatigue Model for PZT Thin Films. F. Chen*, C. Yang, J. Liu, Z. Tian, and S. Zhang, School of Microelectronics and Solid-State Electronics, University of Electronic Science and Technology of China

P3FE-K-3 U6 Sodium Bismuth Titanate Modifications for High Temperature Capacitor Applications. C. J. Walsh and W. A. Schulze*, Alfred University

P3U-L-3 F3 Ultrasound Imaging System using Combinational Coding of Excitation. K. Asafusa*[1], T. Azuma[2], H. Kanda[1], R. Shinomura[1], and S.-I. Umemura[1], [1]Hitachi Medical Corporation, [2]Hitachi Central Research Laboratory

P3U-M-2 G2 The Ultrasonic Attenuation Coefficient for Human Blood Plasma in the Frequency Range of 7 - 90 MHz. M. M. Calor-Filho and J. C. Machado*, Biomedical Engineering Program - COPPE/Federal University of Rio de Janeiro

P3U-M-3 G3 Resolution Improved Ultrasound Attenuation Estimation Based on RF-Data of Spatial Compound Scans. K. V. Jenderka*, Physikalisch-Technische Bundesanstalt (PTB), Ultrasonics Section

P3U-N-4 G11 Application of Doppler Measurement using Multiplexed Dual-Chirp Signals to Multiple Reflectors. M. Yoshizawa*[1], K. Ueda[1], N. Tagawa[2], and T. Moriya[2], [1]Tokyo Metropolitan College of Technology, [2]Department of Electrical Engineering, Tokyo Metropolitan University

P3U-O-4 H10 Evaluation of Thin Compression Plates for Mammographically Compatible Breast Ultrasound. R. C. Booi*[1,2], J. F. Kruecker[1], M. M. Goodsitt[1], M. O'Donnell[2], A. Kapur[3], G. L. LeCarpentier[1], M. A. Roubidoux[1], J. B. Fowlkes[1], and P. L. Carson[1,2], [1]Department of Radiology, [2]Department of Biomedical Engineering, [3]General Electric Global Research Center

P3U-P-3 H3 Diagnostics of Prostate Cancer based on Ultrasonic Multifeature Tissue Characterization. U. Scheipers*[1,4], K. Koenig[2,4], T. Senge[2,4], S. Philippou[3,4], and H. Ermert[1,4], [1]Institute of High Frequency Engineering, Ruhr-Universitaet Bochum, [2]Urological Department, Marienhospital, [3]Institute for Pathology, Augusta-Krankenanstalt, [4]Ruhr Center of Excellence for Medical Engineering KMR

P3U-Q-2 I5 3-D Ultrasound Calibration Using a Phantom with Reduced Complexity. S. Dandekar[1], J. Hossack*[1], and J. Molloy[2], [1]University of Virginia Department of Biomedical Engineering, [2]University of Virginia Department of Radiation Oncology

P3U-R-3 I12 Energy and Pulse Control Possibilities using Ultra-Tight Integration of Electronics and Piezoelectric Ceramics. J. Johansson*, J. van Deventer, and J. Delsing, Lulea University of Technology

P3U-M-4 G4 Dependence of Tissue Characterization Features on Region of Interest Size: Studies on Phantoms and In Vitro Prostate Tissues. Z. He*[1], S. Grimm[3], R. F. Wagner[2], K. A. Wear[2], E. Jannicky[3], D. Huston[1], and B. S. Garra[3], [1]Department of Mechanical Engineering, College of Engineering, University of Vermont, [2]Center for Devices and Radiological Health, FDA, [3]Department of Radiology, University of Vermont College of Medicine

P3U-N-5 G12 Inter-Frame Clutter Filtering for High Frequency Flow Imaging. A. Needles*[1], D. E. Goertz[2], and F. S. Foster[1], [1]Sunnybrook and Women's College Health Sciences Center, Toronto, [2]Erasmus MC, Rotterdam

P3U-O-5 H9 A Feasibility Study on the Development of Ultrasonic Parametric Imaging Based on Nakagami Statistical Model. S.-H. Wang*, P.-H. Tsui, and C.-T. Chuang, Department of Biomedical Engineering, Chung Yuan Christian University

P3U-P-4 H2 Ultrasonic Tissue Characterization as a Predictor of White Matter Damage: Results of a Preliminary Study. T. A. Hope*[1], P. H. Gregson[1], N. Linney[2], and M. Schmidt[3], [1]Dalhousie University, [2]Saint Mary's University, [3]IWK Health Centre

P3U-Q-3 I6 Variability of Three-Dimensional High-Frequency Ultrasound Measurements of Small Tumor Volumes. L. A. Hastie*[1,3], K. C. Graham[2,3], A. C. Groom[2,3], I. C. MacDonald[2,3], A. F. Chambers[2,3], A. Fenster[1,3], and J. C. Lacefield[1,3], [1]Robarts Research Institute, [2]London Regional Cancer Centre, [3]The University of Western Ontario

P3U-R-4 I13 Technique for Reducing Variance in Transducer Array Pulse-Echo Response. S. Zhou* and J. A. Hossack, University of Virginia

P3U-M-5 G5 Viscoelastic Characterization of in-vitro Canine and Porcine Tissues. M. Kiss* and T. Varghese, University of Wisconsin, Department of Medical Physics

P3U-N-6 G7 Velocity and Acceleration Estimation Employing Nonuniform Sampling. L. Benner[1], W. G. Wilkening*[1,2], and H. Ermert[1,2], [1]Institute of High Frequency Engineering, Ruhr-Universitaet Bochum, [2]Ruhr Center of Excellence for Medical Engineering (KMR)

P3U-O-6 H8 Analysis and Measurement of Spectral Characteristics and Spatial Resolution of High Frequency Ultrasound Imaging Systems. M. Vogt*[1], B. Paul[2], S. Scharenberg[2], R. Scharenberg[2], and H. Ermert[1], [1]Institute of High Frequency Engineering, Ruhr-Universitaet Bochum, Germany, [2]taberna pro medicum GmbH, Lueneburg, Germany

P3U-P-5 H1 Construction of Reference Data for Classification of Elasticity Images of Arterial Wall. J. Inagaki*[1], H. Hasegawa[1], H. Kanai[1], M. Ichiki[2], and F. Tezuka[3], [1]Graduate School of Engineering, Tohoku University, [2]Sendai Hospital of East railway Company, [3]Sendai National Hospital

P3U-Q-4 I7 Ultrasound Spatial Compounding via Registration of 2D Slices into 3D Volume. J. Liu*[1], N. Pagoulatos[2], and Y. Kim[3], [1]University of California, Davis, [2]Siemens Medical Solution, [3]University of Washington

P3U-R-5 J13 High Density Interconnections for Polymer Ultrasound Transducers. C. Gregory*, S. Carey, and J. Hatfield, UMIST

P3U-M-6 G6 Mean Scatterer Spacing Estimation using Wavelet Spectrum. J. Tsao* and K.-H. Chiang, Dept. of EE. And Inst. of Comm., National Taiwan University

P3U-N-7 G13 Transit Time Broadening: A Pulsed-Wave Doppler Ultrasound Perspective. A. C. H. Yu*, A. H. Steinman, E. Y. L. Lui, and R. S. C. Cobbold, University of Toronto

P3U-O-7 H7 Use of a Composite Non-Linear Model Including Microbubbles and Tissue to Examine Harmonic Effects for Ultrasonic Propagation and Backscatter in Complex Tissues. O. Mukdadi*[1] and R. Shandas[1,2], [1]University of Colorado, [2]The Children's Hospital

P3U-P-6 I1 Parametric Imaging On a Clinical Scanner. J. Zagzebski*, A. Gerig, Q. Chen, T. Varghese, T. Hall, and H. Tu, Medical Physics, University of Wisconsin

P3U-Q-5 I8 Theoretical and Experimental High-Frequency Nonlinear Ultrasound Propagation through Multilayered Media. R. Williams*[1], E. Cherin[1], J. Tavakkoli[2], R. J. Zemp[3], and F. S. Foster[1], [1]Sunnybrook and Women's College Health Sciences Centre, [2]VisualSonics Inc., [3]University of California at Davis

Session P3U-S
CMUT TECHNOLOGY
Chair: S. Smith
GE Global Research

Session P3U-N **BLOOD FLOW** Chair: T. Thomas Siemens	*Session P3U-O* **IMAGING TECHNIQUES AND MODELING** Chair: P. Li National Taiwan University	**P3U-O-8 H6 Improving Reliability in Measurement of Minute Change in Wall Thickness using Template Matching.** J. Tang*, H. Hasegawa, and H. Kanai, Graduate School of Engineering, Tohoku University	**P3U-P-7 I2 Liver Fatty Change Classification using 25MHz High Frequency Ultrasound.** W.-C. Yeh*[1], Y.-M. Jeng[2], C.-H. Lee[1], P.-H. Lee[3], and P.-C. Li[1], [1]Department of Electrical Engineering, National Taiwan University, [2]Department of Pathology, National Taiwan University Hospital, [3]Department of Surgery, National Taiwan University Hospital	**P3U-Q-6 I9 Ultrasound High Frequency Image of Human Esophagus In Vitro.** M. Soldan and J. C. Machado*, Biomedical Engineering Program - COPPE/ Federal University of Rio de Janeiro	**P3U-S-1 J9 A Low-Noise, Wideband Electronic System for Pulse-Echo Ultrasound Imaging with CMUT Arrays.** A. Caronti*[1], D. Fiasca[1], G. Caliano[1], R. Carotenuto[2], and M. Pappalardo[1], [1]Dipartimento di Ingegneria Elettronica, Universitàdegli Studi Roma Tre, [2]Dipartimento I. M. E. T., Universitàdegli Studi "Mediterranea" di Reggio Calabria
P3U-N-1 G8 Test Phantoms for Color Flow Imaging Systems. T. Kondo*[1], H. Kanda[2], K. Mizusige[3], and H. Matuo[4], [1]Tokushima Bunri University, [2]Hitachi Medical Corporation, [3]Kagawa University Medical School, [4]General Health Promotion Center, Shikoku Electric Power, Inc	**P3U-O-1 H13 Edge Shadows Around Rigid, Absorbing, and Non-Absorbing Cylinders.** R. Steel*[1], T. Poepping[2], R. Thompson[1], and C. Macaskill[1], [1]University of Sydney, [2]University of Edinburgh	*Session P3U-P* **CLINICAL TISSUE CHARACTERIZATION** Chair: J. Miller Washington University	**P3U-P-8 I3 Clinical Test of RULES (Radiofrequency Ultrasonic Local Estimators).** L. Masotti, E. Biagi*, S. Granchi, L. Breschi, E. Magrini, and F. Di Lorenzo, Laboratorio Ultrasuoni e Controlli Non Distruttivi, Dipartimento di Elettronica e Telecomunicazioni	*Session P3U-R* **TRANSDUCER TECHNOLOGY** Chair: V. Varadan The Pennsylvania State University	**P3U-S-2 J10 A Front-End Integrated Circuit for 3D Acoustic Imaging using 2D CMUT Arrays.** I. Cicek*[1], A. Bozkurt[1], and M. Karaman[2], [1]Sabanci University, [2]Isik University
P3U-N-2 G9 Effect of Beam Shape on Techniques That use Doppler Signal Power for Monitoring Vessel Size Change. L. Sweetman and D. H. Evans*, University of Leicester	**P3U-O-2 H12 Knowledge Based Extraction of Left Ventricular Endocardial Border from 2D Echocardiograms.** J. Hanseg'rd*[1], E. Steen[2], S. I. Rabben[2], A. H. Torp[2], S. Frigstad[2], and B. Olstad[2], [1]Department of Informatics, University of Oslo, [2]GE Vingmed Ultrasound	**P3U-P-1 H5 Ultrasonic Imaging of Biochemical Changes in Tissues.** M. Sridhar*, H. Du, C. Pellot-Barakat, J. K. Tsou, and M. F. Insana, UC, Davis	*Session P3U-Q* **3D** Chair: O. Basset CREATIS	**P3U-R-1 I10 Quantitative Estimation of Acoustic Streaming Effects on Ultrasonic Power Measurement.** T. Kikuchi*, S. Sato, and M. Yoshioka, National Metrology Institute of Japan, AIST	**P3U-S-3 J11 Capacitive Micromachined Ultrasonic Transducers (CMUT) with Isolation Posts.** Y. Huang*, E. O. Hæggström, X. Zhuang, A. S. Ergun, and B. T. Khuri-Yakub, Edward L. Ginzton Laboratory, Stanford University
P3U-N-3 G10 Volume Flow Measurements with a Novel Semi-Automated 4D Doppler Ultrasound Scanner. F. Forsberg*[1], J. B. Liu[1], A. Stein[2], X. Deng[1], W. Ackerman[2], D. Herzog[2], K. Abend[2], and L. Needleman[1], [1]Department of Radiology, Thomas Jefferson University, Philadelphia, PA, [2]Vuesonix Sensors, Wayne, PA	**P3U-O-3 H11 Evaluation of 2-D Speckle Tracking Based Strain Rate Imaging using a 3-D Heart Simulation Model.** X. Chen*[1], X. Li[2], D. Sahn[2], K. Kim[1], H. Xie[1], and M. O'Donnell[1], [1]Biomedical Engineering Department, University of Michigan, [2]Department of Pediatrics,Oregon Health Science University	**P3U-P-2 H4 Local Inversion of Transient Shear-Wave Propagation for Elasticity and Viscosity Mapping in Soft Tissues: Theoretical and Experimental Analysis.** J. Bercoff*, M. Tanter, M. Muller, and M. Fink, Laboratoire Ondes et Acoustique	**P3U-Q-1 I4 A New 3D Ultrasonic Model of Pathologic Carotid Vessels Based on Generalized Cylinders.** S. Balocco*[1,2], O. Basset[1], J. Azencot[1], P. Delachartre[1], P. Tortoli[2], and C. Cachard[1], [1]CREATIS, UMR 5515 CNRS, U 630 INSERM, Lyon France, [2]Microelectronic Systems Design Laboratory, Firenze, Italy	**P3U-R-2 I11 Development of Miniature Hydrophone with PZT Flim Deposited by Hydrothermal Method.** H. Kitsunai[1], T. Suzuki[1], N. Kawashima[1], M. Ishikawa[21], M. Kurosawa[2], and S. Takeuchi*[1], [1]Toin University of Yokohama, [2]Tokyo Institute of Technology	**P3U-S-4 J12 Comparison of Measurements and Simulations of CMUT Cells and Arrays.** M. Hofer*[1], A. Caronti[2], M. Kaltenbacher[1], M. Pappalardo[2], and R. Lerch[1], [1]Department of Sensor Technology, [2]Dip. di Ingegneria Elettronica

P3U-S-5 J6 Theoretical Analysis of MUT using a Simple 1D Model. M. Wilm* and S. Ballandras, Institut FEMTO-ST

P3U-U-3 K2 A Novel Ultrasonic Motor with a Built-in Clutch Mechanism for a Force-feed-back Actuator. M. Aoyagi*[1], Y. Tomikawa[2], and T. Takano[3], [1]Muroran Institute of Technology, [2]Yamagata University, [3]Tohoku Institute of Technology

P3U-U-11 J2 A Simple Model of a Multi-Layer Piezoelectric Longitudinal Actuator. D. S. Stutts*, University of Missouri-Rolla

Session P3U-W
NDE IMAGING
Chair: N. Bilgutay
Drexel University

Session P3U-X
SIGNAL PROCESSING
Chair: E. Furgason
Purdue University

P3U-Y-2 L2 Configuration of a 20-mm-Diameter 150 kHz Ultrasonic Longitudinal Vibration System for Plastic Welding. M. Hongoh*, H. Miura, M. Yoshikuni, T. Ueoka, and J. Tsujino, Kanagawa University

Session P3U-T
SURGICAL TRANSDUCERS
Chair: S. Smith
GE Global Research

P3U-U-4 K3 Prediction Method for the Fundamental Radial Mode of Multi-Mode Ultrasonic Motors. J. Puccio*, L. Gatzoulis, and G. Hayward, Centre for Ultrasonic Engineering

P3U-U-12 J1 Torque Control of a Rotary Traveling Wave Type Ultrasonic Motor Impressed High Load Torque in Low Speed Range. Y. Ogahara* and T. Maeno, Keio University

P3U-W-1 L13 Surface-Breaking Flaw Evaluation using an Adaptive Laser Ultrasound System with a Photo-Refractive Quantum-Wells. Y. Matsuda*, H. Nakano, and S. Nagai, National Metrology Institute of Japan / AIST

P3U-X-1 L4 Multiplexed Dual-Chirp Pulse Compression Method for Ultrasonography. N. Tagawa*[1], T. Moriya[1], K. Iwashita[1], and M. Yoshizawa[2], [1]Tokyo Metropolitan University, [2]Tokyo Metropolitan College of Technology

P3U-Y-3 L3 Linear and Nonlinear Acoustic Parameters Measurements in Plates with Various Moisture Contents. F. Vander Meulen*, J. Fortineau, L. Haumesser, S. Dos Santos, and O. Bou Matar, LUSSI

P3U-T-1 J7 Focused Ultrasound Thermal Surgery, Imaging, and Elastometry using the Same Phased Array: Feasibility Study. A. V. Zaitsev*[1], J. S. Thierman[2], J. Juste[1], and K. Hynynen[1], [1]Brigham and Women's Hospital, Harvard Medical School, [2]Harvard-MIT HST Program

P3U-U-5 K4 Characteristics, Modeling and Simulation of a Travelling Wave Ultrasonic Linear Motor. J. M. Fernandez Lopez* and Y. Perriard, Swiss Federal Institute of Technology - EPFL

Session P3U-V
ACOUSTIC AND OPTICAL SCATTERING
Chair: D. Hecht
DLH Laboratories

P3U-W-2 L12 QNDT of Surface Tilt Defects by Photoacoustic Microscopic Imaging. H. Endoh*, K. Inomata, K. Miyamoto, and T. Hoshimiya, Tohoku Gakuin University

P3U-X-2 L5 Denoising and Compression of Ultrasonic Signals using Model-Based Estimation Techniques. R. Demirli* and J. Saniie, Illinois Institute of Technology

P3U-T-2 J8 Design, Finite Element Analysis and Experiments Study on Ultrasonic Torsional Surgery Tool. Z. Zhou* and Y. Chen, Tsinghua University

P3U-U-6 K5 An Effective Frequency Tracking Control and Balancing Compensation Between CW and CCW Rotation Speed Techniques for Ultrasonic Motor. C. Zhihua*[1,2], Z. Chunsheng[1], and H. Weiqing[1], [1]Nanjing University of Aeronautics and Astronautics, [2]National University of Defense Technology

P3U-V-1 K9 An Optical Tunable Notch Filter using an Ultrasonically Induced Long Period Fiber Grating. K. Nakamura*, K. Kubota, J. R. Friend, and S. Ueha, Precision and Intelligence Laboratory, Tokyo Institute of Technology

P3U-W-3 L11 Nondestructive Evaluation of Adhesive Joints in Layered Structures using Nonlinear Measurements of Second Harmonics of Ultrasonic Lamb Waves. M. Deng*[1,2], X. Lv[2], and P. Wang[2], [1]Department of Physics, Logistics Engineering University, [2]College of Automation, Chongqing University of Posts and Telecommunications

P3U-X-3 L6 Waveguide Damage Detection by the Matching Pursuit Using the Gaussian Chirp Pulses. J.-C. Hong*, K. H. Sun, and Y. Y. Kim, Seoul National University

P3U-T-3 J5 A Mechanical Transformer and a Focusing Applicator for the Transmission of Ultrasonic Wave through Thin Ultrasonic Transmission Line. T. Moriya*[1], N. Tagawa[1], S. Naganuma[1], Y. Hashimoto[2], and S.-I. Yagi[2], [1]Tokyo Metropolitan University, [2]Meisei University	**P3U-U-7 K6 Experimental Study of Heat Radiating System in Electronic Apparatus using Electro-Mechanical Vibrator Pump.** T. Takano*[1], Y. Tomikawa[2], and M. Aoyagi[3], [1]Tohoku Institute of Technology, [2]Yamagata University, [3]Muroran Institute of Technology	**P3U-V-2 K10 Waveguide-Type Acoustooptic Frequency Shifter with High Diffraction Efficiency Driven by Surface Acoustic Wave.** S. Kakio*[1], M. Kitamura[1], Y. Nakagawa[1], T. Hara[2], H. Ito[2], T. Iizuka[3], T. Kobayashi[3], and M. Watanabe[3], [1]University of Yamanashi, [2]Tohoku University, [3]OPTOQUEST Corp	**P3U-W-4 L10 Ultrasonic Testing of Steel Tubes by Supercritical Parametric Wave Phase Conjugation.** A. Brysev[1,2], L. Krutyansky[1,2], O. Bou Matar[1], V. Preobrazhensky[1,2], and P. Pernod*[1], [1]Institut d'Electronique, de Microélectronique et de Nanotechnologie (IEMN-DOAE, UMR CNRS 8520), [2]Wave Research Center of General Physics Institute (RAS)	**P3U-X-4 L7 Performance Evaluation of DWT, DCT, and WHT for Compression of Ultrasonic NDE Data.** G. Cardoso* and J. Saniie, Illinois Institute of Technology	
Session P3U-U **ULTRASONIC MOTORS AND ACTUATORS** Chair: Y. Yong Rutgers University	**P3U-U-8 K7 Optimal Design on Stator of a 3-DOF Ultrasonic Motor.** C. Zhao*[1], Z. Li[2], and W. Huang[3], [1]Nanjing University of Aeronautics and Astronautics, [2]Nanjing University of Aeronautics and Astronautics, [3]Nanjing University of Aeronautics and Astronautics	**P3U-V-3 K11 Dependence of Poisson's Ratio on Porosity in Nanoporous Films using Brillouin Light Scattering.** C. M. Flannery* and S. Kim, NIST	**P3U-W-5 L9 Ultrasonic Air-Coupled Metrology of Material Surfaces.** Y. Gomez-Ullate and F. Montero de Espinosa*, Instituto de Acustica CSIC	**P3U-X-5 L8 Flaw Location from Perpendicular NDE Ultrasonic Transducers using the Wavelet Packet Transform.** M. A. Rodríguez-Hernández[1], A. Ramos[2], J. L. San Emeterio[2], and J. J. Pérez-Solano*[3], [1]ETSI Telecomunicación, Universidad Politécnica de Valencia, [2]Instituto de Acústica, CSIC, [3]Instituto de Robótica, Universidad de Valencia	
P3U-U-1 J4 Localized Heating Effects of Liquid Based on SAW Streaming. N. Shimizu[1], J. Kondoh*[1,2], Y. Matsui[3], and S. Shiokawa[3], [1]Graduate School of Science and Technology, Shizuoka University, [2]Faculty of Engineering, Shizuoka University, [3]A&R Center for Surface Wave Technology	**P3U-U-9 K8 Novel Horn Designs for Power Ultrasonics.** S. Sherrit*, X. Bao, Y. Bar-Cohen, and Z. Chang, Jet Propulsion Laboratory, California Institute of Technology	**P3U-V-4 K12 Design of Functional Devices with Resonant Filter with a Simple Sonic Crystal Structures.** C. Kaneshiro*, M. Ozaki, K. Koh, and K. Hohkawa, Electric & Electrical Engineering, Kanagawa Institute of Technology	**P3U-W-6 K13 In vitro Ultrasonic Force Microscopy.** B. D. Huey*[1,3], O. V. Kolosov[2], R. Szoszkiewicz[3], and A. Kulik[3], [1]University of Connecticut, Institute of Materials Science, [2]Symyx Technologies, [3]EPFL, IPMC	*Session P3U-Y* **NDE METHODS** Chair: D. Yuhas Industrial Measurement Systems	
P3U-U-2 K1 Development of a Multilayer Actuator with PMN-PT Single Crystals for an Implantable Hearing Aid. Y. R. Roh*[1], J. H. Seon[1], D. W. Lim[1], and S. G. Lee[2], [1]Kyungpook National University, [2]iBULE Photonics Co.	**P3U-U-10 J3 Configurations of Ultrasonic Motors Using Multiple Longitudinal Transducers.** A. Suzuki*, M. Kihara, Y. Katsumata, N. Kikichi, and J. Tsujino, Kanagawa University			**P3U-Y-1 L1 Concentration Control in Lactic Fermentation Process from Ultrasonic Velocity Measurements.** P. Resa*, L. Elvira, and F. Montero de Espinosa, Instituto de Acústica, CSIC	

	Session U1-H **ABERRATION CORRECTION** Chair: G. Trahey Duke University	*Session U2-H* **THERAPY: CAVITATION** Chair: K. Hynynen Harvard	*Session U3-H* **HIGH FREQUENCY TRANSDUCERS** Chair: G. Lockwood Queens University	*Session U4-H* **TRANSDUCERS I** Chair: Y. Yong Rutgers University	*Session U5-H* **WAVE PROPAGATION** Chair: W. Arnold Fraunhofer Institute	*Session U6-H* **LADDERTYPE FILTERS AND DUPLEXERS** Chair: M. Solal TEMEX
	510AC	**510BD**	**511AB**	**513AB**	**512C-H**	**512A-F**
8:30 a.m.	**U1-H-1 (Invited)Time Reversed Acoustics.** F. Mathias*, Laboratoire Ondes et Acoustique, ESPCI	**U2-H-1 Effect of Pulse Parameters on Cavitation and Acoustic Streaming in Ultrasonic Surgical Devices.** M. E. Schafer*, Sonic Tech, Inc.	**U3-H-1 Development of a High Frequency (35 MHz) Linear Ultrasonic Array Using 2-2 Composite Elements.** J. M. Cannata*, Q. F. Zhou, and K. K. Shung, University of Southern California	**U4-H-1 Development of Strong Elasticoluminescence From Ferroelectric Phase.** C.-N. Xu*[1,2], Y. Liu[1], H. Yamada[2], X. Wang[2], and X.-G. Zheng[3], [1]National Institute of Advanced Industrial Science and Technology (AIST), [2]PRESTO, Japan Science and Technology Agency, [3]Department of Physics, Saga University	**U5-H-1 Optimized Excitation Sources and Velocity Exact Solutions for Ultrasonic Field Propagation in a Nonlinear Medium with Hysteretic Behavior.** S. Dos Santos*[1], V. Gusev[2], L. Haumesser[1], F. Vander Meulen[1], and O. Bou Matar[1], [1]LUSSI FRE 2448 CNRS -GIP Ultrasons, [2]LPEC UPRESA-CNRS 6087	**U6-H-1 A Miniaturized 3x3 mm$_2$ SAW Antenna Duplexer for US-PCS Band with Temperature Compensated LiTaO$_3$/Sapphire Substrate.** J. Tsutsumi*[1], S. Inoue[1], Y. Iwamoto[1], M. Miura[1], T. Matsuda[1], Y. Satoh[1], T. Nishizawa[2], M. Ueda[2], and O. Ikata[2], [1]Fujutsu Laboratories Ltd., [2]Fujitsu Media Devices Limited
8:45 a.m.		**U2-H-2 Relative Effects of Acoustic Nonlinearity and Cavitation on the Dynamics of HIFU Lesion Formation in a Tissue Phantom.** V. A. Khokhlova*[1], M. R. Bailey[2], J. Reed[2], P. J. Kaczkowski[2], and L. A. Crum[2], [1]Department of Acoustics, Faculty of Physics, M. V. Lomonosov Moscow State University, [2]Center for Industrial and Medical Ultrasound, Applied Physics Laboratory, University of Washington	**U3-H-2 Piezocomposite 30MHz Linear Array for Medical Imaging: Design Challenges and Performances Evaluation of a 128 Elements Array.** S. Michau*, P. Mauchamp, and R. Dufait, VERMON S.A	**U4-H-2 Spherical F1mm SAW device based on Ball Semiconductor/MEMS Technology.** D. Y. Sim*[1], A. Mizukami[2], S. Akao[3], I. Satoh[4], M. Bryan[1], N. Takeda[1], T. Ohgi[3], N. Nakaso[3], T. Miyagishi[4], H. Tanaka[4], T. K. Fukiura[4], H. Kazato[4], H. Watanabe[2], T. Mihara[2], and K.Yamanaka[2], [1]Ball Semiconductor Inc., [2]Department of Materials Processing, Tohoku University, [3]Toppan Printing Co., Ltd., [4]Yamatake Corp	**U5-H-2 A Novel Numerical Method for Simulating Wave Propagation in Moving Media.** M. Bezdek*, A. Rieder, H. Landes, and R. Lerch, Department of Sensor Technology, University of Erlangen	**U6-H-2 High-Q SAW Resonator with SiO2 Coat for Stabilizing Temperature Characteristic.** R. Takayama*, H. Nakanishi, Y. Iwasaki, and T. Kawasaki, Matsushita Electronic Components Co., Ltd.

9:00 a.m.	**U1-H-2 A Novel Phase Aberration Measurement Technique Derived from the DORT Method: Comparison with Correlation-Based Method on Simulated and *In-Vivo* Data.** A. T. Fernandez, M. R. Burcher*, and C. R. Cohen-Bacrie, Philips Research USA	**U2-H-3 Spatial Control of Cavitation: Theoretical and Experimental Validation of a Dual-Frequency Excitation Method.** S. D. Sokka*, T. P. Gauthier, and K. Hynynen, Brigham & Women's Hospital, Harvard Medical School	**U3-H-3 Wide Frequency Band and High Intensity Thickness Vibration of Hydrothermal Lead Zirconate Titanate Polycrystalline Film.** M. Ishikawa*[1], M. K. Kurosawa[1], and S. Takeuchi[2], [1]Tokyo Institute of Technology, [2]Toin University of Yokohama	**U4-H-3 Single Crystal Piezomotor for Large Stroke, High precision and Cryogenic Actuations.** X. Jiang*[1], P. W. Rehrig[1], W. S. Hackenberger[1], D. Viehland[2], and S. Dong[2], [1]TRS Technologies, Inc., [2]Virginia Polytechnic Institute and State University	**U5-H-3 Analysis of Ultrasonic Wave Propagation in Metallic Pipe Structures using Finite Element Modelling Techniques.** A. Gachagan*[1], P. Reynolds[2], and A. McNab[1], [1]University of Strathclyde, [2]Weidlinger Associates	**U6-H-3 SAW Ladder Filter with Wide Rejection Band Adjacent to Passband.** J. J. Caron* and S. Shishkin, Sawtek, Inc.
9:15 a.m.	**U1-H-3 Iteration of Ultrasound Aberration Correction Methods.** S.E. Måsøy*[1], T. Varslot[2], and B. Angelsen[1], [1]Norwegian University of Science and Technology, Department of Circulation and Imaging, [2]Norwegian University of Science and Technology, Department of Mathematical Sciences	**U2-H-4 Heating Mechanism of Microbubbles and Bubble Properties.** Y. Kaneko*, J. S. Allen, S. Yoshizawa, and Y. Matsumoto, Dept. of Mech. Eng., The Univ. of Tokyo	**U3-H-4 Shear Wave Transducer using (11-20) Textured ZnO Film.** T. Yanagitani*, T. Nohara, M. Matsukawa, Y. Watanabe, and T. Otani, Doshisha University	**U4-H-4 New Technology for COntrol of Light Intensity using Acoustical Activity in Ferroelectrics.** F. R. Akhmedzhanov*, Samarkand State University	**U5-H-4 Wave Propagation in Transversely Isotropic Circular Cylinders.** F. Honarvar*[1], A. Engilela[2], S. A. Mirnezami[1], and A. N. Sinclair[3], [1]K.N. Toosi University of Technology, [2]Islamic Azad University, [3]University of Toronto	**U6-H-4 SAW Duplexers without ?/4 Phase Shifter for CDMA Cellular Phone Systems.** T. Onzuka*, K. Noguchi, S. Yoshimoto, and Y. Yamamoto, NRS Technologies Inc.
9:30 a.m.	**U1-H-4 Experimental Comparisons of the Impact of Abdominal Wall Aberrators on Linear and Nonlinear Beam Patterns.** K. D. Wallace*[1], B. S. Robinson[2], M. R. Holland[1], M. R. Rielly[2], and J. G. Miller[1], [1]Washington University, [2]Philips Ultrasound	**U2-H-5 Nonlinear Ultrasound Propagation in a Spherical Bubble Cloud.** S. Yoshizawa*, T. Ikeda, S. Takagi, and Y. Matsumoto, Dept. of Mech. Eng., The Univ. of Tokyo	**U3-H-5 Lead-Free Thick Piezoelectric Films as Miniature High Temperature Ultrasonic Transducers.** M. Kobayashi*[1], C.-K. Jen[2], and Y. Ono[2], [1]Dept. of ECE, McGill University, [2]IMI, National Research Council Canada	**U4-H-5 High Frequency Filters Based on Piezoelectrically Transduced Micromechanical Resonators.** L. Yan*[1], J. Wu[2], and W. C. Tang[3], [1]Department of Mechanical and Aerospace Engineering, University of California, Irvine, [2]Department of Electrical Engineering and Computer Science, University of California, Irvine, [3]Department of Biomedical Engineering, University of California, Irvine	**U5-H-5 Experimental Study of a Sharp Bending Wave-Guide Constructed in a Sonic-Crystal Slab of an Array of Short Aluminum Rods in Air.** T. Miyashita*, Dept. Electronics and Informatics, Ryukoku University	**U6-H-5 Investigation of SAW W-CDMA Antenna Duplexer and GSM-Based FEM Including Duplexer.** M. Hikita*[1], N. Shibagaki[1], K. Sakiyama[2], H. Sunayama[2], and K. Tachibatake[2], [1]Central Research Lab. Hitachi Ltd., [2]Hitachi Media Electronics Ltd.
9:45 a.m.	**U1-H-5 Efficient and Accurate Spline-Based Time Delay Estimation.** F. Viola* and W. Walker, University of Virginia	**U2-H-6 Bubble Interactions in Clouds Produced during Shock Wave Lithotripsy.** E. A. Zabolotskaya*, Y. A. Ilinskii, G. Douglas Meegan, and M. F. Hamilton, Applied Research Laboratories The University of Texas at Austin		**U4-H-6 Piezoelectric Micromechanical Disk Resonators Towards UHF Band.** L. Yan*[1], J. Wu[2], and W. C. Tang[3], [1]Department of Mechanical and Aerospace Engineering, University of California, Irvine, [2]Department of Electrical Engineering and University of California, Irvine, [3]Department of Biomedical Engineering, University of California, Irvine	**U5-H-6 A Computational Method to Calculate the Transmit-Receive mode Echo Responses from Targets of Complex Geometry.** F. Buiochi*[1], O. Martínez[2], L. Gómez-Ullate[2], and F. Montero de Espinosa[3], [1]Escola Politecnica da Universidade de Sao Paulo, [2]Instituto de Automatica Industrial - CSIC, [3]Instituto de Acustica - CSIC	**U6-H-6 A SAW Duplexer with Superior Temperature Characteristics for US-PCS.** M. Jakob, U. Rösler, E. Garova-Mayer, G. Kovacs*, and W. Ruile, EPCOS AG

	Session FE1-H **PIEZOELECTRIC MATERIALS I** Chair: A. Safari Rutgers University			*Session FC1-H* **PHASE NOISE MEASUREMENT AND REDUCTION TECHNIQUES** Chair: G. Montress Raytheon Research Division	*Session FC2-H* **SENSOR TECHNOLOGY AND INSTRUMENTATION** Chair: R. Lec Drexel University	
	513CD			**511CF**	**511DE**	
8:30 a.m.	**FE1-H-1 (Invited) Bismuth Layer-Structured Ferroelectric Ceramics for Lead-Free Piezoelectric Applications.** T. Takenaka*, H. Nagata, and S. Horiuchi, Tokyo University of Science			**FC1-H-1 Direct-Digital Phase Noise Measurement.** J. Grove, W. Solbrig, and S. R. Stein, Timing Solutions Corporation	**FC2-H-1 SAW Sensors using Orthogonal Frequency Coding.** D. Puccio*[1], D. C. Malocha[1], D. Gallagher[1], and J. H. Hines[2], [1]ECE Dept., University of Central Florida, [2]Microsensor Systems, Inc	
8:45 a.m.				**FC1-H-2 Phase Noise Measurement of Low-Power Signals.** E. Rubiola*[1], E. Salik[2], N. Yu[2], and L. Maleki[2], [1]Université Henri Poincaré - ESSTIN - LPMIA, [2]Jet Propulsion Laboratory, Caltech Institute of Technology	**FC2-H-2 Measurement of the Equivalent Circuit Parameters of Chemical Interface Layers on Bulk Acoustic Wave Resonators.** G. Gouws*, R. Holt, and J. Zhen, School of Chemical Physical Sciences	

9:00 a.m.	**FE1-H-2 Dielectric and Piezoelectric Characteristics of Lead-Free (Bi,Na,K)0.5TiO3 System Ceramics as a Function of Sr Substitution and the Amount of MnO2 Addition.** J. Yoo[1], H. Lee[2], D. Oh*[3], Y. Jeong[4], J. Hong[5], and C. Lee[6], [1]Semyung University, [2]Semyung University, [3]Sunny Electronics Corp., [4]KEPRI, [5]Dongseoul College, [6]Chungju National University			**FC1-H-3 W-Band Dual Channel AM/PM Noise Measurement System.** A. Hati*[1], C. W. Nelson[1], F. G. Nava[2], D. A. Howe[1], and F. L. Walls[2], [1]National Institute of Standards and Technology, [2]Total Frequency	**FC2-H-3 On-Chip Self-Sensing Function of 4x4 Matrix Micromachined Resonating Piezoelectric Membranes for Mass Detection Applications.** L. Nicu[1], M. Guirardel*[1], D. Saya[1], S. Hinh[1], J. Sicard[1], D. Lagrange[1], F. Mathieu[1], E. Cattan[2], D. Remiens[2], and C. Bergaud[1], [1]LAAS-CNRS, [2]IEMN-CNRS/DOAE	
9:15 a.m.	**FE1-H-3 Piezoelectric Properties of BiFeO3 - PbTiO3 Ceramics.** T. Comyn*, S. McBride, and A. Bell, Institute for Materials Research, University of Leeds			**FC1-H-4 Dual Photonic-Delay-Line Cross Correlation Method for the Measurement of Microwave Oscillator Phase Noise.** E. Salik*[1], N. Yu[1], L. Maleki[1], and E. Rubiola[2], [1]Jet Propulsion Laboratory, California Institute of Technology, [2]ESSTIN and LPMIA, Université Henri Poincaré	**FC2-H-4 Packaging of Surface Acoustic Wave (SAW) Based Biosensors: An Important Issue for Future Biomedical Applications.** K. Länge[1], G. Bläss[1], A. Voigt[1], M. Rapp*[1], and E. Hansjosten[2], [1]Forschungszentrum Karlsruhe, Institute for Instrumental Analysis, [2]Forschungszentrum Karlsruhe, Institute for Micro Process Engineering, Germany	
9:30 a.m.	**FE1-H-4 Alternative Lead-Free Piezoelectrics: ($(K,Na)NbO_3$ Based Ceramics.** B. Malic*[1], J. Bernard[1], D. Jenko[1], J. Holc[1], M. Kosec[1], A. Barzegar[2], and D. Damjanovic[2], [1]Jozef Stefan Institute, [2]Ceramics Laboratory, Swiss Federal Institute of Technology EPFL			**FC1-H-5 The Photonic Delay Technique for Phase Noise Measurement of Microwave Oscillators.** E. Rubiola*[1], E. Salik[2], S. Huang[2], N. Yu[2], and L. Maleki[2], [1]Université Henri Poincaré - ESSTIN - LPMIA, [2]Jet Propulsion Laboratory, California Institute of Technology	**FC2-H-5 A New Analog Oscillator Electronics Applied to a Piezoelectric Vibrating Gyro.** R. Levy*[1], G. Jean-paul[2], D. Janiaud[1], O. Le Traon[1], S. Muller[1], and G. Raynaud[2], [1]ONERA : Office National Détudes et de Recherche Aérospatiales, [2]IEF: Institut D'eléctronique Fondamentale	
9:45 a.m.	**FE1-H-5 Piezoelectric/Electrostrictive Multimaterial PMN-PT Monomorph Actuators.** A. Hall*, M. Allahverdi, E. K. Akdogan, and A. Safari, Rutgers University			**FC1-H-6 Phase Noise Suppression in Frequency Comb Generators.** F. G. Nava*, C. W. Nelson, A. Hati, and D. A. Howe, National Institute of Standards and Technology	**FC2-H-6 Miniaturizing Quartz Vibratory Gyro Sensor with Hammer-Headed arms.** T. Kikuchi*[1], S. Gouji[1], T. Tomoyoshi[1], S. Hayashi[1], N. Okada[1], M. Tani[1], S. Ishikawa[1], S. Yokoi[1], T. Enokijima[1], Y. Kawamura[1], Y. Osugi[1], M. Masuda[1], H. Katsukawa[1], Y. Kobayashi[2], and Y. Morita[2], [1]NGK insulators, Ltd, [2]Seiko Epson Corporation	

	Session U1-I **CONTRAST AGENTS IMAGING** Chair: K. Ferrara University of California - Davis	*Session U2-I* **THERAPY: BRAIN** Chair: E. Ebbini University of Minnesota	*Session U3-I* **SINGLE CRYSTAL TRANSDUCER MATERIALS** Chair: C. Oakley Tetrad Corporation	*Session U4-I* **ACOUSTIC AND OPTICAL SCATTERING** Chair: F. Hickernell University of Arizona	*Session U5-I* **IMAGING AND SIGNAL PROCESSING** Chair: J. Saniie Illinois Institute of Technology	*Session U6-I* **SYSTEM AND DEVICE APPLICATIONS** Chair: B. Abbott Sawtek
	510AC	**510BD**	**511AB**	**513AB**	**512C-H**	**512A-F**
10:30 a.m.	**U1-I-1 A Two-Step Procedure for Optimization of Contrast Sensitivity and Specificity of Post-Beamforming Volterra Filters.** M. F. Al-Mistarihi*, P. Phukpattaranont, and E. S. Ebbini, University of Minnesota Twin Cities	**U2-I-1 Large Volume Blood-Brain Barrier Disruption by Low Frequency Focused Ultrasound: A Method for Targeted Drug Delivery and Molecular Imaging.** K. Hynynen*, N. McDannold, N. Vykhodtseva, N. Sheikov, and F. A. Jolesz, Harvard Medical School and Brigham & Women's Hospital	**U3-I-1 High Coupling $KNbO_3$ Width-Extensional Vibrators with a Polar Multidomain Structure.** H. Koyama*[1], K. Nakamura[1], and T. Takano[2], [1]Graduate School of Engineering, Tohoku University, [2]Tohoku Institute of Technology	**U4-I-1 Ultrasonic Field Measurement in Test Cells Combining the Acousto-Optic Effect, Laser Interferometry & Tomography.** G. Harvey*, A. Gachagan, and A. McNab, Centre for Ultrasonic Engineering	**U5-I-1 Optimization of an Array Based Pulse-Echo System for Identification of Reflector Geometry.** P. Pedersen* and A. Nadkarni, Worcester Polytechnic Institute	**U6-I-1 (Invited) SAW in China.** Y. Shui*, Nanjing University
10:45 a.m.	**U1-I-2 Spectral Compensation for Tissue Attenuation and Transmit Intensity in Ultrasonic Detection of Microbubbles by Harmonic Method.** S. Chen*, M. Fatemi, E. McMahon, J. F. Greenleaf, and M. Belohlavek, Mayo Clinic College of Medicine	**U2-I-2 Transcranial MRI-Guided Focused Ultrasound-Induced Blood-Brain Barrier Opening in Rats.** L. H. Treat*[1,2], N. J. McDannold[2], N. Vykhodtseva[2], and K. Hynynen[2], [1]Harvard-MIT Division of Health Sciences & Technology, [2]Dept. of Radiology, Brigham and Women's Hospital/ Harvard Medical School	**U3-I-2 Multilayer PMN-PT Single Crystal Transducer for Medical Application.** S. M. Rhim*[1], H. Jung[1], and S.-G. Lee[2], [1]HUMANSCAN Co., Ltd., [2]BULe PHOTONICS Co., Ltd.	**U4-I-2 Nondestructive Elasticity Evaluation of Thin Adhesive Layers by Brillouin Scattering.** M. Matsukawa*[1], H. Yamura[1], and N. Ohtori[2], [1]Faculty of Engineering, Doshisha University, [2]Graduate School of Science and Technology, Niigata University	**U5-I-2 Ultrasonic Flaw Detection using Fast Lifting Wavelet Transform for NDE Applications.** E. Oruklu* and J. Saniie, Illinois Institute of Technology	

11:00 a.m.	**U1-I-3 High Frequency Nonlinear Scattering and Imaging using a Sub-micron Contrast Agent.** D. E. Goertz*[1,2], M. E. Frijlink[1], N. de Jong[1,3], and A. F. W. van der Steen[1,2], [1]Erasmus MC, [2]Interuniversity Cardiac Inst. Netherlands, [3]Physics of Fluids, Univ. Twente	**U2-I-3 Schlieren Observation of Therapeutic Field in Water Surrounded by Cranium Radiated from 500 kHz Ultrasonic Sector Transducer.** T. Azuma*[1], K. Kawabata[1], S. Umemura[1], M. Ogihara[2], K. Asafusa[2], J. kubota[2], A. Sasaki[2], and H. Furuhata[3], [1]Central Research Laboratory, Hitachi, Ltd., [2]Hitachi Medical Corporation, [3]ME Lab. Jikei Univ. School of Med	**U3-I-3 A Multirow Single Crystal Phased Array for Wideband Ultrasound Imaging.** M. J. Zipparo*[1], C. G. Oakley[1], D. M. Mills[2], A. M. Dentinger[2], and L. S. Smith[2], [1]Tetrad Corporation, [2]GE Global Research	**U4-I-3 Longitudinal Acoustic Properties Measurements of Solid Specimens by the Plane-Wave Ultrasonic Material Characterization System in the UHF Range.** J. Kushibiki and M. Arakawa*, Tohoku University	**U5-I-3 Performance Assessment of a New Kalman Filter-Based Method for Ultrasonic Time-of-Flight Estimation.** L. Angrisani[1], A. Baccigalupi[1], and R. Schiano Lo Moriello*[2], [1]Università di Napoli Federico II - Dipartimento di Informatica e sistemistica, [2]Università di Napoli Federico II - Dipartimento di Ingegneria Elettrica	**U6-I-2 Orthogonal Frequency Coding for SAW Device Applications.** D. C. Malocha*, D. Gallagher, and D. Puccio, ECE Dept., University of Central Florida
11:15 a.m.	**U1-I-4 High Frequency Contrast Imaging.** Y. Sun*, D. E. Kruse, and K. W. Ferrara, University of California, Davis	**U2-I-4 Prediction of the Skull Overheating during High Intensity Focused Ultrasound Transcranial Brain Therapy.** M. Pernot, M. Tanter*, J.-F. Aubry, and M. Fink, Laboratoire Ondes et Acoustique, ESPCI, Universit$_6$ Paris VII, UMR CNRS 7587	**U3-I-4 Broad Band Single Crystal Transducers for Contrast Agent Harmonic Imaging.** W. Hackenberger*[1], X. Jiang[1], X. Geng[2], A. Winder[3], and F. Forsberg[4], [1]TRS Technologies, Inc., [2]Blatek, Inc., [3]J&W Medical, LLC, [4]Thomas Jefferson University Hospital	**U4-I-4 Tunable Phononic Band Gaps of Surface and Bulk Acoustic Waves in Two-Dimensional Phononic Crystals.** T.-T. Wu and Z.-G. Huang*, Institute of Applied Mechanics, National Taiwan University	**U5-I-4 Ensemble of Classifiers Approach for NDE Data Fusion.** D. Parikh*, M. Kim, J. Oagaro, S. Mandayam, and R. Polikar, Rowan University	**U6-I-3 The New Approach To Realize Small Imbalances In Differential Rx-outputs For SAW Front End Module.** O. Hikino*[1], M. Kijima[1], K. Yokoyama[1], M. Ohki[1], N. Matsuura[1], K. Sakiyama[1], and M. Hikita[2], [1]Hitachi Media Electronics Co., Ltd., [2]Central Research Lab. Hitachi Ltd.
11:30 a.m.	**U1-I-5 (Invited) Ultrasound Contrast Imaging—A Company Perspective.** P. J. A. Frinking*, M. Arditi, and M. Schneider, Bracco Research S.A	**U2-I-5 The Use of Optison to Reduce the Power Requirements for Focused Ultrasound Lesion Production in the Brain: A MRI/Histology Study in Rabbits.** N. I. Vykhodtseva*, N. McDannold, and K. Hynynen, Department of Radiology, Brigham and Women's Hospital, Harvard Medical School	**U3-I-5 Characterization of Very High Frequency Transducers with Wire Target and Hydrophone.** B. Huang and K. K. Shung*, University of Southern California	**U4-I-5 Full Band Gaps for Surface Acoustic Waves in Piezoelectric Phononic Crystals.** V. Laude*, M. Wilm, S. Benchabane, and A. Khelif, FEMTO-ST	**U5-I-5 Broadband Ultrasonic Attenuation Measurements using Coded Sweep Excitations.** R. P. B. Costa-Felix*[1] and J. C. Machado[2], [1]National Institute of Metrology, Standardization, and Industrial Quality Inmetro, [2]Biomedical Engineering Program - COPPE/Federal University of Rio de Janeiro, RJ, Brasil	**U6-I-4 Modular Integration of RF SAW Filters.** M. Goetz* and C. Jones, Clarisay, Inc.
11:45 a.m.		**U2-I-6 Ultrasonic Transcranial Brain Therapy: First In Vivo Clinical Investigation on 22 Sheep using Adaptive Focusing.** M. Pernot[1], J.-F. Aubry*[1], M. Tanter[1], A.-L. Boch[2], M. Kujas[2], and M. Fink[1], [1]Laboratoire Ondes et Acoustique, ESPCI, Université Paris VII, U.M.R. C.N.R.S. 7587, 10 rue Vauquelin, 75005 Paris, France, [2]Groupe Hospitalier Pitié-Salpêtrière, Paris, France		**U4-I-6 Some Peculiarities of Acoustoptical Interactions in X-Ray Range.** M. Kovalchuk, Y. Pisarevsky*, and A. Blagov, Institute of crystallography RAS	**U5-I-6 Theoretical and Experimental Study of Time Reversal in Anisotropy.** B. Zhang*, M. Lu, and C. Wang, Institute of Acoustics, The Chinese Academy of Sciences	**U6-I-5 Quantitative Evaluation of Congruent $LiNbO_3$ Crystals using the LFB Ultrasonic Material Characterization System.** J. Kushibiki, Y. Ohashi*, and J. Hirohashi, Tohoku University

	Session FE1-I **PIEZOELECTRIC MATERIALS II** Chair: S. Pilgrim Alfred University			*Session: FC1-I* **TIMESCALES AND TIME TRANSFER** Chair: T. Parker NIST	*Session FC2-I* **FREQUENCY SHIFTS IN CRYSTAL RESONATORS** Chair: D. Stevens Vectron International	
	513CD			**511CF**	**511DE**	
10:30 a.m.	**FE1-I-1 (Invited) High Performance, High Temperature Perovskite Piezoelectrics.** T. R. Shrout*, S. Zhang, R. Eitel, C. Stringer, and C. A. Randall, Penn State University			**FC1-I-1 Time Comparisons between USNO and PTB: A Model for the Determination of the Time Offset between GPS Time and the Future Galileo System Time.** A. Bauch*[1], D. Piester[1], G. Petit[2], and A. Moudrak[3], [1]Physikalisch-Technische Bundesanstalt, Braunschweig, Germany, [2]Bureau International des Poids et Mesures, Sévres, France, [3]Deutsches Zentrum für Luft- und Raumfahrt, IKN, Oberpfaffenhofen, Germany	**FC2-I-1 Examination of Detailed Frequency Behavior of Quartz Resonators under Low Dose Exposures to Proton Radiation.** G. L. Weaver*[1], M. J. Reinhart[1], H. B. Sequeira[1], and W. Stapor[2], [1]The Johns Hopkins University Applied Physics Laboratory, [2]Innovative Concepts	
10:45 a.m.				**FC1-I-2 A New Technique for Estimating Frequency from GPS Carrier-Phase Time-Transfer Data.** C. Hackman*[1], J. Levine[1,2], T. Parker[2], D. Piester[3], and J. Becker[3], [1]JILA, [2]National Institute of Standards and Technology, [3]Physikalisch-Technische Bundesanstalt	**FC2-I-2 622MHz High Frequency Fundamental Composite Crystal Resonator with an Air-Gapped Electrode.** M. Umeki*, T. Sato, H. Uehara, and M. Okazaki, Nihon Dempa Kogyo Co., Ltd.	

11:00 a.m.	**FE1-I-2 Piezoelectrics and Electrostrictors for High Temperature Ultrasonic Drills.** W. Hackenberger*[1], E. Alberta[1], S. Shang[2], R. Eitel[2], and T. Shrout[2], [1]TRS Technologies, Inc., [2]The Pennsylvania State University			**FC1-I-3 Continuous Geodetic Time Transfer Analysis Method.** R. Dach*[1], T. Schildknecht[1], U. Hugentobler[1], and G. Dudle[2], [1]Astronomical Institute, University of Bern, [2]Swiss Federal Office of Metrology and Accreditation (metas)	**FC2-I-3 An Investigation Into the Effects of Electrode Film Thickness on RBA in High Frequency Fundamental Mode Crystals.** R. Morris*, Connor Winfield	
11:15 a.m.	**FE1-I-3 Charging and Switching of Ferroelectrets: How Much Can Ferroelectrets Behave Like Ferroelectrics?.** R. Schwoediauer*, I. Graz, and S. Bauer, Johannes Kepler University Linz			**FC1-I-4 Uncertainty Estimation on Multi-Channel GPS Time Transfer.** M. Addouche*, F. Meyer, and F. Vernotte, Observatoire de Besançon	**FC2-I-4 Frequency Shifts in Crystal Resonators Due to Intrinsic Stresses in Unequal Thickness Electrodes.** X. Yang[1], J. Yang[1], J. Kosinski*[2], and J. Turner[1], [1]University of Nebraska, [2]US Army RDECOM	
11:30 a.m.	**FE1-I-4 (Invited) Relaxor Ferroelectric Polymers with High Electromechanical Responses.** Q. M. Zhang*[1], C. Huang[1], R. Klein[1], F. Xia[1], D.-Y. Jeong[1], K. Ren[1], V. Bohnar[2], and A. Levstik[2], [1]The Pennsylvania State University, [2]Jozef Stefan Institute			**FC1-I-5 Comparison between GPS and Loran Performance using Indoor and Outdoor Loran Antennas.** J. Jacoby*, C. Schweitzer, P. Schick, and H. Monson, Locus, Incorporated	**FC2-I-5 Reduction of Spurious Responses in a Thickness-Twist Mode Resonator Made of Crystal Class 32 by Tilting Edges.** M. Onoe*[1], H. Sekimoto[2], and M. Okazaki[3], [1]University Tokyo (Emeritus), [2]Tokyo Metropolitan University, [3]Nihon Dempa Kogyo Co. Ltd.	
11:45 a.m.						

	Session U1-J **CONTRAST AGENTS: THERAPY** Chair: A. Boukaz Erasmus M. C.	*Session U2-J* **INTRAVASCULAR IMAGING** Chair: H. Ermert Ruhr University	*Session U3-J* **TRANSDUCER MATERIALS** Chair: S. Smith GE Global Research	*Session U4-J* **ULTRASONIC MOTORS AND ACTUATORS** Chair: T. Maeno Keio University	*Session U5-J* **NDE** Chair: R. Maev University of Windsor	*Session U6-J* **SAW MATERIALS AND PROPAGATION** Chair: M. Periera da Cunha University of Maine
	510AC	**510BD**	**511AB**	**513AB**	**512C-H**	**512A-F**
1:30 p.m.	**U1-J-1 Remote Manipulation of Cells with Ultrasound and Microbubbles.** A. van Wamel*[1,2], A. Bouakaz[1,2], M. Versluis[3], and N. de Jong[2,3], [1]Dept. of Experimental Echocardiography, Thoraxcentre, Erasmus MC, [2]Interuniversity Cardiology Institute of The Netherlands, [3]Dept. of Applied Physics, Physics of Fluids, University of Twente, Enschede	**U2-J-1 Intravascular Ultrasound Tissue Harmonic Imaging in vivo.** M. E. Frijlink*[1], D. E. Goertz[1,2], and A. F. W. van der Steen[1,2], [1]Erasmus MC, Biomedical Engineering, [2]Interuniversity Cardiology Institute of the Netherlands	**U3-J-1 Ferroelectrets: Highly Anisotropic Electrically Charged Polymer Foams for Electromechanical Transducer Applications.** M. Wegener*[1], E. Tuncer[1], W. Wirges[1], R. Gerhard-Multhaupt[1], M. Dansachmüller[2], S. Bauer-Gogonea[2], R. Schwödiauer[2], and S. Bauer[2], [1]University of Potsdam, Department of Physics, [2]Johannes Kepler University, Soft-Matter Physics	**U4-J-1 A Novel Approach for High Power Ultrasonic Linear Motors.** T. Hemsel[1], M. Mracek[1], P. Vasiljev[2], and J. Wallaschek*[1], [1]Heinz Nixdorf Institute, Mechatronics and Dynamics, University of Paderborn, [2]Dept. of Physics and Technology, Ultrasonic Mechanism, Vilnius Pedagogical University	**U5-J-1 (Invited) Ultrasonic Tomography - Application to the Visualization of Air Flows.** F. C. Tenoudji, V. Dewailly, J. P. Frangi, and G. Theron, Laboratoire d'Environnement et Dèveloppement de l'Universitè Paris 7, 2, Place Jussieu, Paris, France	**U6-J-1 Existence of Harmonic Metal Thickness Mode Propagation for Longitudinal Leaky Waves.** M. Solal*[1], T. Makkonen[2], R. Lardat[1], V. P. Plessky[3], W. Steichen[1], and M. M. Salomaa[2], [1]TEMEX Microsonics, [2]Materials Physics Laboratory, Helsinki University of Technology, [3]GVR Trade SA
1:45 p.m.	**U1-J-2 Combined Optical and Ultrasonic Monitoring of Laser-Generated Intracellular Contrast Agents: Initial Cell Culture Studies.** M. J. Zohdy*[1], C. Tse[1], J. Y. Ye[2], and M. O'Donnell[1], [1]Biomedical Engineering Department, University of Michigan, [2]Center for Ultrafast Optical Science, University of Michigan	**U2-J-2 Computerized Segmentation of Blood and Luminal Borders in Intravascular Ultrasound.** C. Perrey*[1,3], U. Scheipers[1,3], W. Bojara[2,3], S. Holt[2,3], M. Lindstaedt[2,3], and H. Ermert[1,3], [1]Institute of High Frequency Engineering, Ruhr-Universitaet, [2]Department of Cardiology Bergmannsheil, Ruhr University, [3]Ruhr Center of Excellence for Medical Engineering KMR	**U3-J-2 Ferroelectrets: Ultrasonic Transducer for a Biomimetic Sonar System.** A. Streicher*[1], M. Kaltenbacher[1], R. Müller[2], H. Peremans[3], and R. Lerch[1], [1]Department of Sensor Technology, [2]Maersk Institute, [3]Antwerp-University Faculty St. Ignatius	**U4-J-2 An Ultrasonic Linear Motor using a Ridge Waveguide.** M. Tominaga*, J. R. Friend, R. Kaminaga, K. Nakamura, and S. Ueha, Precision and intelligence Laboratory, Tokyo Insutitute of Technology		**U6-J-2 Optimized Cut of Lithium Niobate for HVPSAW Filters with Different Metalization Ratio of Element Resonators.** N. Naumenko*[1] and B. Abbott[2], [1]Moscow Steel and Alloys Institute, [2]Sawtek Inc

2:00 p.m.	**U1-J-3 In Vitro Acoustic Molecular Imaging of Tissue Factor Expressed by Smooth Muscle Cells with Stable Liquid Perfluorocarbon Nanoparticle Contrast Agents.** J. N. Marsh*, K. C. Crowder, M. S. Hughes, M. J. Scott, E. K. Lacy, S. A. Wickline, and G. M. Lanza, Washington University School of Medicine	**U2-J-3 'Blind' Data Calibration of Intravascular Ultrasound Data for Automated Tissue Characterization.** A. Nair*[1], D. Calvetti[2], and D. G. Vince[1], [1]Department of Biomedical Engineering, ND20, The Cleveland Clinic Foundation, [2]Department of Mathematics, Case Western Reserve University	**U3-J-3 Semi-Quantitative Piezoelectric Activity Testing in Polymer Layers.** C. Brox Nilsen*, C. Gregory, and J. Hatfield, University of Manchester Institute of Science and Technology	**U4-J-3 Analysis of Bidirectional Vibrational Transport of Small Objects by Periodic Wave Trains of Pulses.** V. G. Mozhaev* and A. V. Zyryanova, Faculty of Physics, Moscow State University	**U5-J-2 Operating Principles of the Monolithic Cylinder Gyroscope.** B. Kanani*, B.K. Pulse Ltd	**U6-J-3 Evaluation of Material Constants and SAW Properties in $LaCa_4O(BO_3)_3$ Single Crystals.** H. Shimizu*[1], H. Takeda[1], T. Nishida[1], T. Shikita[2], S. Okamura[1], and T. Shiosaki[1], [1]Graduate School of Materials Science, Nara Institute of Science and Technology (NAIST), [2]Research Development Division, Sakai Chemical Industry Co., Ltd.
2:15 p.m.	**U1-J-4 In Vivo Ultrasonic Detection of Angiogenesis with Site-Targeted Nanoparticle Contrast Agents using Measure-Theoretic Signal Receivers.** M. S. Hughes*[1], J. N. Marsh[1], C. S. Hall[2], J. H. Allen[1], P. A. Brown[1], E. K. Lacy[1], M. J. Scott[1], S. A. Wickline[1], and G. M. Lanza[1], [1]Washington University School of Medicine, Cardiovascular Division, [2]Philips Research, USA	**U2-J-4 Application of Ultrasonic Thermal Imaging in IVUS Systems.** Y. Shi*, X. Chen, H. Xie, and M. O'Donnell, University of Michigan	**U3-J-4 Piezoelectric Material Nonlinearity Identification with a Multiharmonic Finite Element Method.** B. Kaltenbacher*, M. Hofer, M. Kaltenbacher*, and R. Lerch, Department of Sensor Technology, University of Erlangen	**U4-J-4 Analytical and Numerical Modeling of an Ultrasonic Stepping Motor using Standing Waves.** J. M. Fernandez Lopez* and Y. Perriard, Swiss Federal Institute of Technology - EPFL	**U5-J-3 Precision Ultrasonic Micrometer Position Indicator with Temperature Compensation.** M. Pedrick* and B. R. Tittmann, The Pennsylvania State University	**U6-J-4 Properties of Radio Frequency Rayleigh Waves on Langasite at Elevated Temperatures.** R. Fachberger*[1], J. Biniasch[2], G. Bruckner[1], G. Knoll[1], R. Hauser[1], and L. Reindl[2], [1]Carinthian Tech Research, [2]Albert-Ludwig University
2:30 p.m.	**U1-J-5 Acoustic Radiation Force Enhances Adhesion of Microbubbles Targeted to P-Selectin.** J. Rychak*[1], J. Hossack[1], and A. Klibanov[2], [1]University of Virginia Department of Biomedical Engineering, [2]University of Virginia Cardiovascular Imaging Center	**U2-J-5 Intravascular Ultrasound Palpography for Determining the Age of a Thrombus: An Animal Study In Vivo.** J. A. Schaar[1,2], F. Mastik[1], E. D. van Deel[1], C. J. Slager[1], P. W. Serruys[1], D. J. Duncker[1], and A. F. W. van der Steen*[1,2], [1]Biomedical Engineering Thorax Centre Rotterdam, [2]Interuniversity Cardiology Institute of the Netherlands	**U3-J-5 New Low Acoustic Impedance Piezoelectric Material for Broadband Transducer Applications.** M. Lethiecq*[1], F. Levassort[1], L.-P. Tran-Huu-Hue[1], G. Feuillard[1], T. Bove[2], E. Ringgaard[2], and W. Wolny[2], [1]GIP ULTRASONS/LUSSI, [2]Ferroperm Piezoceramics A/S	**U4-J-5 Precise Position Control of Ultrasonic Motor using Fuzzy Controller.** H. Li*[1], C. Gu[2], and C. Zhao[1], [1]Nanjing University of Aeronautics and Astronautics, [2]Huazhong University of Science and Technology	**U5-J-4 On the Sensitivity of Corrosion and Fatigue Damage Detection using Guided Ultrasonic Waves.** P. Fromme*[1], P. D. Wilcox[2], M. Lowe[3], and P. Cawley[3], [1]University College London, [2]University of Bristol, [3]Imperial College London	**U6-J-5 Analysis of the SAW Propagation in Langasite Crystal by X-Ray Topography.** D. V. Roshchupkin*[1], E. D. Roshchupkina[1,2], O. A. Buzanov[2,3], and D. V. Irzhak[1], [1]Institute of Microelectronics Technology RAS, [2]Moscow State Institute of Steel and Alloys, [3]FOMOS-Materials Co.
2:45 p.m.	**U1-J-6 Increasing Binding Efficiency of Ultrasound Targeted Agents with Radiation Force.** S. Zhao*, M. Borden, S. Bloch, D. Kruse, K. W. Ferrara, and P. A. Dayton, University of California, Davis	**U2-J-6 Analysis of Blood Clot Formation with Transient Elastography: Similarity with Sol-Gel Transition in Agar-Gelatin Phantoms.** J.-L. Gennisson*, F. Yu, and G. Cloutier, Laboratory of Biorheology and Medical Ultrasonics	**U3-J-6 Piezoelectric Ceramics with High Dielectric Constants for Ultrasonic Medical Transducers.** Y. Hosono* and Y. Yamashita, Advanced Discrete Semiconductor Technology Laboratory, Corporate Research & Development Center, Toshiba Corporation	**U4-J-6 Development of an Arrayed-type Multi-Degree-of-Freedom Ultrasonic Motor Based on a Selection of Reciprocating Vibration Modes.** K. Otokawa*[1], K. Takemura[2], and T. Maeno[1], [1]Keio University, [2]Tokyo Institute of Technology	**U5-J-5 Nonlinear Interaction of Ultrasound with an Unbounded Rough Interface.** P. Wu*, Signals and Systems Group, Department of Engineering Sciences, Uppsala University	**U6-J-6 Acoustic Waves on Plane Interfaces in Piezoelectric Bi-Crystalline Structures of Specific Types.** A. N. Darinskii[1] and M. Weihnacht*[2], [1]Institute of Crystallography, Russian Academy of Sciences, [2]Leibniz Institute for Solid State and Materials Research Dresden

Session FE1-J
CAPACITORS AND DIELECTRICS
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1:30 p.m. **FE1-J-1 (Invited) The Nature of Large Dielectric Constant of Relaxors.** Y. Poplavko*, National Technical University of Ukraine "KPI"

1:45 p.m.

2:00 p.m.	**FE1-J-2 Integrated High Energy Density PLZT Based Capacitors.** D. P. Williams*, B. A. Tuttle, J. A. Voigt, D. L. Moore, and P. G. Clem, Sandia National Labs					
2:15 p.m.	**FE1-J-3 Laser Crystallized Bismuth Zinc Niobate Thin Films.** J.-G. Cheng* and S. Trolier-Mckinstry, Materials Research Institute and Materials Science and Engineering Department, Penn State University					
2:30 p.m.	**FE1-J-4 High Dielectric Constant All-polymer Composites.** C. Huang*, F. Xia, H. Li, M. Poh, and Q. M. Zhang, The Pennsylvania State University					
2:45 p.m.	**FE1-J-5 Structure and Properties of High Dielectric Constant $CaCu_3Ti_4O_{12}$ Ceramics.** W. Ren*[1,2], Z. Yu[1], V. D. Krstic[1], and B. K. Mukherjee[1,2], [1]Centre for Manufacturing of Advanced Ceramics and Nanomaterials, [2]Department of Physics, Royal Military College of Canada					

	Session U1-K **VASCULAR IMAGING** Chair: J. Greenleaf Mayo Clinic	*Session U2-K* **BEAMFORMING II** Chair: W. Walker University of Virginia	*Session U3-K* **TRANSDUCERS II** Chair: J. Tsujino University of Kanagawa	*Session U4-K* **ULTRASONIC MOTORS AND ACTUATORS II** Chair: M. Kurosawa Tokyo Institute of Technology	*Session U6-K* **ADVANCED TECHNIQUES** Chair: B. Potter Vectron International	
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3:30 p.m.	**U1-K-1 High-Frequency Ultrasound Characterization of Pulmonary Artery Wall under Normotensive and Hypertensive Conditions.** K. R. Waters*, National Institute of Standards and Technology, Materials Reliability Division	**U2-K-1 Nearfield Coding and Spatial Processing for Ultrasound Imaging.** R. Zemp* and M. Insana, Department of Biomedical Engineering, University of California, Davis	**U3-K-1 Ultrasonic Lamb Wave NDE System using an Air-Coupled Concave Array Transducer.** M. J. Garcia-Hernandez*[1], J. A. Chavez[1], Y. Yañez[1], J. P. Prego-Borges[1], J. Salazar[1], A. Turo[1], and F. Montero de Espinosa[2], [1]Sensor Systems Group, Electronic Engineering Department, Universitat Politecnica de Catalunya, [2]Instituto de Acùstica CSIC	**U4-K-1 A Cylindrical Micro Ultrasonic Motor using a Micro-Machined Bulk Piezoelectric Transducer.** T. Kanda*[1], A. Makino[1], K. Suzumori[1], T. Morita[2], and M. K. Kurosawa[3], [1]Okayama University, [2]Tohoku University, [3]TOkyo Institute of Technology	**U6-K-1 Temperature Compensated $LiTaO_3$/ Sapphire Bonded SAW Substrate with Low Loss and High Coupling Factor Suitable for US-PCS Application.** M. Miura*[1], T. Matsuda[1], Y. Satoh[1], M. Ueda[2], O. Ikata[2], Y. Ebata[2], and H. Takagi[3], [1]Fujitsu Laboratories Ltd., [2]Fujitsu Media Devices Limited, [3]The National Institute of Advanced Industrial Science and Technology	
3:45 p.m.	**U1-K-2 Improved Accuracy of Vascular Wall Shear Rate Measurements.** J. K. Tsou*[1], J. Liu[1], C. Pellot-Barakat[1,2], and M. F. Insana[1], [1]University of California, Davis, [2]INSERM	**U2-K-2 Two-Dimensional Blind Iterative Deconvolution of Medical Ultrasound Images.** R. Jirik*[1] and T. Taxt[2], [1]Dept. of Biomedical Engineering, Brno University of Technology, [2]Dept. of Biomedicine, University of Bergen	**U3-K-2 Investigation into the Non-Linear Response from Active Ultrasonic Monitoring Systems for Application in the Pharmaceutical Industry.** A. Gachagan*, M. Tramontana, A. Alsada, A. Nordon, D. Littlejohn, and G. Hayward, University of Strathclyde	**U4-K-2 Design and Testing of a 4-mm^3 Bidirectional Linear Microfin Actuator.** J. Friend*, G. Yasuyuki, K. Nakamura, and S. Ueha, Tokyo Institute of Technology	**U6-K-2 Low Resistance Quartz Resonators for Automotive Applications Without Spurious Modes.** M. Mayer*, A. Bergmann, K. Wagner, T. Telgmann, and A. Glas, EPCOS AG	

4:00 p.m.	**U1-K-3 Comparison of Ultrasound Radiation Force and Fluid Pressure Generated Waves in Arterial Vessels.** X. Zhang*, R. R. Kinnick, M. Fatemi, and J. F. Greenleaf, Mayo Clinic College of Medicine	**U2-K-3 A Flexible Algorithm for Layout-Optimized Sparse cMUT Arrays.** A. Austeng*, J. E. Kirkebø, and S. Holm, Institute for Informatics, University of Oslo	**U3-K-3 Miniature, High Efficiency Transducers for Use in Ultrasonic Flow Meters.** S. G. Joshi*[1], B. D. Zaitsev[2], and I. E. Kuznetsova[2], [1]Marquette University, [2]Institute of Radio Engineering and Electronics	**U4-K-3 Numerical Study on Scattering of Rayleigh Wave by Silicon Slider Projections for SAW Motor.** Y. Miyazaki*[1], T. Shigematsu[1], Y. Ishigami[2], and M. K. Kurosawa[1], [1]Tokyo Institute of Technology, [2]Matsushita Electric Works, Ltd.	**U6-K-3 Ultra Wideband Love Wave Devices in GHz Range on Cu-Grating/Rotated-YX-LiNbO$_3$-Substrate Structure.** K.-Y. Hashimoto*, H. Asano, K. Matsuda, N. Yokoyama, T. Omori, and M. Yamaguchi, Dept. EME, Chiba University	
4:15 p.m.	**U1-K-4 3D Simulations of Difference Frequency Effects on a Blood Vessel in Ultrasound-Stimulated Vibro-Acoustography.** J. Heikkilä*[1], T. Karjalainen[1], K. Hynynen[1,2], and M. Vauhkonen[1], [1]Department of Applied Physics, University of Kuopio, [2]Department of Radiology, Brigham and Women's Hospital, Harvard Medical School	**U2-K-4 Rectilinear 3-D Ultrasound using Synthetic Aperture Techniques.** N. M. Daher* and J. T. Yen, University of Southern California	**U3-K-4 Efficient Generation and Measurement of Guided Torsional Waves Using Magnetostrictive Nickel Patches.** C. I. Park*, S. H. Cho, S. W. Han, and Y. Y. Kim, Seoul National University	**U4-K-4 Very Fast Scanning Probe for Ophthalmic Ecography using an Ultrasound Motor.** R. Carotenuto*[1], G. Caliano[2], A. Caronti[2], A. Savoia[2], and M. Pappalardo[2], [1]Dipartimento I. M. E. T., Università degli Studi "Mediterranea" di Reggio Calabria, [2]Dipartimento di Ingegneria Elettronica, Università degli Studi Roma Tre	**U6-K-4 Theoretical and Experimental Results of Unidirectional Interdigital Transducers using Grating SAW Substrates and New Resonators using ?-Period Reflectors.** K. Yamanouchi* and Y. Satoh, Tohoku Institute of Technology	
4:30 p.m.	**U1-K-5 Detection of Shear Wave propagation in an Artery using Pulse Echo Ultrasound and Kalman Filtering.** Y. Zheng*[1], S. Chen[2], X. Zhang[2], and J. F. Greenleaf[2], [1]St. Cloud State University, [2]Mayo Foundation	**U2-K-5 Curved Two-Dimensional Arrays in Ultrasound.** J. E. Kirkebø*, A. Austeng, and S. Holm, Institute for Informatics, University of Oslo	**U3-K-5 A 5MHz Piezocomposite Ultrasound Array for Operation in High Temperatures and Harsh Environment.** C. Devallencourt*, S. Michau, C. Bantignies, and N. Felix, VERMON	**U4-K-5 Single Crystal Ultrasonic Motor for Cryogenic Actuations.** X. N. Jiang*[1], S. Dong[2], P. W. Rehrig[1], W. S. Hackenberger[1], and D. Viehland[2], [1]TRS Technologies, Inc., [2]Virginia Tech	**U6-K-5 Phase Sensitive Optical Measurements and Numerical Simulations of a Fan-Shaped Filter.** K. Kokkonen*[1], P. Dufilie[2], J. V. Knuuttila[1], and M. M. Salomaa[1], [1]Helsinki University of Technology, [2]Temex	
4:45 p.m.	**U1-K-6 Transcutaneous Measurement of Viscoelasticity of Arterial Wall by Application of Remote Actuation.** H. Hasegawa* and H. Kanai, Graduate School of Engineering, Tohoku University	**U2-K-6 A 3x3 Matrix Beamformer of Partially Overlapping Beams using a 1.5D Array for Real Time Cross-Correlation Imaging (CCI)-A Numerical Validation.** R. M. Schmitt*[1], W. G. Scott[1], J. B. Fowlkes[2], O. D. Kripfgans[2], R. D. Irving[1], J. M. Rubin[2], and P. L. Carson[2], [1]Winprobe Inc., [2]Dept. of Radiology, University of Michigan	**U3-K-6 Configurations of 40 kHz Ultrasonic Complex Vibration Sources with Complex Transverse Vibration Rods and a Disk with Multiple Transducers.** J. Tsujino*, T. Ueoka, and Y. Kikuchi, Kanagawa University	**U4-K-6 An Autonomous Self-Powered Acoustic Transmitter using Radioactive Thin Films.** R. Duggirala*, H. Li, and A. Lal, SonicMEMS Laboratory, School of Electrical and Computer Engineering, Cornell University	**U6-K-6 A Study of Electrostatic Discharge Effects of the SAW Pattern by the FDTD Method.** K.-Y. Lin* and K.-H. Lin*, Department of Electrical Engineering, National Sun Yat-sen University	

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PROCESSING
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3:30 p.m. **FE1-K-1 Solid State Conversion Grain Growth of Piezoelectric Single Crystals.** S. Kwon*[1], W. Hackenberger[1], P. Rehrig[1], J. B. Lee[2], T. M. Heo[2], D. H. Kim[2], and H.-Y. Lee[2,3], [1]TRS Technologies, [2]Ceracomp Co. Ltd., [3]Sunmoon University

3:45 p.m. **FE1-K-2 Fabrication of Piezoelectric Single Crystals without Melting Step of Major Components.** T.-M. Heo[2], J.-B. Lee*[2], D.-H. Kim[2], and H.-Y. Lee*[1], [1]Sunmoon University, [2]Ceracomp Co., Ltd.

4:00 p.m.	**FE1-K-3 Microstructure and Piezoelectric Properties of $<$001$>$ Fiber Textured Pb(Mg1/3Nb 1/3)O3-PbTiO3 Ceramics.** M. Pham Thi*[1], P. Colomban[2], and O. Lacour[3], [1]Thales Research & Technology France, [2]LADIR, [3]Thales Underwater Systems					
4:15 p.m.	**FE1-K-4 Novel Transducers by Layered Manufacturing and Direct-Write Technology.** A. Safari* and M. Allahverdi, Rutgers University					
4:30 p.m.	**FE1-K-5 Ferroelectric and Relaxor Ferroelectric Materials by New Sol-Gel Routes.** K. Babooram*, H. Tailor, D. Chin, and Z.-G. Ye, Simon Fraser University					
4:45 p.m.	**FE1-K-6 Processing and Application of Ferroic Glass Ceramics.** Y. Xi[1,2] and Z. Liangying[2], [1]Electronic Materials Research Laboratory Xian Jiaotong University, Xian, 710049, China, [2]Functional Materials Research Laboratory Tongji University, Shanghai, 200092, China					

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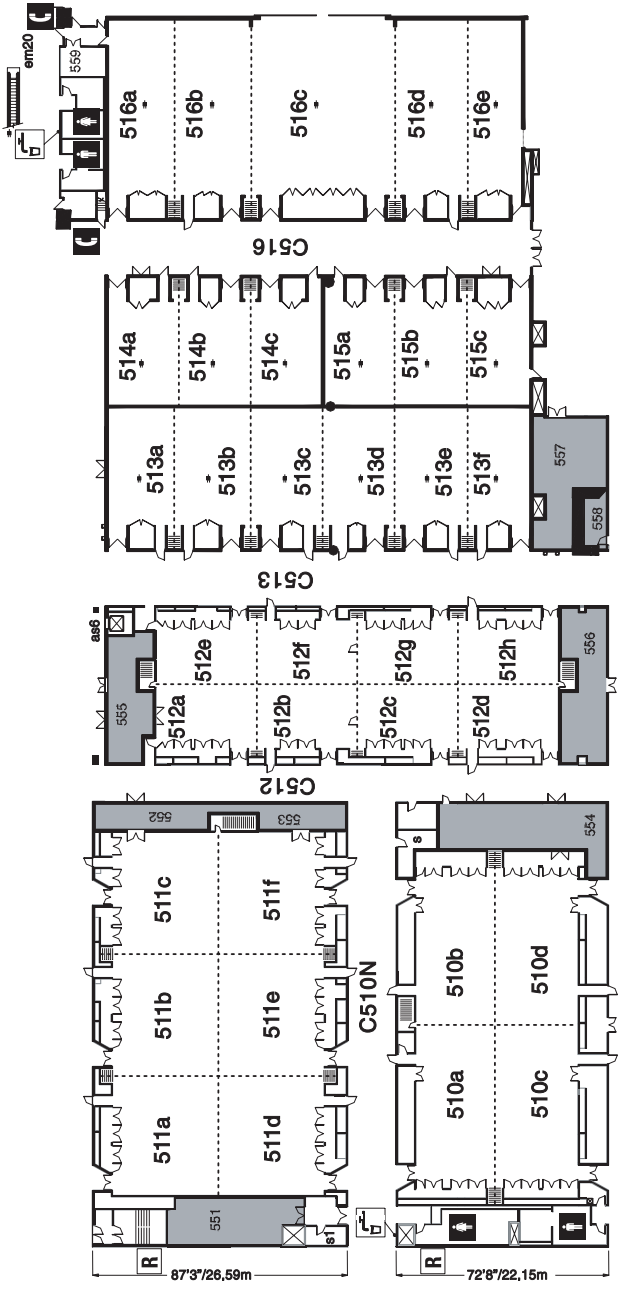
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