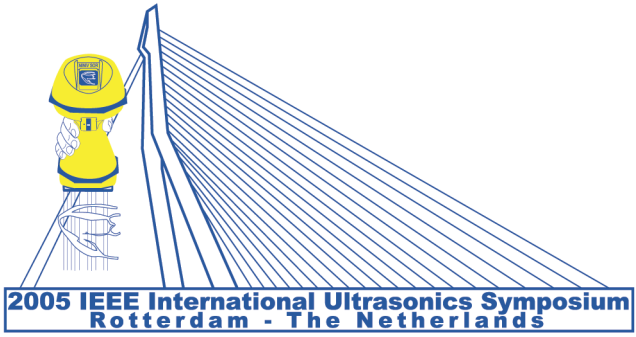
PROGRAM

2005 IEEE INTERNATIONAL ULTRASONICS SYMPOSIUM AND SHORT COURSES



September 19–21, 2005
Conference Centre
De Doelen
Rotterdam, The Netherlands

IEEE

UFFC

A CONFERENCE OF THE IEEE ULTRASONICS, FERROELECTRICS, AND FREQUENCY CONTROL SOCIETY (UFFC-S)

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September 19–21, 2005
Rotterdam, The Netherlands

Ton van der Steen
General Chair

Welcome to Rotterdam

It is indeed a pleasure to welcome you to the 2005 IEEE International Ultrasonics Symposium in Rotterdam, The Netherlands from September 18 through September 21, 2005.
The conference will be held in "De Doelen", a conference centre at Rotterdam Central Railway Station, which is a 40-minute train ride from Schiphol, Amsterdam International Airport. It is a modern, very well equipped conference centre that is perfectly suited for conferences around 1000 delegates.
Rotterdam is a multicultural city that has an interesting mixture of traditional and modern architecture. It has many museums, covering art, natural history, cultural anthropology, maritime life and many other topics with art collections ranging from Dutch masters through African sculptures to contemporary art. All museums are within easy walking distance from the conference centre. Rotterdam hosts the largest port in the world and both the river and the harbor create a special atmosphere in the city. The Pilgrim fathers started their journey from the Pilgrims' church in the harbor of Rotterdam and Hotel New York, the cruise terminal of the Holland America Line, the main historic cruise line between the USA and Europe can also be found here.
Other than the museums and historic sites Rotterdam has an extensive cultural and sports program. At the Doelen the grand finale of the Gergiev festival of the Rotterdam Philharmonic Orchestra will be given the Saturday night before the IEEE conference. The final of the World Championship Baseball will be on the same evening in the Neptunus stadium, the home of the European champion and since Feyenoord, one of the top 3 soccer teams of the Netherlands plays a home match on Sunday, we will try to arrange tickets for delegates. Please check the conference website for details.
It will be the third visit to Europe for the IEEE International Ultrasonics Symposium, and we trust that the Rotterdam conference in 2005 will be as successful as the Cannes conference in 1994 and the Munich conference in 2002.
Hope to meet you all in Rotterdam,

Best Regards,

Ton van der Steen
General chair

VENUE

Conference Centre, 'De Doelen'
Willem Burgerzaal Complex
Kruisplein 30
3012 CC Rotterdam
The Netherlands
http://www.doelen.nl/english_info.html

TRAVEL INFORMATION

From Schiphol Airport (main airport) in Amsterdam, there is a direct train connection to Rotterdam Central Railway Station every half hour. The traveling time is approximately one hour. See www.ns.nl for the timetable and prices.

You can buy your train ticket at the yellow machines just before the platforms. Near the platforms there is also a counter where you can buy a ticket.
Tip! You can also buy your train ticket in the yellow machines while waiting for your luggage. You can pay with credit card (only MasterCard).

It is advisable to travel through Schiphol, however it is also possible to travel to Rotterdam Airport. The center of Rotterdam can be reached in about 15 minutes by car (A13) and by public transport (bus 33, direction central station, every 15 minutes).

Information about public transport
Information number: 0900 9292
www.ns.nl

LOCAL TRANSPORTATION

For public transport (underground, tram or bus) you need a card called *strippenkaart (€ 6,50, 15 strippen.)* Available at the post office or railway station. You can also ask at your hotel where these are sold in the neighborhood.

HOTEL REGISTRATION

Blocks of rooms have been reserved at various hotels in Rotterdam. For information on hotel accommodations, bookings and a hotel reservation form see www.ieee-uffc.org.

Registration cut-off date is August 17, 2005. After this date, rooms and rates will be based on an availability basis only.

MISCELLANEOUS INFORMATION

Lunch:
There is no location to have lunch at the venue. At the registration desk you can obtain a list of restaurants near the venue.

Coffee, tea, water:
Coffee, tea and water will be served during the breaks in the:
Expohal, poster sessions (ground floor)
Foyer room 2, Jurriaanse Zaal, exhibits area (first floor)
Foyer room 1, Willem Burger Zaal (third floor)

ACCREDITATION

The Dutch Society for Medical Physics (Nederlandse Vereniging voor Klinische Fysica, NVKF) has accredited the symposium with 6 Continuing Professional Development points (CPD) per half workday. Category 1: International conference.

REGISTRATION DESK FOR THE SYMPOSIUM

The registration desk will be located in the Expohal on the ground floor (entrance, Willem Burgerzaal Complex, Kruisplein 30).

Saturday, September 17:	6:00 p.m.-9:00 p.m.
Sunday, September 18:	7:00 a.m.-7:00 p.m.
Monday, September 19:	7:00 a.m.-6:00 p.m.
Tuesday, September 20:	7:00 a.m.-5:30 p.m.
Wednesday, September 21:	7:00 a.m.-1:00 p.m.

REGISTRATION AND FEES

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

A printed version of the Proceedings will no longer be available from the Symposium. However, it can be ordered directly from IEEE after the Symposium.
Registration fee includes CD proceedings

	Before Aug. 1	After Aug. 1
IEEE Member	❍ $425	❍ $525
Non-IEEE Member	❍ $525	❍ $625
Student/Retiree	❍ $60	❍ $60
Life Members	❍ $0	❍ $0
One-Day Registration (without Proceedings)	❍ $300	❍ $300
Additional CD Proceedings	❍ $75	❍ $75
UFFC CD Archive (available only to UFFC members)	❍ $60	❍ $60

IEEE AND UFFC-S ENROLLMENT

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

If you are a current IEEE member and wish to become a first-time member of the UFFC-S, free membership is offered at the time of registration. You will receive the UFFC-S Transactions and all UFFC-S Newsletters published in 2005.

IEEE/UFFC-S enrollment forms will be available at the IEEE exhibit booth in Foyer Room 2.

MESSAGE DESK

Messages may be left at the Symposium Registration desk.
Phone number registration desk
(during opening hours): +31 (0)10 217 18 21
Fax number registration desk: +31 (0)10 217 18 22

PROCEEDINGS

The Symposium Proceedings (CD format) will be available around November 15. A copy will be mailed to all paid registrants except guests and one-day registrants.

A printed version of the Proceedings will no longer be available from the Symposium. However, it can be ordered directly from IEEE after the Symposium.

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

AUDIOVISUAL EQUIPMENT/SPEAKER SERVICE CENTER (SSC)

All rooms will have a lap-top computer and a projector. Presentations should be in Microsoft PowerPoint or Adobe pdf format and have to be loaded into the Symposium computers at the Speaker Service Center [SSC, Hudigzaal, third floor, close to room 1 (Willem Burger Zaal)]. Presenting from your own laptops will not be permitted.

You may use a USB memory stick, CD, or your own lap-top to transfer your presentation to the Symposium computers. Technicians are available to assist you. Computers are available in the SSC to make alterations before transferring.

The presentation can be handed in at the SSC up until 1.5 hours before the session starts. Please note that when you have an early morning session you will need to up-load your presentation the day before. The SSC will be open:
Sunday, September 18: 12 p.m. – 5 p.m.
Monday, September 19 to Wednesday, September 21: 7 a.m. – 6 p.m.

Please bring a back-up of your presentation on CD or USB memory stick.

Speakers can also hand in their presentation from four weeks before the conference until the early morning of the day that the presentation is scheduled.
From August 15th until the conference, a special web site will be open to up-load presentations.
The web site can receive presentations until the Speakers Service Center opens on the day the presentation is given.
For example, if your presentation is on Tuesday, September 20, you can up-load the presentation until Tuesday, September 20, 7:00 a.m.

Presentations made in PowerPoint can be uploaded, as well as audio- or video-material (if you use a special font, please upload that as well). The address of the website is: http://ftp.dedoelen.nl Your name, date, and time of the presentation have to be filled out to be able to up-load the presentation. Further instructions on how to up-load are mentioned on the site itself.

Presentations can only be up-loaded, neither down-loaded nor viewed by others. Only a technician from de Doelen has access to the presentations.

Should you have any questions or difficulties with the web site, please email: j.rotmans@dedoelen.nl.

POLICY ON PHOTOGRAPHY

Recordings of presented slides by photo or video is not permitted.

WIRELESS LAN

Wireless LAN will be available at selected locations in the conference centre.

UFFC CD ARCHIVE

The UFFC digital archive is available in a CD ROM version for the low price of $60 for UFFC members only. Please see the registration form for ordering information.

OPENING SOCIAL RECEPTION

Date: Monday, September 19
Time: 6:00 p.m. to 8:30 p.m.
Foyer Room 2, Jurriaanse Zaal (first floor, exhibits area)
Expohal (ground floor, poster sessions)
Admission and consumption free for delegates and guests.

After a welcome by Ivo Opstelten, the mayor of Rotterdam, drinks and cold and warm snacks will be offered. Furthermore, the winners of the student poster prize will be announced by Gerry Blessing, President of IEEE-UFFC. Live music will provide ambience to complete your first conference day.

CONFERENCE DINNER PARTY

Date: Tuesday, September 20
Time: 7 p.m. – midnight. Departure 8:00 p.m.
Price: $50.00.
$10.00 for students
Dinner, drinks, and entertainment are included.
Please register early.

Description:

Welcome on board the OCEAN DIVA; Europe's biggest event ship. On board, you will have food, drinks and entertainment! All ingredients for this grand cruising event are in place. As we sail, you will be talking, eating, and dancing while the city passes by. All delegates are cordially invited to join this cruise. This event is highly subsidized for all delegates and for students there is only a token registration fee.

Terms and conditions:

Only entrance with party voucher.
Vouchers can be bought in advance with conference registration or on-site at the registration desk. Please note that limited tickets are available so registration in advance is advised.

Location:

Wilhelminakade
(cross the river -> Erasmus bridge (to the right), between the building with the green lights and Café Rotterdam). Route description is available at the registration desk.

Public Transport:

Tram
From de Doelen -> Central Station: tramline 20, 23 or 25, get off at stop "Wilhelminaplein". The first stop after the bridge.
Cost: *3 strippen*.

Tram 8 from Central Station or the city center (direction Spangen) and get off at stop "Leuvenhaven", then you cross the bridge by foot.
Cost: *2 strippen*.

Underground
From de Doelen -> Central Station: blue line direction “Slinge” or “Spijkenisse” and get off at stop “Wilhelminaplein”. Cost: *3 strippen*.

Taxi
Taxi’s can get you to the boat very easily (from the city center € 15)
Phone taxi company: RTC +31 (0)10 462 60 60.

GUEST PROGRAM

A varied program is being planned to entertain those who register for the Symposium as guests. Registration permits you to enjoy our special reception every morning between 8 and 10 a.m. at the venue, as well as the evening social reception on Monday. Three guest tours, individually priced, will also be arranged for the enjoyment of the guests.

PLEASE NOTE: Only registered GUESTS (see special badge) may attend the guest reception. Check the registration desk for the time and location of the morning guest reception.

Terms and conditions for each Partnering Event:

- Tours should be booked in advance when registering for the congress (see registration form).
- **Only entrance with daytrip voucher.**
- Tickets are not reimbursable after being purchased.
- Tours depart from and return to Rotterdam.
- English speaking guides accompany tours.
- Please note that tours are based on a minimum number of participants per tour. Changes may occur for reasons beyond our control.
- Please note that registration will be in order of received registration forms and payment.

Tour 1: Historic Delft

Date: Monday, September 19
Time: 9:15 a.m. – 5:00 p.m.
Price: $60, Lunch is included

Bus leaves from venue de Doelen. Meet at registration desk. For more information please come to the registration desk.

Delft is one of the oldest cities in The Netherlands; it received its municipal rights in the year 1246. In the year 1389 Delft opened her first sea port “Delftshaven”, which is now a part of Rotterdam. You will begin this visit to Delft with coffee and original Dutch pastry. Then you will have a city walk under the guidance of an English-speaking guide. You will visit “The new Church”. The lunch will take place in “t Boterhuis”, a building where they used to trade butter. In the afternoon you will make a trip by canal boat through the canals of Delft with many interesting sights. Finally you will visit a small factory where you can see how Delftware is made. Here you will find an extensive selection of Dutch ceramics and souvenirs.

Tour 2: 'Typical Dutch': visit the windmills

Date: Tuesday, September 20
Time: 9:15 a.m. – 2:00 p.m.
Price: $60, Lunch not included. Drinks and snacks are available on the boat.

City walk leaves from venue de Doelen. Meet at registration desk. For more information please come to the registration desk.

You will start the day with a walk through the city center. The guide will tell historical facts about Rotterdam and show important architectural works in the center. The walk ends at the dock where a boat is ready to set off for Kinderdijk. In Kinderdijk you will find 19 famous Dutch windmills, which were built in 1740 and are very well preserved. In 1997 the mills of Kinderdijk were put on the world heritage list of UNESCO. You will be able to visit one of the many windmills. You will be back in Rotterdam in the afternoon and have time to shop or visit one of the museums.

Tour 3: Architecture tour

Date: Wednesday, September 21
Time: 10:00 a.m. – 5:00 p.m
Price: $60, Lunch is included

Bus leaves from brasserie, café Dudok, Meent 88, Rotterdam
For more information please come to the registration desk.

You will start the day with coffee with famous homemade apple pie in a well-known brasserie designed by architect W.M. Dudok. From there a touring car will pick you up and make a tour past architectural highlights and the skyline of the city. Lunch is served in the "Euromast" (at 110 meters high) from which you have a great view over the city. After lunch have a stroll through the Museum Park and visit the Museum Boijmans van Beuningen.

CONFERENCE MANAGEMENT

FASS
ieee-uffc@assochq.org
and
Het Congresbureau, Erasmus MC Rotterdam, The Netherlands
j.mudde@erasmusmc.nl

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Special Grants

Interuniversity Cardiology Institute of the Netherlands (ICIN)

ICIN

The Dutch Foundation for Ultrasound in Medicine & Biology (SUGB)

SUGB

EXHIBITS

Time: Daily from 8 a.m. to 6 p.m.

Location: Foyer room 2, Jurriaanse Zaal (first floor)
Foyer room 3, Van der Mandele Zaal (first floor)

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Smart Material GmbH
Sonora Medical Systems, Inc.
Sound Technology, Inc.
Valpey Fisher Corporation
W. L. Gore & Associates

SHORT COURSES

All courses are Sunday, September 18.

1 - Medical Ultrasound Transducers

8:00 a.m. – 12:00 p.m.
Douglas G. Wildes and L. Scott Smith
GE Global Research Center - Niskayuna, NY, USA

This course will provide an introduction to the design, fabrication, and testing of medical ultrasound transducers. Starting from an overview of the basic types of phased-array transducers (linear, convex, sector), we will discuss how the design for a probe is derived from its target application and how equivalent-circuit, finite-element, and acoustic field models can be used to optimize the design and accurately predict performance. A discussion of the structure of an ultrasound probe will lead to a survey of the different types of materials used in probes and their critical properties. Typical fabrication processes will be introduced and common problems in probe manufacturing will be summarized. Methods for evaluating completed transducers will be discussed. The course will highlight recent developments in probe technology, including. single crystal piezoelectrics, cMUT transducers, multi-row and 2D arrays, and electronics in probes, and will discuss performance advantages and fabrication difficulties which may be associated with each.
Douglas G. Wildes is a physicist with GE Global Research. He earned an A.B. in physics and mathematics from Dartmouth College and a Ph.D. in low-temperature physics from Cornell University, then joined

GE in 1985. Since 1991, Dr. Wildes' research has focused on aperture design, fabrication processes, and high-density interconnect technology for multi-row and 2D transducers for medical ultrasound. Dr. Wildes has 19 issued patents and 18 external publications. He is a member of the American Physical Society and a Senior Member of the IEEE.
L. Scott Smith is a physicist with GE Global Research. He earned B.S. and Ph.D. degrees in physics from the University of Rochester and the University of Pennsylvania respectively. Joining GE in 1976, he developed phased array probes for medical ultrasound. More recently, he examined novel probe materials and led projects on pediatric endoscopes and adaptive acoustics. Dr. Smith has 37 issued patents and over 35 refereed publications. He is a member of the American Physical Society and a Senior Member of the IEEE where he serves as Vice Chair for Transducers on the Ultrasonics Symposium's Technical Program Committee.

2 - Elasticity Imaging: Principles, Systems, Approaches and Applications

8:00 a.m. – 12:00 p.m.
Stanislav Emelianov
University of Texas - Austin, Texas, USA

Elasticity imaging is rapidly evolving into a new diagnostic and treatment-aid tool. The primary purpose of this course is to provide both a broad overview and comprehensive understanding of elasticity imaging, and, as such, it is well suited for both newcomers and active researchers in the field. Starting with a historical introduction to elasticity imaging, we begin to lay a foundation for static and dynamic approaches in elasticity imaging with a brief discussion of theory of elasticity including both the equation of equilibrium and the wave equation. We will also review the mechanical properties of soft tissues. Then, experimental aspects of elasticity imaging will be discussed with emphasis on data capture, signal and image processing algorithms to measure internal tissue motion induced by either internally or externally applied forces. Motion tracking methods will be introduced, and techniques to increase and optimize signal-to-noise ratio in strain imaging will be overviewed. Finally, techniques to map elasticity and other mechanical properties of tissue will be presented and discussed. Following an overview of elasticity imaging, the ultrasound elasticity imaging techniques and their biomedical and clinical applications will be presented. Advantages and limitations of each approach will be discussed and contrasted with other elasticity imaging techniques such as MRI or optical elastography. The course will conclude with overview of several experimental and commercial systems capable of ultrasound elasticity imaging, and discussion of current and potential clinical applications of elasticity imaging.
Stanislav Emelianov received the B.S. and M.S. degrees in physics and acoustics in 1986 and 1989, respectively, from the Moscow State University, and the Ph.D. degree in physics in 1993 from Moscow State University, and the Institute of Mathematical Problems of Biology of the Russian Academy of Sciences, Russia. In 1989, he joined the Institute of Mathematical Problems of Biology, where he was engaged in

both mathematical modeling of soft tissue biomechanics and experimental studies of noninvasive visualization of tissue mechanical properties. Following his graduate work, he moved to the University of Michigan, Ann Arbor, as a post-Doctoral Fellow in the Bioengineering Program, and Electrical Engineering and Computer Science Department. From 1996 to 2002, Dr. Emelianov was a Research Scientist at the Biomedical Ultrasonics Laboratory at the University of Michigan. During his tenure at Michigan, Dr. Emelianov was involved primarily in the theoretical and practical aspects of elasticity imaging. Dr. Emelianov is currently an Assistant Professor of Biomedical Engineering at the University of Texas, Austin. His research interests are in the areas of medical imaging for therapeutics and diagnostic applications, ultrasound microscopy, elasticity imaging, photoacoustical imaging, cellular/molecular imaging, and functional imaging.

3 - Ultrasound Contrast Agents: Theory and Experimental Results

8:00 a.m. – 12:00 p.m.
Nico de Jong and Michel Versluis
Erasmus MC - Rotterdam, the Neth. & University of Twente - Enschede, the Netherlands.

The course consists of 6 main topics: a) First an overview will be presented of the (clinical and pre-clinical available) contrast agents, including the properties and characteristics of the gas inside the bubble and the shell surrounding it. b) Models of the behavior of small bubbles in a ultrasound field will be discussed. Simple models based on a one dimensional mass-spring system and more complicated models including gas and shell properties. c) Experimental ultrasound methods for UCA will be presented for characterizing the bubbles in a UCA, like harmonic and subharmonic scattering, absorption and attenuation. Also the influence of ambient pressure, temperature and gas concentration will be discussed. d) Experimental optical methods for characterizing individual bubbles. e) Imaging methods for contrast agents, like fundamental, harmonic, subharmonic and superharmonic and multi-pulse methods like pulse inversion, power modulation etc. and new methods like chirp excitation. f) Ultrasound mediated drug delivery: Interaction between mammalian cells and ultrasound in the vicinity of bubbles will be discussed.
Nico de Jong graduated from Delft University of Technology, The Netherlands, in 1978. He got his M.Sc. in the field of pattern recognition. Since 1980, he has been a staff member of the Thoraxcenter of the Erasmus University Medical Center, Rotterdam, The Netherlands. At the Dept. of Biomedical Engineering, he developed linear and phased array ultrasonic probes for medical diagnosis, especially compound and transesophageal transducers. In 1986 his interest in ultrasound applications shifted toward the theoretical and practical background of ultrasound contrast agents. In 1993 he received his Ph.D. for "Acoustic properties of ultrasound contrast agents." Currently he is interested in the development of 3-D transducers and fast framing camera systems. De Jong is the project leader of STW and FOM projects on ultrasound

contrast imaging and drug delivery systems. Together with Folkert ten Cate, MD, he is organizer of the annual European Symposium on Ultrasound Contrast Imaging, held in Rotterdam and attended by approximately 175 scientists from all over the world. Since 2003 Nico de Jong is part-time professor at the University of Twente.

Michel Versluis graduated in Physics in 1988 at the University of Nijmegen, the Netherlands, with a special interest in Molecular Physics and Astrophysics. Later, he specialized in the application of intense tunable UV lasers for flame diagnostics resulting in a successful defense of his PhD thesis in 1992. Michel Versluis is now a lecturer at the University of Twente, the Netherlands, in the Physics of Fluids group working on the experimental study of bubbles and jets in multiphase flows and granular flows. He also works on the use of microbubbles as a tool for medical diagnosis and therapy. Dr. Versluis teaches various courses in Fluid Mechanics, one of them focusing on the physics of bubbles.

4 - Recent Trends in Beamformation in Medical Ultrasound

1:00 p.m. – 5:00 p.m.
Kai Thomenius
General Electric's Corporate R&D - Niskayuna, NY, USA

The goal of this introductory course is to review the design of ultrasound front ends and beamformers from a linear systems point of view including transduction, beamformation, and image formation functions. We will discuss analytical methods used in developing the design of a typical beamformer in use in diagnostic ultrasound today. The key points to be covered deal with methods of analysis of arrays and beamformers, the interaction of transmit and receive beams with clinically relevant targets, and how this interaction is used in image formation. The means by which these analytical methods contribute to a beamformer design and the trade-offs involved are reviewed. The techniques developed for such analysis will be applied to topics of current interest involving beamformation such as system miniaturization, 2D arrays, synthetic aperture techniques, and aberration correction.

Kai E. Thomenius is a Chief Technologist in the Imaging Technologies Organization at General Electric's Global Research facility in Niskayuna, NY. His focus is on Ultrasound and Biomedical Engineering. Previously, he has held senior R&D roles at ATL Ultrasound, Inc., Interspec Inc., Elscint, Inc., Inc as well as several other ultrasound companies, and is currently an Adjunct Professor in the Electrical, Computer, and Systems Engineering Department at Rensselaer Polytechnic Institute where he teaches a course in general imaging. Dr. Thomenius' academic background is in electrical engineering with a minor in physiology; all of his degrees are from Rutgers University. His long-term interests have been in ultrasound beamformation and miniaturization of ultrasound scanners, propagation of acoustic waves in inhomogeneous media such as tissue, the potential of bioeffects due to those acoustic beams, and determination of additional diagnostic information from the echoes that arise from such beams. Recently he has contributed to work on coherent

beamformers in millimeter wave radar applications. He is a Fellow of the American Institute of Ultrasound in Medicine.

5 - Micromachined Ultrasonic Sensors and Actuators

1:00 p.m. – 5:00 p.m.
Ville Kaajakari, Amit Lal, and Richard White
Cornell University - Ithaca, NY and University of California - Berkeley, CA

Part A: The goal of this part is to introduce the fundamentals of micromachining, and the way they affect the design and performance of ultrasonic sensors and actuators. We will cover established micromachining techniques, such as bulk micromachining and surface micromachining on silicon. Material on thin film deposition and foundries will be presented. The relevant acoustic and ultrasonic properties of materials used in MEMS will be discussed for predictable device design. Nonlinearities, material property gradients, and internal stresses will be covered to describe their effect on design.
Part B: Case studies of sonic MEMS will be presented. These include (1) electrostatic actuation of micromachined membranes, nonlinearities and effective electromechanical coupling, (2) comparison of PZT and thin-film piezoelectric actuation of silicon bulk and surface micromachined structures (silicon horn design, microphones, speakers, flexural plate waves, FBARS), and (4) nonlinear ultrasound in microfluidic devices, and (5) Micro resonators for RF communications.
Amit Lal is an associate professor of electrical and computer engineering at Cornell University. He received his Ph. D. in electrical engineering from the University of California, Berkeley in 1996, and the B.S. degree from the California Institute of Technology in 1990. Amit Lal is the leader of the SonicMEMS group at Cornell University, which focuses on ultrasonics, micromachining, modeling of piezoelectric systems, use of radioactive energy sources in microsystems, and design and analysis of integrated circuits. He has published papers on ultrasonic sensors and actuators at conferences in ultrasonics and micromachining. He serves on the Technical Committee on Physical Acoustics in the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society. He holds patents on micromachined acoustic sources/receivers, and silicon-based high-intensity ultrasonic actuators. He is also the recipient of the NSF CAREER award for research on applications of ultrasonic pulses to MEMS.
Richard M. White is a professor of EECS and a founding co-director of the Berkeley Sensor & Actuator Center at the University of California at Berkeley, Dick White has concentrated on ultrasonics and microsensors. He has published on thermoelastic wave generation, SAW transduction, and flexural plate-wave sensors. He has co-authored three books - a text for freshmen, a book on solar cells, and the reference book "Acoustic Wave Sensors". White is a member of the National Academy of Engineering, and has received awards for his contributions to ultrasonics from the IEEE and the Ultrasonics and Frequency Control soci-

eties of the UFFC. His present research interests include ultrasonic airborne particulate monitoring and wireless passive proximity metering of AC power use in dwellings.
Ville Kaajakari received his M.S. and Ph.D. degrees in electrical and computer engineering fromUniversity of Wisconsin-Madison in 2001 and 2002, respectively. He is currently Senior Research Scientist at VTT Information Technology, Finland, where his research interest is RF-MEMS.

6 - Clinical Applications of Diagnostic Ultrasound

1:00 p.m. – 5:00 p.m.
Folkert ten Cate and Juiry W. Wladimiroff
Erasmus MC - Rotterdam, the Netherlands

The goal of this introductory course is to review the clinical applications of ultrasound imaging in cardiology. The presentation will be illustrated with realtime 2D and 3D Echoimages.
Folkert J ten Cate, M.D., is director of the clinical echolaboratory of the Thoraxcenter , Erasmus MC in Rotterdam.His main interest is in cardiomyopathies and ultrasound contrast both for diagnosis and treatment. He is a Fellow of the American College of Cardiology and the European Society of Cardiology.
Professor ***Juiry W. Wladimiroff*** was born in The Hague. He graduated from the school of medicine in Leiden in 1965 and was Board certified in Obstetrics and Gynecology in 1972. After some initial endeavours, Wladimiroff soon went down to London to study with Professor Stuart Campbell at the Post-graduate Institute at the Queen Charlotte's Hospital. In the late 1970s he field tested Organon Teknika's original realtime equipments from the Netherlands (in collaboration with Nicolaas Bom, the original inventor) and demonstrated the usefulness of the MiniVisor in the rapid measurement of the biparietal diameter at the bedside. His research at Queen Charlotte's started with the measurement of fetal urinary production rate, which he continued to expand after returning to the Netherlands, looking at fetal urinary production under a variety of physiological and pathological situations. From then on Professor Wladimiroff became particularly interested in the physiology and patho-physiology of pregnancy and the fetus and his group was very productive in researches pertaining to fetal cardiology, fetal vascular and cerebral function and fetal blood flow as assessed by doppler velocimetry. In 1974, he received his PhD at the University of Nijmegen with a thesis on fetal monitoring. In 1973, he started work as a consultant at the department of obstetrics and gynecology of Erasmus University Rotterman at Dijkzigt Hospital; in 1977, he was appointed reader at this department, and in 1980 full professor. Since 1984, he was head of the division of prenatal diagnosis and since 1996, when the two divisions were merged, head of the division of obstetrics and prenatal diagnosis at Rotterdam University Hospital. In 1981, his group reported fetal left ventricular volume determination from a study of two-dimensional measurement of real-time ultrasonic images of the left ventricle. Their group was the first to describe doppler studies of the middle cerebral arteries and the carotid carteries, and popularizing the

carotid artery/ umbilical artery PI ratio for the assessment of fetal compromise. Professor Wladimiroff was the President of the Dutch Society of Obstetrics and Gynecology from 1993 to 1995 and was the Chairman of the National Liason Committee for Medical Research Committees in the Netherlands. He has organized numerous National and International Scientific meeetings and Symposia and was the Chairman of the Education Committee of the International Society for Ultrasound in Obstetrics and Gynecology (ISUOG). He is also a board member of the Society of the "Fetus as a Patient" and executive board member of the European Board and College of Obstetrics and Gynecology and has carried out visitations in departments from Slovenia to Portugal. Professor Wladimiroff has produced over 300 important scientific papers and contributed to over 20 books and monographs. He is well regarded by his colleagues as a great teacher and investigator. Since 1977, he has supervised 25 PhDs on many different aspects of prenatal diagnosis, of obstetrical, gynecological and Doppler ultrasound, and of fetal monitoring. His PhD students came from Holland, Switzerland, Britain, Indonesia and Austria. In recognition of his contributions to the advancement of ultrasound in Obstetrics and Gynecology, he was presented the Ian Donald Gold Medal by the ISUOG in 1997. In 1999 he received the Gold Medal from the Drs. Haackert Foundation for "Lifetime Achievements in the field of Prenatal Diagnosis and Therapy".

7 - Non-linear Acoustics and Harmonic Imaging

6:00 p.m. – 10:00 p.m.
Victor Humphrey
Southampton University - Southampton, UK

This course will provide an introduction to the origins of non-linear propagation, and its consequences and applications in medical ultrasound.
The first section will review the basic physics of non-linear propagation, and discuss the propagation of plane waves as a means of introducing non-linear acoustics terminology. This will be followed by a discussion of the techniques used to numerically model non-linear propagation and the specific problems of performing measurements in high amplitude fields with their associated distortion and harmonic content. The effects of diffraction and attenuation on non-linear propagation will then be introduced by considering the fields of transducers and arrays, and the fields they generate in tissue; this will be illustrated by a combination of experimental results and model predictions. This will lead on to a discussion of the consequences for medical ultrasound of non-linear propagation. Finally the application to harmonic imaging will be described.
Victor Humphrey is a Professor of Acoustics at the Institute of Sound and Vibration Research (ISVR) in Southampton, U.K. He received his BSc and PhD degrees from the University of Bristol in 1975 and 1981 respectively. He then moved to the School of Physics at the University of Bath where was promoted to Senior Lecturer. In 2004 he took up his current position at ISVR. His initial research was in the area of laboratory applications of non-linear parametric arrays in underwater acoustics. For this work he was awarded the Institute of Acoustics A.B.

Wood Medal 1988. Subsequently he helped to develop a research programme on the non-linear propagation of ultrasound in medical fields that investigated these fields both numerically and experimentally. He was awarded the University of Bath Mary Tasker Award for excellence in teaching in 1995.

8 - Finite Element Modelling of Ultrasound Applications

6:00 p.m. – 10:00 p.m.
Paul Reynolds and John Mould
Weidlinger Associates Inc - Los Altos, USA

Finite Element Modelling (FEM) of ultrasound devices has been growing since its early use in the late 1980s and early 1990s. It is now common, and likely soon to be universal, to find industrial and academic groups with a significant ultrasound research component to utilize computer simulations of one form or another in their work. While the researchers are experts in their own field of ultrasound, they rarely have such extensive knowledge of the field of finite element modelling and consequently often have difficulty in making appropriate choices and decisions regarding their modelling needs and approach. It is the aim of this course to educate the ultrasound expert in the important considerations with regards to the finite element modelling of ultrasound applications, with particular emphasis on phenomena occurring in front of the transducer. By the end of the course, it is our intention that the attendees will have the basic information on finite element simulations, and several common but varied applications, with which to make informed decisions in regards to simulating their own particular problems, and therefore make best use of the resources available to them. The course will be divided in four parts.

Part 1: Finite Element Basics
The first section will involve an introduction to the field of finite element modelling, in order to ensure that all participants are aware of the basic assumptions inherent in the various modelling approaches. Common terminology, types of analysis (harmonic, transient etc), types of solution methods (implicit, explicit), types of numerical solver (direct, iterative), and typical boundary conditions, such as symmetry and infinite element (e.g. absorbers and PML), validation and verification methods will be detailed.

Part 2: Wave Propagation
The second section will concentrate on the modelling of wave propagation through various media. Initial consideration will be given to the simple, linear, elastic cases and then moving to include the effects of long distance propagation, material discontinuities, frequency dependant attenuation, and non-linearity (such as is prominent in higher-harmonic imaging).

Part 3: Ultrasound Applications
The third section will consider a variety of ultrasound applications.

This includes accidental or intentional tissue heating (such as with HIFU). Appropriate and accurate calculation of thermal generation (sometimes called the Bioheat Equation) and its application as a load to a thermal model will be detailed. Aspects of ultrasound/thermal coupling will be compared to acoustic radation force calculation, which bear significant resemblance in approach.

Part 4: Efficient Application of Modelling Software on Available Hardware
The ability to economically answer the questions posed often marks the difference between a successful and a failed project. We cover simple and effective approaches for ensuring maximum return on time invested in FEM, and important considerations for ensuring sufficiently accurate answers. This will then extend to discussion of numerical optimization techniques, and the relative costs compared to the potential benefits considered. We will discuss common computer architectures, the 32 to 64 bit transition, and multi-processing, in order to leave the potential user somewhat more comfortable in this rapidly changing and bewildering field.
Paul Reynolds received B.Eng in Electrical and Mechanical Engineering from the University of Strathclyde, Scotland, in 1994, and Ph.D in 1998 for his work on finite element modelling of piezoelectric transducers. Since 1999 he has worked at WAI using the PZFlex finite element package to model a wide range of ultrasound and piezoelectric applications, including medical imaging, therapeutics, SONAR, and sensors.
John Mould received B.Sc. and M.Sc. in Civil Engineering from Virginia Tech in 1978 and 1979 respectively. He received a Ph.D. in Civil Engineering from the University of Colorado in 1983. Since joining WAI in 1983 he has been an analyst and a major contributor to the development of the entire FLEX family of codes for Nonlinear Solids, Acoustics, Thermal, Piezoelectric and Electromagnetic analyses.

9 - Flow Measurements and Doppler

6:00 p.m. – 10:00 p.m.
Hans Torp
Norwegian University of Science and Technology -Trondheim, Norway

This course provides basic understanding of physical principles and signal processing methods for flow measurements and visualization; with emphasis on Doppler methods and blood flow applications. The course starts with an overview of currently used techniques for velocity estimation in pulsed and continuous wave Doppler and color flow imaging. Statistical models for the received signal, as well as commonly used velocity and flow estimators are developed. Several different simulation methods for ultrasound signals from moving blood and clutter signals will be discussed. This includes fast simulation methods, as well as full 3D point scatter models using spatial impulse response techniques or k-space analysis. Efficient simulation tools to explore estimator properties are derived, and examples on implementation in Matlab will be shown. Methods to suppress clutter signals from slowly moving targets, including regression filter will be discussed. Elements from classi-

cal estimation theory will be applied to develop minimum variance velocity estimators in the presence of clutter noise. The performance will be compared with commonly used approaches for clutter rejection and velocity estimation, and practical implementations will be discussed. Velocity components transversal to the ultrasound beam can not be measured by Doppler techniques. However, several approaches to overcome this limitation has been proposed, including speckle tracking, transit time measurements, and lateral beam modulation. Principles and practical limitations will be discussed. Methods for visualisation of 2D vector flow information will be shown.

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

MESSAGE FROM THE TECHNICAL CHAIR

John Hossack
Technical Program Chair

On behalf of the Technical Program Committee (TPC), I welcome you to the 2005 IEEE International Ultrasonics Symposium. This year we had 876 abstract submissions. This is approximately 100 submissions more than submitted in both of the previous two years. In order to accommodate this growth, we have added an additional parallel oral session that is shared among the different subgroups that make up the overall symposium. Planning for the symposium required extensive effort by the Technical Program Committee leading up to the TPC meeting held on June 18th and 19th, 2005 in Chicago, IL. The acceptance rate was approximately 75% and is in line with historical levels. In particular, we have observed significant growth in Sensors and Physical Acoustics this year. This is likely a function of the physical location of the conference (i.e. Europe) where the balance of medical related, versus non medical related, funding is more even than is found in North America (for example). (A similar trend can also be observed in the distribution of abstracts at the successful 2002 Munich conference.)

In line with previous years, we have held the total length of the conference to one day of short courses and a full three days of six oral sessions in parallel and three large poster sessions, without a single gap any where in the program. In view of the increased number of parallel sessions, I ask that all concerned (speakers and session chairs) keep the conference strictly on time.

We have 18 eminent invited speakers providing a range of talks spanning a historical review of a famous scientist (Lord Rayleigh) to overviews of exciting and new technical growth areas. We will also continue our tradition of holding a student poster competition. These posters will remain on display for the entire conference. The winners of the competition will each receive a certificate and a $100 cash prize.

Regards,

John A. Hossack
2005 IEEE Ultrasonics Symposium Technical Chair

GROUP 1:

Patrick W. Serruys: 'Biomedical Engineering in the Catheterization Laboratory'
Timothy Leighton: 'Bubble Acoustics: from Seas to Surgeries'
Peter Wells: 'Lord Rayleigh'
Jaques Souquet: 'Telemedicine: What is in Place Today? What are the Challenges for the Future?'
Kathy Ferrara: 'Targeted Ultrasound Imaging and Drug Delivery'
Ralph Sinkus: 'Dynamic MR-Elastography as a Non-Invasive Imaging Modality: In Vivo Application to Breast, Liver, and Brain'

GROUP 2:

Chris Lowe: 'Novel Acoustic Biosensors'
K. Yamanaka: 'Diffraction-Free Propagation of Collimate Surface Acoustic Wave on a Sphere Applied for Innovative Gas Sensors'
Ute Rabe: 'Surface Characterization Using Ultrasonic Vibration Modes of Atomic Force Microscope Cantilevers'

GROUP 3:

Paul Muralt: 'Is There a Better Material for Thin Film BAW Applications than AIN?'
S. V. Krishnaswamy: 'Piezoelectric/Ferroelectric Films for Microwave/MEMS Application - Historical Perspective'
E. V. Charnaya: 'Ionic Conductivity in Acoustic Crystals'

GROUP 4:

Meirion F. Lewis: 'SAW and Optical Signal Processing'
Peter Wright: 'Trends in Integrated Front-End Modules for Cellular Handsets'

GROUP 5:

Christopher Daft: 'cMUTs and Electronics for 2-D and 3-D Imaging: Monolithic Integration, In-Handle Chip Sets and System Implications'
Stephen M. Fry: 'A Glimpse into the Future of Intravascular Ultrasound Technology'
Tim Proulx: 'Advances in Catheter-Based Ultrasound Imaging'
Jie Chen: 'Commercialization of Piezoelectric Single Crystals for Medical Imaging Applications'

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Erasmus University Medical Centre, Rotterdam, The Netherlands
a.vandersteen@erasmusmc.nl

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John Hossack
University of Virginia, Charlottesville, VA, USA
hossack@ieee.org

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Erasmus University Medical Centre, Rotterdam, The Netherlands
n.dejong@erasmusmc.ml

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vdv@ieee.org

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Emad Ebbini: University of Minnesota, USA

Helmut Emert: Electrical Engineering Department, Ruhr University, Germany
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Kathy Ferrara: Biomedical Engineering, University of California, USA
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James Greenleaf: Ultrasound Research, Mayo Clinic, USA
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Walter Arnold: Fraunhofer Institute for Nondestructive Testing, Germany
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Lawrence W. Kessler: Sonoscan Inc., USA

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Jun-ishi Kushibike: Department of Electrical Engineering, Graduate School of Engineering, Tohoku University, Japan
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Bob R. Potter: Vectron International, USA
Arne Ronnekleiv: Division of Physical Electronics, Norwegian Institute of Technology, Norway
Clemens C. W. Ruppel: EPCOS AG - SAW RD SAM, Germany
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Robert Weigel: University of Erlangen-Nuremberg, Germany

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Clyde Oakley: Vice-president of Probe Development, Tetrad Corporation, USA
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K. Kirk Shung: Bioengineering Department, Pennsylvania State University, USA
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*Non-voting position

FUTURE SYMPOSIA

2006 IEEE International Ultrasonics Symposium, Vancouver, Canada
General Chair: Stuart Foster
Date: 3-6 October 2006

2007 IEEE International Ultrasonics Symposium- New York City, New York, USA
General Chair: John Kosinski

2008 IEEE International Ultrasonics Symposium - Beijing, China
General Chair: Jian-yu Lu

Monday, September 19
Willem Burger Zaal
8:30 a.m.-10:00 a.m.

Welcome

Ton van der Steen, General Chair
John Hossack, Technical Program Chair

Awards and Recognitions

Achievement Award
Distinguished Service Award
Rayleigh Award
Outstanding Paper Award
Fellow Awards
Distinguished Lecturer Award
David Sarnoff Award

Nanoscience, From Single-Molecule Science to Applications

Cees Dekker
Delft University of Technology, Kavli Institute of NanoScience,
Lorentzweg 1, 2628 CJ Delft, The Netherlands
http://www.mb.tn.tudelft.nl/

Prof.dr. Cees Dekker (1959) is a professor in Molecular Biophysics at the Technical University Delft. His research takes place at the boundaries of nanotechnology, biology and physics. His work in carbon nanotubes is most famous, but his current interests have diverted to nanotechnology of living cells. He published more than 130 peer reviewed papers, of which more than 20 in Nature en Science. In 2003 he was appointed as a member of the Royal Dutch Academy of Arts and Sciences. Dekker received several honours and awards, including the 2001 Agilent Europhysics Prize, the 2003 Spinoza Award of the Netherlands Organization for Scientific Reasearch and an honorate doctorate in Diepenbeek, Belgium. Further information can be found on: www.mb.tn.tudelft.nl/user/dekker/index.htm

This talk will give a broad introduction and overview of nanoscience and nanotechnology. I will illustrate the excitement and potential of this emerging field by focusing on a number of examples, in particular carbon nanotubes for nanoelectronics and single-molecule techniques for biophysics of DNA-enzyme interactions.

NOTES

Session PS
STUDENT PAPER FINALISTS

Chairs: Helen Roth, Philips Medical Systems and Tom Thomas, Siemens Medical Solutions

PS-1 **High Frequency Ultrasound Characterization of the Blood Clotting Process: Intra- and Inter-Individual Variations.** R. Libgot*[1], F. Ossant[1,2], Y. Gruel[2], and F. Patat[1,2], [1]*LUSSI FRE 2448 CNRS, Tours, France*, [2]*Bretonneau University Hospital, Tours, France.*

PS-2 **Ultrasonic Detection of the Anisotropy of Protein Cross Linking in Myocardium.** S. Baldwin*, M. Yang, K. Marutyan, K. Wallace, M. Holland, and J. Miller, *Washington University in St. Louis, St. Louis, MO.*

PS-3 **Detection of the Myocardial Boundary in the Left Ventricle from Simultaneously Acquired Triplane Ultrasound Images Using Multi View Active Appearance Motion Models.** J. Hansegård*[1], S. Urheim[2], E. Steen[4], H. Torp[3], B. Olstad[3], S. Malm[3], and S. Rabben[4], [1]*University of Oslo, Oslo, Norway*, [2]*Rikshospitalet University Hospital, Oslo, Norway*, [3]*The Norwegian University of Science and Technology, Trondheim, Norway*, [4]*GE Vingmed Ultrasound, Horten, Norway.*

PS-8 **Morpho-Mechanical Analysis of the Dentin-Cement Interface Strength Using a Scanning Acoustic Microscope.** E. Bakulin*[1], L. Denisova[2], R. Maev[1], F. Rusanov[2], A. Denisov[2], D. Gavrilov[2], F. Severin[1], and G. Grayson[3], [1]*Windsor University, Windsor, Ontario, Canada*, [2]*Institute for Biochemical Physics, Moscow, Russian Federation*, [3]*Ultradent Clinical Research Ltd., Windsor, Ontario, Canada.*

PS-9 **Parametric Modeling of Wave Propagation in Gas Mixtures - A System Identification Approach.** J. Martinsson* and J. E. Carlson, *Lulea University of Technology / EISLAB, Lulea, Sweden.*

PS-10 **Intermediate Frequency Resonators using Lamb Waves Co-Integrated with Bulk Acoustic Wave Resonators.** A. Volatier*[1,3], G. Caruyer[1,3], E. Defay[2], D. Pellissier Tanon[1], P. Ancey[1], and B. Dubus[3], [1]*STMicroelectronics, Crolles, France*, [2]*CEA-LETI/DIHS/LCRF, Grenoble, France*, [3]*IEMN, Lille, France.*

PS-11 **Calibration of Acoustic Radiation Pressure Field inside Microchannels using Microparticle Zeta Potential Measurement.** M. Araz* and A. Lal, *Cornell University, Ithaca, NY.*

PS-16 **A High Frequency Variable Focus Ultrasonic Transducer Using Polyurea Thin Film.** M. Nakazawa*[1], T. Kosugi[1], K. Nakamura[1], S. Ueha[1], A. Maezawa[2], and Y. Hirao[3], [1]*Tokyo Institute of Technology, Yokohama, Japan*, [2]*Konica Minolta, Tokyo, Japan*, [3]*Kobayashi Institute of Physical Research, Tokyo, Japan.*

PS-17 **3-D Ultrasound Imaging Using Forward-Viewing CMUT Ring Arrays for Intravascular and Intracardiac Applications.** D. Yeh*[1], O. Oralkan[1], I. Wygant[1], M. O'Donnell[2], and B. Khuri-Yakub[1], [1]*Stanford University, Stanford, CA*, [2]*University of Michigan, Ann Arbor.*

PS-18 **Analysis and Design of Dual-electrode Capacitive Micromachined Ultrasonic Transducers.** R. O. Guldiken* and F. L. Degertekin, *Georgia Institite of Technology, Atlanta.*

P1A-4 **Determination of Velocity Vector Angles for the Directional Cross-Correlation Method.** J. Kortbek*[1,2] and J. Jensen[1], [1]*Center for Fast Ultrasound Imaging, Technical University of Denmark, Denmark*, [2]*B-K Medical, Herlev, Denmark.*

P1A-5 **Blood Velocity Estimation Using Spatio-Temporal Encoding Based on a Frequency Division Approach.** F. Gran*, S. Nikolov, and J. A. Jensen, *Center for Fast Ultrasound Imaging, Technical University of Denmark, Copenhagen, Denmark.*

P1A-6 **Destruction-Mode Opto-acoustic Flow Measurements with Gold Nanorods.** P.-C. Li*[1], S.-W. Huang[1], C.-W. Wei[1], and C. R. Wang[2], [1]*Department of Electrical Engineering, National Taiwan University, Taipei, Taiwan, ROC*, [2]*Department of Chemistry and Biochemistry, National Chung Cheng University, Chia-Yi, Taiwan, ROC.*

P1A-7 **A Simple Method to Reduce Aliasing Artifacts in Color Flow Mode Imaging.** J. Udesen*[1,2], S. I. Nikolov[1], and J. A. Jensen[1], [1]*Center for Fast Ultrasound Imaging, Technical University of Denmark, Lyngby, Denmark.*, [2]*B-K Medical A/S,, Herlev, Denmark.*

P1B-4 **Measurement Spatial Distribution of Heart Wall Motion Generated by Remote Perturbation of Inner Pressure.** H. Kanai*, H. Hasegawa, and K. Imamura, *Tohoku University, Sendai, Japan.*

P1B-5 **Transient Ultrasound Elastography for Breast Cancer Diagnosis Using Impulsive Radiation Force: an In Vitro Study.** D. Melodelima*[1], J. Bamber[1], F. Duck[2], and J. Shipley[2], [1]*Royal Marsden NHS trust and Institute of Cancer Research, Sutton, Surrey, UK*, [2]*Royal United Hospital MHS trust, Bath, UK.*

P1B-6 **The Effect of Surrounding Gelatin on Ultrasound Generated Short Pulse Wave Propagation in Arteries.** X. Zhang* and J. Greenleaf, *Mayo Clinic College of Medicine, Rochester, MN.*

P1C-4 **Evaluation of a Modified Autocorrelation Method when Applied to Cardiac Strain Rate Imaging.** A. Blomberg*[1], A. Heimdal[2], S. I. Rabben[2], J. D'Hooge[3], and A. Austeng[4], [1]*University of Oslo, Oslo, Norway*, [2]*GE Vingmed Ultrasound, Oslo, Norway*, [3]*University Hospital Gasthuisberg, Leuven, Belgium*, [4]*University of Oslo, Oslo, Norway.*

Session P1D
BEAMFORMER IMPLEMENTATION

Chair: J.-Y. Lu, University of Toledo

P1D-1 **"Synthetic Axial Acquisition" Full Resolution C-Scan Ultrasonic Imaging.** Y. Li*, T. Blalock, W. Walker, and J. Hossack, *University of Virginia, Charlottesville, VA.*

P1D-2 **A Hardware Efficient Beamformer for Small Size Ultrasound Scanners.** J. Y. Lee*, H. S. Kim, and T. K. Song, *Sogang University, Seoul, South Korea.*

PS-4 **3D Perfusion Mapping in the Intact Mouse Heart after Myocardial Infarction using Myocardial Contrast Echocardiography.** Y. Li*, Z. Yang, B. A. French, and J. A. Hossack, *University of Virginia, Charlottesville, VA.*	PS-12 **Cantilever Resonance Induced In Situ by Magnetostriction for Active Flow Control.** O. Ducloux*[1], N. Tiercelin[1], Y. Deblock[1], P. Pernod[1], V. Preobrazhensky[1,2], and A. Merlen[3], [1]*LEMAC / IEMN-DOAE – UMR CNRS 8520, Ecole Centrale de Lille, Cité Scientifique - Av Poincaré, Villeneuve d'Ascq, France,* [2]*LEMAC / Wave Research Center - GPI-RAS, Moscow, Russia,* [3]*LEMAC / LML UMR CNRS 8107, Villeneuve d'Ascq, France.*	*Session P1A* ***BLOOD FLOW*** Chair: E. Ebbini, University of Minnesota	*Session P1B* ***ELASTOGRAPHY*** Chair: P.-C. Li, National Taiwain University	*Session P1C* ***TISSUE CHARACTERIZATION*** Chair: E. Biagi, University of Florence	P1D-3 **Modern Implementation of a Realtime 3D Beamformer and Scan Converter System.** K. Wall* and G. Lockwood, *Queen's University, Kingston, Ontario, Canada.*
PS-5 **Applying *In Vitro* Elasticity Imaging Results to Optimize *In Vivo* Breast Lesion Characterization Using a Combined 3D US/Digital X-ray System.** R. Booi*[1], P. Caron[1], R. Erkamp[1], H. Xie[1], A. Kapur[2], G. LeCarpentier[1], M. Roubidoux[1], J. Fowlkes[1], and M. O'Donnell[1], [1]*University of Michigan, Ann Arbor,* [2]*General Electric Global Research Center, Schenectady, NY.*	PS-13 **Double-Resonance SAW Filters.** J. Meltaus*[1], V. P. Plessky[2,1], and S. S. Hong[3], [1]*Helsinki University of Technology, Espoo, Finland,* [2]*GVR Trade SA, Bevaix, Switzerland,* [3]*Samsung Electro-Mechanics Co., Ltd., Suwon, Korea.*	P1A-1 **Synthetic Aperture Flow Angle Estimation on In-Vivo Data from the Carotid Artery.** N. Oddershede* and J. A. Jensen, *Center for Fast Ultrasound Imaging, Technical University of Denmark, Denmark.*	P1B-1 **Analysis of Transient Shear Wave Generation for Real-Time Shear Elastography In-Vivo.** S. Yagi*[1], A. Sanuga[1], Y. Kondo[2], K. Tamura[2], and M. Sato[3], [1]*Meisei University, Oume, Tokyo, Japan,* [2]*Aloka Co., Ltd., Oume, Tokyo, Japan,* [3]*Microsonic Co., Ltd., Tokyo, Japan.*	P1C-1 **Breast Tumor Classification Based on Image Sequence Analysis during Compression.** K.-H. Lee[1], Y.-H. Chou[2], C.-M. Chen[3], and P.-C. Li*[1], [1]*University, Taipei, Taiwan, ROC,* [2]*Veterans General Hospital, Taipei, Taiwan, ROC,* [3]*INational Taiwan University, Taipei, Taiwan, ROC.*	P1D-4 **About the Possibility to Implement a Nonuniform Oversampling Receive Beamformer in a FPGA.** L. Lie* and M. E. Tanase. *Politehnica University of Timosoara, Romania.*
PS-6 **Stress Field Formation for Multifrequency Vibro-acoustography.** M. Urban*[1], G. Silva[2], R. Kinnick[1], M. Fatemi[1], and J. Greenleaf[1], [1]*Mayo Clinic College of Medicine, Rochester, MN,* [2]*Universidade Federal de Alagoas, Maceio, AL, Brazil.*	PS-14 **Identification of New LTO HVPSAW Orientations Considering Finite Thickness Electrodes.** T. Kenny* and M. Pereira da Cunha, *University of Maine, Orono.*	P1A-2 **Real-time Adaptive Clutter Rejection Filtering in Color Flow Imaging Using Power Method Iterations.** L. Loevstakken*[1], S. Bjaerum[2], K. Kristoffersen[2], and H. Torp[1], [1]*Norwegian University of Science and Technology, Trondheim, Norway,* [2]*GE Vingmed Ultrasound, Horten, Norway.*	P1B-2 **A Parametric Study on Processing Parameters for Two-Dimensional Cardiac Strain Estimation: An In-Vivo Study.** S. Langeland*, P. F. Wouters, H. A. Leather, P. Claus, B. Bijnens, and J. D'hooge, *Catholic University of Leuven, Leuven, Belgium.*	P1C-2 **Ultrasound Based Assessment of Geometrical Parameters Involved in Lumen Preservation during Atherosclerotic Plaque Build Up.** J. Wentzel, A. Dharampal, F. Gijsen*, J. Schuurbiers, G. Rodriguez-Granillo, A. van der Steen, P. de Feyter, and C. Slager[1], *Erasmus MC, Rotterdam, the Netherlands.*	P1D-5 **Phased Subarrays for Low Cost C-Scan Applications.** Y. Li*, T. Blalock, W. Walker, and J. Hossack, *University of Virginia, Charlottesville, VA.*
PS-7 **A Lateral Field Excited Acoustic Wave Pesticide Sensor.** W. Pinkham*, L. French, D. Frankel, and J. Vetelino, *University of Maine, Orono, ME.*	PS-15 **Hexagonal SAW Devices for Enhanced Sensing.** S. Cular*[1], V. Bhethanabotla[1], and D. Branch[2], [1]*University of South Florida, Tampa, FL,* [2]*Sandia National Laboratories, Albuquerque, NM.*	P1A-3 **A New Eigen-Based Flow Estimator using the Matrix Pencil Approach.** A. Yu*[1], L. Mo[2], R. Warriner[1], and R. Cobbold[1], [1]*University of Toronto, Toronto, ON, Canada,* [2]*ZONARE Medical Systems, Mountain View, CA.*	P1B-3 **Elastographic Parameters by Surface Wave Analysis.** N. Benech, C. A. Negreira*, and I. Nuñez, *Facultad de Ciencias, Montevideo. Uruguay.*	P1C-3 **A Novel Method for Automatic Contour Extraction of Ultrasonic Breast Lesions.** C.-K. Yeh*[1], Y.-S. Chen[1], and W.-S. Chen[2], [1]*Yuan Ze University, Taiwan, Chung-Li, Taiwan,* [2]*National Taiwan University Hospital, Taiwan, Taipei, Taiwan.*	P1D-6 **An Arbitrary Waveform Transmitter Using Bipolar Pulsers Based on a High Order Modified Sigma Delta Modulation.** H. H Kim*, H. S Han, and T. K Song, *Sogang university, Seoul, South Korea.*

Session P1E
MEDICAL IMAGING
Chair: J d.'Hooge, University of Leuven

P1E-1 **Phase Based Liver Motion Compensation of Harmonic Images.** A. Kissi*[1], A. Bouakaz[1], L. Pourcelot[1], S. Cormier[2], and F. Tranquart[1], [1]*INSERM Unity 619, Tours, France*, [2]*LERI CRESTIC, Reims, France.*

P1E-2 **Spectroscopic Three-Dimensional Imaging of Light Scattering Medium by Detection of Ultrasonic Velocity Change Due to Light Illumination.** H. Horinaka*[1], T. Ura[1], Y. Nakatani[1], K. Wada[1], and T. Matsunaka[2], [1]*Osaka Prefecture University, Sakai, Osaka, Japan*, [2]*Aloka Co. Ltd., Mitaka, Tokyo, Japan.*

P1E-3 **Multitone Nonlinear Coding.** A. Nowicki*, J. Wójcik, and W. Secomski, *Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland.*

P1E-8 **Versatile Assessment of 3D Prostate Anatomy and Elastic Anomalies.** Y Li*, C. D. Garson, and J. A. Hossack, *University of Virginia, Charlottesville, VA.*

P1E-9 **A Study of Motion Artifacts of Fourier-Based Image Construction.** J. Wang* and J.-Y. Lu, *Ultrasound Lab, Dept. of Bioengineering, The University of Toledo, Toledo, OH.*

Session P1F
ACOUSTIC SENSORS
Chair: P. Khuri-Yakub, Stanford University

P1F-1 **Investigation of Precision Sound Velocity Measurement Methods as Reference for Ultrasonic Gas Flow Meters.** P. Norli*[1], P. Lunde[1], and M. Vestrheim[2], [1]*Christian Michelsen Research AS (CMR), Bergen, Norway*, [2]*University of Bergen, Dept. of Physics and Technology, Bergen, Norway.*

P1F-6 **A Novel Doppler Based Ultrasonic Surface Roughness Measurement.** J. Rezanejad Gatabi*[1] and I. Rezanejad Gatabi[2], [1]*Iran University of Science and Technology, Tehran-Tehran-Iran*, [2]*Khajeh Nasir Toosi-University of Technology, Tehran-Tehran-Iran.*

P1F-7 **Interaction of Surface Acoustic Waves with Particles.** J. Kondoh*[1], T. Oyama[1], Y. Matsui[1], and S. Shiokawa[2], [1]*Faculty of Engineering, Shizuoka University, Hamamatsu-shi, Shizuoka , Japan*, [2]*SAW&SPR-Tech, Hamamatsu-shi, Shizuoka, Japan.*

P1F-8 **Organic Vapor Sensing and Discrimination using Enhanced Sensitivity Thickness Shear Mode Devices.** R. Williams, S. Cular*, A. Upadhyayula, and V. Bhethanabotla, *University of South Florida, Tampa, FL.*

Session P1G
NDE MODELING AND MEASUREMENTS
Chair: N. Bilgutay, Drexel University

P1G-5 **Designing and Signal Processing of Intelligent Inspection Pig Applying Ultrasonic A-Scan.** C. Tianlu*, Q. Peiwen, J. Tao, and Z. Zhigang, *Dept. of Information Measurement technology and Instrument, Shanghai Jiaotong University, Shanghai, P. R. China.*

P1G-6 **Ultrasonic Monitoring of Paper Coating Bulk Modulus During Layer Formation.** T. Karppinen*, I. Lassila, and E. Haeggstrom, *Dept. Physical Sciences, Univ. of Helsinki, Helsinki, Uusimaa, Finland.*

P1G-7 **High Precision Tuning Fork Sensor for Liquid Property Measurements.** L. Matsiev*, J. Bennett, and O. Kolosov, *Symyx Technologies, Santa Clara, CA.*

P1G-8 **An Ultrasonic Flowmeter in Production Boreholes of Oilfields.** H. Zhang*[1], W. Lin[1], C. Zhang[1], D. Wang[1], and T. Lu[2], [1]*Institute of Acoustics, Chinese Academy of Sciences, Beijing, China*, [2]*China Oilfield Services Limited, Tianjing, China.*

Session P1H
ULTRASONIC MOTORS/LAB ON A CHIP
Chair: S. Bhave, Cornell University

P1H-1 **A New Scheme for Experimental-Based Modeling of a Traveling Wave Ultrasonic Motor.** H. Mojallali[1], R. Amini*[2], R. Izadi-Zamanabadi[2], A. A. Jalali[1], and J. Poshtan[1], [1]*Iran University of Science and Technology, Tehran, Iran*, [2]*Aalborg University, Aalborg, Denmark.*

P1H-2 **Trapping and Extraction of Small Particles by Vibrating Sharp Edges.** J. Hu*, J. Yang, J. Xu, C. Tay, and Y. Cai, *Nanyang Technological University, Singapore.*

P1H-3 **Flow-Birefringence Spectroscopy of Molecular Orientation with Quadrapole Piezo-Actuator System.** M. Hosoda*[1], K. Horii[2], H. Ogawa[1], K. Takagi[2], H. Nomura[1], and K. Sakai[2], [1]*Tokyo Denki University, Saitama, Japan*, [2]*University of Tokyo, Tokyo, Japan.*

Session P1I
PIEZOELECTRICAL TRANSFORMERS/ MOTORS
Chair: M. Kurosawa, Tokyo Institute of Technology

P1I-1 **Effects of Electric Load on Vibration Distribution of a Piezoelectric Transformer Operating at the Thickness Shear Mode.** J. Du*, J. Hu, and K. J. Tseng, *Nanyang Technological University, Shcool of EEE, Singapore.*

P1I-2 **Modeling and Characteristics Comparison of Two Different Piezoelectric Transformers.** J. M. Fernandez* and Y. Perriard, *Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland.*

P1I-3 **A Power Ultrasonic Actuator Based on a Displacement Amplifier Vibrating in Flexural Mode.** A. Iula*[1], L. Parenti[1], N. Lamberti[2], and M. Pappalardo[1], [1]*University Roma Tre, Roma, Italy*, [2]*University of Salerno, Salerno, Italy.*

P1E-4 **Ultrasound Bladder Scanner Based on 2D Concave Probe.** S. Derrouich*, J. Oyama, T. Higuchi, and T. Abe, *Nagasaki University, Nagasaki City, Japan.*

P1E-5 **Design and Evaluation of a Low Cost PC Card used for an Acoustic Radiation Force Based Mechanical Characterization System.** M. Santy*, T. Blalock, and W. Walker, *University of Virginia, Charlottesville, VA.*

P1E-6 **High-Frequency High Frame Rate Ultrasound Imaging System for Small Animal Imaging with Linear Arrays.** X.-C. Xu*, C.-H. Hu, L. Sun, J. Yen, and K. Shung, *University of Southern California, Los Angeles,CA.*

P1E-7 **Ultrasound-Based Air Bubble Trapping System for Haemodialysis.** P. Palanchon*[1], A. Bouakaz[2], L. Pourcelot[3], and F. Tranquart[2], [1]*CIT, CHU Bretonneau, Tours, France,* [2]*INSERM U619, Tours, France,* [3]*Ultrasound and Nuclear Medecine, CHU Bretonneau, Tours, France.*

P1F-2 **A Controlled Investigation of the Spatial Distribution of Acoustic Cavitation Activity Generated in a Standing Wave Field Produced by a 40 kHz Cleaning Vessel Transducer.** M. Hodnett*, M. Choi, P. Gelat, and B. Zeqiri, *Quality of Life Division, National Physical Laboratory, Teddington, Middlesex, UK.*

P1F-3 **Investigation on Viscoelasticity of Silicone Rubber Using Impedance Change of a Quartz-Crystal Tuning-Fork Tactile Sensor.** H. Itoh* and Yuuki Yamada, *Shinshu University, Nagano, Japan.*

P1F-4 **Influence of Receiver Noise Properties on Resolution of Passive Wireless Resonant SAW Sensors.** V. Kalinin*, *Transense Technologies plc, Upper Heyford, Bicester, Oxon., UK.*

P1F-5 **Piezoelectric Bimorph Microcantilever: A New Gas Pressure Sensor.** V. Mortet*[1], R. Petersen[2], K. Haenen[1,2], and M. D'Olieslaeger[1,2], [1]*Universiteit Hasselt, Institute for Materials Research, Diepenbeek, Belgium,* [2]*IMEC vzw, Division IMOMEC, Diepenbeek, Belgium.*

P1G-1 **Studies on Effective and Stable Absorbing Boundary Conditions in Ultrasonic Wave Modeling.** H. Zhao[1], X. Wang[1,2], and H. Zhang*[1], [1]*Institute of Acoustics, Haidian District, Beijing, China,* [2]*CSIRO Petroleum, Bently, WA, Australia.*

P1G-2 **Measurement Method of Longitudinal Acoustic Properties for Solid Specimens using Thin Layer Water Couplant in UHF Range.** H. Odagawa*, M. Arakawa, K. Morioka, and J. Kushibiki, *Tohoku University, Sendai, Japan.*

P1G-3 **Application of the FDTD TF/SF Method to Analysis of the Scattering Phenomena of the Elastic Wave Fields in Solids.** M. Sato*, *Akita University, Akita, Akita, Japan.*

P1G-4 **Study of the Time-Dependence of the Mechanical Properties of Doughs for Flour Strength Evaluation.** J. Garcia-Alvarez*, J. M. Rodriguez, Y. Yañez, A. Turo, J. A. Chavez, M. J. Garcia, and J. Salazar, *Technical University of Catalonia (UPC), Barcelona, Spain.*

P1G-9 **Lamb Wave Propagation in a Piezoelectric Plate Subjected to Conductive and Viscous Fluid Loadings.** S.-H. Kuo* and Y.-C. Lee, *Nation Cheng Kung University, Tainan,Taiwan.*

P1G-10 **Mechanical Characterization of Ta and TaN Diffusion Barrier Layers using Laser Acoustics.** D. M. Profunser*[2,1], J. Vollmann[1], and J. Dual[1], [1]*ETH Zurich, Center of Mechanics, Zurich, Switzerland,* [2]*Hokkaido University, Graduate School of Engineering, Sapporo, Japan.*

P1G-11 **Evaluation of Low-Light Absorption Material by Photoacoustic Microscope.** A. Minamide*[1], N. Naoe[1], and Y. Tokunaga[2], [1]*Kanazawa Technical College, Kanazawa, Japan,* [2]*Kanazawa Institute of Technology, Ishikawa, Japan.*

P1G-12 **Ultrasonic Testing of the Time Evolution Propertiesof Oranges.** F. Camarena*, J. A. Martínez-Mora, M. Ardid, J. Ramis, and V. Espinosa, *EPSG-UPV, Gandía, Valencia, Spain.*

P1H-4 **Ultrasonic Mmicromanipulation of Liquid Droplets for a Lab-on-a-Chip.** M. Takeuchi* and K. Nakano, *Faculty of Engineering, Tamagawa University, Machida, Tokyo, Japan.*

P1H-5 **Smart Separation Devices for Particle Concentration in Water using Ultrasonic Standing Wave.** Y.-S. Lee* and J. Kwon, *Smart Measurement Group, Korea Research Institute of Standards and Science, Daejeon, South Korea.*

P1H-6 **Free Stator Analytical Modeling of a Novel Low Voltage Multilayer Piezoelectric Motor.** H. Mojallali[1], R. Amini*[2], R. Izadi-Zamanabadi[2], A. A. Jalali[1], and J. Poshtan[1], [1]*Iran University of Science and Technology, Tehran, Iran,* [2]*Aalborg University, Aalborg, Denmark.*

P1H-7 **Development of Gyro-Moment Motor.** Y. Tomikawa*, T. Takano, and M. Aoyagi, *Yamagata University, Yamagata Japan.*

P1I-4 **An Ultrasonically Levitated Non-Contact Sliding Table with the Traveling Vibrations on Fine-Ceramic Beams.** D. Koyama*, T. Ide, J. Frend, K. Nakamura, and S. Ueha, *Precision and Intelligence Laboratory, Tokyo Institute of Technology, Yokohama, Japan.*

P1I-5 **Mini-Driver for Ultrasonic Motor Based on CPLD.** L. Huafeng* and Z. Chunsheng, *Nanjing Univ. of Aeronautics and Astronautics, Nanjing, China.*

P1I-6 **Development of a Miniature Ultrasonic Motor using a Helical Coil as a Stator.** T. Moriya*[1], Y. Furukawa[2], Y. Akano[1], and A. Nakajima[2], [1]*Tokyo Metropolitan University, Hachioji-shi, Tokyo, Japan,* [2]*Tokyo University of Agriculture & Technology, Koganei-shi, Tokyo, Japan.*

Session P1J ***SIMULATION OF SAW DEVICES*** Chair: L. Reindl, University of Freiburg	P1J-8 **Fast and Precise Multi-Purpose P-Matrix Simulation Tool: Built-In Features and Application Examples.** R. Lardat*, T. Pastureaud, and W. Steichen, *TEMEX.*	P1K-5 **Third-Order Intermodulation Distortion in Capacitively-Driven VHF Micromechanical Resonators.** Y.-W. Lin*, S.-S. Li, Z. Ren, and C. T.-C. Nguyen, *University of Michigan, Ann Arbor, MI.*	P1L-3 **Modelling of Ultrasonic Wave Propagation in Integrated Piezoelectric Structures under Residual Stress.** M. Lematre*, G. Feuillard, and M. Lethiecq, *LUSSI GIP Ultrasons Université F. Rabelais, EIVL Blois France.*	P1M-2 **Connection Between X-Waves, Fourier-Bessel Series and Optimal Modelling Aperture for Circular Symmetric Arrays.** P. D. Fox*, *INSERM U619 & CIT, CHU Bretonneau, 2 Bis Boulevard Tonnelle, 37044, Tours, France, Tours, Centre, France.*	
P1J-1 **Refinement of the COM Parameter Evaluation.** B. Sveshnikov* and V. Cherednick, *Nizhny Novgorod State University, Russia.*	P1J-9 **COM Model of the Impedance-Loaded SAW Sensor.** Q. Fu*, W.-J. Fischer, and H. Stab, *Dresden University of Technology, Dresden, Sachsen, Germany.*	P1K-6 **Charge-Biased Vibrating Micromechanical Resonators.** S.-S. Li*, Y.-W. Lin, Y. Xie, Z. Ren, and C. T.-C. Nguyen, *University of Michigan, Ann Arbor, Michigan.*	P1L-4 **Net-shape Ceramic Manufacturing as an Aid to Realize Ultrasonic Transducers for High Resolution Medical Imaging.** T. Button*[1], S. Cochran[2], K. Kirk[2], K. McDonald[2], C. Meggs[1], D. Rodriguez-Sanmartin[1], R. Webster[1], and D. Zhang[1], [1]*University of Birmingham, Birmingham, UK*, [2]*University of Paisley, Paisley, Scotland, UK.*	P1M-3 **Focused Air Transducers: Sound Field Computation and FE Modeling.** J. Lan*, S. Frazier, and M. Chiasson, *Airmar Technology Corporation, Milford, NH.*	
P1J-2 **The K-Model - Green's Function Based Analysis of Surface Acoustic Wave Devices.** J. H. Kuypers*, D. A. Eisele, and L. M. Reindl, *University of Freiburg, Freiburg, Germany.*	P1J-10 **A Quasi-COM Model for 2-Dimensional Surface Wave and Simulation for Leaky Surface Wave Devices.** X. Zhang[1], J. Lin[2], W. Wang*[1], H. Wang[1], H. Wu[1], and Y. Shui[1], [1]*Nanjing University, Nanjing, Jiangsu, China*, [2]*Department of Communication and Information Engineering, Guili, Guangxi, China.*	P1K-7 **Layer Mode Devices on Epitaxially Grown GaN Films on Al_2O_3.** K. Hohkawa*[1], C. Kaneshiro[1], K. Koh[1], K. Nishimura[2], and N. Shigekawa[2], [1]*Kanagawa Institute of Technology, Kanagawa , Japan*, [2]*Nippon Telegraph & Telephone Co., Kanagawa, Japan.*	P1L-5 **Broadband EMFi Ultrasonic Transducer for Bat Research.** A. Streicher*[1], M. Kaltenbacher[1], H. Peremans[2], and R. Lerch[1], [1]*Friedrich Alexander University Erlangen-Nuremberg, Erlangen, Germany*, [2]*Antwerp-University Faculty St. Ignatius, Antwerp, Belgium.*	P1M-4 **Different Approaches to Finite Element Modeling of Effective Moduli of Porous Piezoceramics with 3-3 (3-0) Connectivity.** A. Nasedkin[1], A. Rybjanets*[2], L. Kushkuley[2], Y. Eshel[2], and R. Tasker[3], [1]*Rostov State University, Rostov on Don, Russia*, [2]*UltraShape Ltd., Tel Aviv, Israel*, [3]*TASI Technical Software Inc., Kingston, Canada.*	
P1J-3 **Closed-form COM Modeling of Reflective SAW Transducers with Arbitrary Polarity Sequence and Apodization.** A. S. Rukhlenko*, *Institute of Microtechnology, Neuchatel, Switzerland.*	*Session P1K* ***SAW DEVICES I*** Chair: R. Potter, Vectron International	P1K-8 **Development of High-Speed Laser Probe System Based on Knife-Edge Method for Diagnosis of RF SAW Devices.** H. Kamizuma*, T. Omori, K. Hashimoto, and M. Yamaguchi, *Chiba University, Chiba-shi, Japan.*	P1L-6 **Basic Study on Lead Free BNT Piezoelectric Film Deposited by Hydrothermal Method.** T. Hasegawa*[1], N. Kawashima[1], S. Takauchi[1], M. Ishikawa[2], and M. Kurosawa[2], [1]*Toin University of Yokohama, Yokohama, Kanagawa, Japan*, [2]*Tokyo Institutu of Technology, Yokohama, Kanagawa, Japan.*	P1M-5 **The Temperature Influence on the Piezoelectric Transducer Noise, Measurements and Modeling.** F. Coutard*, E. Tisserand, and P. Schweitzer, *LIEN, Université Henri Poincaré, Vandoeuvre, France.*	

P1J-4 **Empirical Equation for the Temperature Coefficient of Frequency Derived for Leaky SAW Devices.** S. Sabah*[1], E. Chilla[1], and D.-P. Chen[2], [1]*VI Telefilter, Teltow, Brandenburg, Germany*, [2]*Vectron International, Hudson, NH.*	P1K-1 **Tunable Edge Reflectors in SAW Filters.** V. Cherednick[1], M. Dvoesherstov[1], V. Reut[2], and B. Sveshnikov*[1], [1]*Nizhny Novgorod State University, Russia*, [2]*AEC Design, St.-Petersburg, Russia.*	P1K-9 **Nonstandard Electrostatic Problem for SAW Interdigital Transducer in External Electric Field.** Y. Tasinkevych* and E. Danicki, *Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland.*	P1L-7 **Piezoelectric Properties of $BaTiO_3$ Thin Films Grown by ECR-PLD.** S. Ito, K. Nakamura*, and K. Ishikawa, *Tohoku University, Sendai, Japan.*	P1M-6 **Nonlinearities and Hysteresis Phenomena in Reciprocal Ultrasound Systems.** M. Willatzen*, L. Wang, and Y. Feng, *Mads Clausen Institute, University of Southern Denmark, Grundtvigs Alle 150, DK-6400 Sonderborg, Denmark.*	
P1J-5 **Transmission and Reflection Coefficients of SAW in Basic Cells of SPUDT.** R. Taziev*, *Institute of Semiconductor Physics of Russian Academy of Sciences, Novosibirsk, Novosibirsk, Russia.*	P1K-2 **Design and Fabrication of Thin Film Lamb Wave Resonators Utilizing a Longitudinal Wave Transducer.** V. Yantchev* and I. Katardjiev, *Uppsala University, The Angstrom Laboratory, Uppsala, Sweden.*	*Session P1L* ***MATERIALS FOR TRANSDUCERS*** Chair: T. Shrout, The Pennsylvania State University	P1L-8 **Aluminum Nitride Thin Films on Titanium for Piezoelectric MEMS Applications.** S. Boeshore*, E. Parker, V. Lughi, and N. MacDonald, *University of California, Santa Barbara, Santa Barbara, CA,.*	P1M-7 **Pseudospectral Time-Domain Method to Calculate Radiation Pattern of Lens-Focused Transducers.** C. Batifol, S. Callé*, P. Maréchal, M. Lethiecq, and F. Levassort, *François Rabelais University, LUSSI, FRE 2448 CNRS, Tours Cedex, France.*	
P1J-6 **Analysis of SAW Devices using FEM/BEM Method and Parallel Computing.** X. Perois*, T. Pastureaud, P.-A. Girard, and R. Lardat, *Temex, Sophia Antipolis, Fance.*	P1K-3 **Amplitude and Phase Measurement of Surface Acoustic Waves Within a SAW Filter Having Fan-Shaped Transducers and Numerical Simulations.** T. Chiba*, *Meisei University, Hino, Tokyo, Japan.*	P1L-1 **Temperature Evaluation of Soft and Hard PZT Transducers for Ultrasonic Trapping in a Microfluidic Platform.** L. Johansson*[1], M. Nilsson[2], T . Lilliehorn[1], M. Almqvist[2], J. Nilsson[2], T. Laurell[2], and S. Johansson[1], [1]*Uppsala University, Uppsala, Sweden*, [2]*Lund University, Lund, Sweden.*	*Session P1M* ***TRANSDUCER MODELING*** Chair: R. Lerch, University of Erlangen		
P1J-7 **Finite-Difference Time-Domain Simulation of Dispersive Layered SAW Filters Including Electrode Massloading.** K. Y. Wong* and W. Y. Tam, *The Hong Kong Polytechnic University, Hong Kong.*	P1K-4 **Designing Capacitively Coupled Microelectromechanical Filters.** A. Alastalo* and V. Kaajakari, *VTT Information Technology, Espoo, Finland.*	P1L-2 **Multilayer Piezoelectric Copolymer Transducers.** T. Lilliehorn*[1], T. Blom[1], M. Nilsson[2], M. Almqvist[2], U. Simu[1], and S. Johansson[1], [1]*Uppsala University, Uppsala, Sweden*, [2]*Lund Institute of Technology, Lund, Sweden.*	P1M-1 **Analysis of Point Spread Function in Phased Array Imaging.** Mahmoud Sakhaei*, Ali MahloojiFar, and M. Hasan Ghasemian, *Tarbiat Modarres uiversity, Tehran, Iran.*		

	Session 1A **LOCAL DRUG DELIVERY UCA/ THERAPEUTIC** Chair: P. Burns, University of Toronto	Session 2A **STATIC ELASTICITY** Chair: H. Ermert, Ruhr University	Session 3A **BIOSENSORS** Chair: J. Vetelino, University of Maine	Session 4A **PHONONIC CRYSTALS** Chair: J. Brown, JB Consulting	Session 5A **BAW THIN FILM FILTERS** Chair: R. Weigel, University of Erlangen-Nuremberg	Session 6A **HIGH FREQUENCY ARRAYS** Chair: S. Smith, GE Global Research
	Room 1	**Room 2**	**Room 3**	**Room 4**	**Room 5**	**Room 6**
11:30 a.m.	1A-1 **Mechanisms of Ultrasonically-Mediated Drug Delivery: High-Speed Camera Observations of Microbubbles with Attached Nanobeads.** C.T. Chin*[1], A. van Wamel[2], M. Emmer[2], N. de Jong[2], C. S. Hall[1], and A L. Klibanov[3], [1]*Philips Research, New York*, [2]*Erasmus MC, Rotterdam, The Netherlands*, [3]*University of Virginia, Charlottesville, VI.*	2A-1 **A Single-Element Focused Transducer Method for Harmonic Motion Imaging.** C. Maleke, M. Pernot, and E. Konofagou*, *Columbia University, New York, NY.*	3A-1 **(Invited) Novel Acoustic Biosensors.** C. R. Lowe*, A. C. Stevenson, B. Araya-Kleinsteuber, R. Sethi, and E. Kiouprit zi, *Institute of Biotechnology, University of Cambridge, Tennis Court Road, Cambridge, CB2 1QT, UK.*	4A-1 **Apodized Phononic Crystals.** Y. Nelin*, *National Technical University of Ukraine, Kyiv, Ukraine.* 11:45 AM	5A-1 **A High Performance WCDMA Hybrid Differential BAW Filter.** C. Muller*[1], M. A. Dubois[1], Y. Ueshima[2], and K. Takasuka[2], [1]*CSEM, Neuchatel, Switzerland*, [2]*AKM, Tokyo, Japan.*	6A-1 **Performance and Characterization of High Frequency Linear Arrays.** M. Lukacs*, J. Yin, G. Pang, R. Garcia, E. Cherin, R. Williams, J. Mehi, and F. S. Foster, *Imaging Research, Sunnybrook & Women's College Health Science Centre, University of Toronto, Toronto, Ontario, Canada.*
11:45 a.m.	1A-2 **Mechanisms of Cell Membrane Permeabilization with Ultrasound and Contrast Microbubbles.** T. A. Tran*[2,3], S. Roger[2,3], J. Y. LeGuennec[2,3], F. Tranquart[1,4], and A. Bouakaz[1,3], [1]*Inserm, U619, Inserm, U619, Tours, France*, [2]*Inserm, E0211, Inserm, E0211, Tours, France*, [3]*Université F. Rabelais, Université F. Rabelais, Tours, France*, [4]*CIT Ultrasons, CIT Ultrasons, Tours, France.*	2A-2 **Reconstruction of Thermal Property Distributions - Thermal Conductivity, Diffusivity, Capacity.** C. Sumi* and H. Yanagimura, *Sophia University, Tokyo, Japan.*		4A-2 **Imaging of Propagating Surface Acoustic Waves on Phononic Crystals.** D. M. Profunser*, O. B. Wright, and O. Matsuda, *Graduate School of Engineering, Hokkaido University, Sapporo, Hokkaido, Japan.*	5A-2 **Above-IC FBAR Technology for WCDMA and WLAN Applications.** M.-A. Dubois*[1], C. Billard[2], J.-F. Carpentier[3], P. Vincent[2], G. Parat[2], and C. Muller[3], [1]*CSEM, Neuchâtel, Switzerland*, [2]*CEA-LETI, Grenoble, France*, [3]*ST Microelectronics, Central R&D, Crolles, France.*	6A-2 **A Kerfless 30 MHz Linear Ultrasonic Array Design.** J. Cannata*, J. Williams, and K. K. Shung, *University of Southern California, Los Angeles, Ca.*

12:00 p.m.	1A-3 **Trapping of Low Sensitivity Object by Seed Bubbles.** Y. Yamakoshi*, *Gunma University, Kiryu, Gunma, Japan.*	2A-3 **Dynamic Signal Arrival Correction for Vibro-Acoustography Image Formation.** M. Urban* and J. Greenleaf, *Department of Physiology and Biomedical Engineering, Mayo Clinic College of Medicine, Rochester, MN.*	3A-2 **A Lateral Field Excited Acoustic Wave Biosensor.** C. York*, P. Millard, L. French, and J. Vetelino, *University of Maine, Orono, ME.* 12:15 PM	4A-3 **Hypersonic Band Gaps in Two-Dimensional Piezoelectric Phononic Crystal Slabs.** A. Khelif*[1], B. Aoubiza[2], S. Mohammadi[3], A. Adibi[3], and Vincent Laude[1], *[1]Institut FEMTO-ST, Besançon cedex, France, [2] Université de Franche-Comté, Besançon, France, [3]Georgia Institute of Technology, Atlanta, GA.*	5A-3 **BAW Components for PCS-CDMA Applications.** E. Schmidhammer*, H. Heinze, M. Woelky, M. Schmiedgen, G. Henn, R. Braun, and T. Metzger, *EPCOS AG, Munich, Germany.*	6A-3 **An Investigation of the Effective Width of Elements in Kerfless Annular Arrays.** C. E. M Démoré* and G. R. Lockwood, *Queen's University, Kingston, ON, Canada.*
12:15 p.m.	1A-4 **Ultrasound-Induced Uptake of Different Size Markers in Mammalian Cells.** R. Karshafian*[1,2], S. Samac[2], M. Banerjee[2], P. D. Bevan[1,2], and P. N. Burns[1,2], *[1]Medical Biophysics, University of Toronto, Toronto, ON, Canada, [2]Imaging Research, SWCHSC, Toronto, ON, Canada.*	2A-4 **Evaluation of Array Signal Processing Methods to Ultrasound-Based Arterial Pulse Wave Velocity Measurements on *In Vitro* and *In Vivo* Data.** A. Dentinger*, R. Hoctor, and K. Thomenius, *GE Global Research, Niskayuna, NY.*	3A-3 **Shear Mode AlN Thin Film Electroacoustic Resonator for Biosensor Applications.** G. Wingqvist*, J. Bjurström, and I. Katardjiev, *Uppsala University, Uppsala, Sweden.*	4A-4 **Channel Drop Process of Elastic Wave in a Two Dimensional Phononic Crystal.** Y. Pennec*[1], B. Djafari-rouhani[1], A. Khelif[2], A. Choujaa[2], J. Vasseur[2], S. Benchabane[2], H. Larabi[1], and V. Laude[2], *[1]LDSMM, Université de Lille1, Villeneuve d'ascq, France, [2]Institut FEMTO-ST, Département LPMO, Besançon, France.*	5A-4 **A Miniaturized FBAR Duplexer with Reduced Acoustic Loss for the W-CDMA Application.** J. Tsutsumi*, M. Iwaki, Y. Iwamoto, T. Yokoyama, T. Sakashita, T. Nishihara, M. Ueda, and Y. Satoh, *FUJITSU LABORATORIES LTD., Akashi, Hyogo,J apan.*	6A-4 **Polyimide Backed 40 MHz PVDF Transducers.** J. Ketterling*[1], O. Aristizábal[2], and D. H. Turnbull[2], *[1]Riverside Research Institute, New York, NY, [2]Skirball Institute of Biomolecular Medicine, New York University School of Medicine, New York, NY.*
12:30 p.m.	1A-5 **(Invited) Targeted Ultrasound Imaging and Drug Delivery.** K. Ferrara*, *University of California, Davis, CA.*	2A-5 **Wavelet Transform-Based Strain Estimation for Elastography.** L. Xu* and J. Bamber, *Joint Department of Physics, Institute of Cancer Research and Royal Marsden NHS Trust, Sutton, Surrey, UK.*	3A-4 **A Langasite SH SAW O157:H7 *E. coli* Sensor.** E. Berkenpas*, P. Millard, and M. Pereira da Cunha, *University of Maine, Orono, ME,.* 12:45 PM	4A-5 **Analyses of Surface Acoustic Wave Propagation in Phononic Crystal Waveguides using FDTD Method.** J.-H. Sun* and T.-T. Wu, *Institute of Applied Mechanics, National Taiwan University, Taipei, Taiwan.*	5A-5 **Bulk Acoustic Wave Resonators and Filters - 2D Modelling and Industrialization Aspects.** F. Vanhelmont*[1], A. Jansman[1], J. Ruigrok[1], R. Milson[2], E. van der Sar[3], P. Huiskamp[3], G. de Bruin[3], F. de Bruijn[3], J.-W. Lobeek[3], and A. Tuinhout[3], *[1]Philips Research Laboratories, Eindhoven, The Netherlands, [2]Philips Research Laboratories, Redhill, United Kingdom, [3]Philips Semiconductors, Nijmegen, The Netherlands.*	6A-5 **High Frequency Copolymer Annular Array Ultrasound Transducer Fabrication Technology.** E. Gottlieb*, J. Cannata, C. Hu, and K. Shung, *University of Southern California, Los Angeles, CA.*
12:45 p.m.		2A-6 **Ultrasound Elastography of Reconstructed Cleft Lips.** C. L. de Korte*[1], N. van Hees[2], W. F. Huyskens[2], G. Weijers[1], C. Katsaros[2], and J. M. Thijssen[1], *[1]Clinical Physics Laboratory, UMC St Radboud, Radboud University Medical Center, Nijmegen, The Netherlands, [2]Department of Orthodontics and Oral Biology, Radboud University Medical Center, Nijmegen, The Netherlands.*	3A-5 **Monitoring the Blood Coagulation Process with QCM and SH-SAW Sensors.** G. Guhr*, R. Kunze, G. Martin, H. Schmidt, and M. Weihnacht, *Institute for Solid State and Materials Research Dresden, Dresden. Saxony, Germany.*	4A-6 **Analysis of Wave Propagation in Phononic Crystal with Channel using the Plane-Wave Expansion and Supercell Techniques.** Z.-G. Huang* and T.-T. Wu, *Institute of Applied Mechanics, National Taiwan University, Taipei , Taiwan.*	5A-6 **Low Insertion Loss, High Rejection Handset Duplexer for UMTS-1 WCDMA Band.** D. Feld*, T. Jamneala, and C. Wade, *Agilent Technologies, San Jose, CA.*	6A-6 **Design of Sparse Annular Arrays for High Frequency Imaging.** J. Brown* and G. Lockwood, *Queen's University, Kingston, Ontario, Canada.*

Session 1B
IVUS I
Chair: T. van der Steen, Erasmus MC

Room 1

2:30 p.m.

1B-1 **(Invited) Biomedical Engineering in the Catheterization Laboratory.** P. W. Serruys*, *Interventional Cardiology Thorax center ErasmusMC, Rotterdam, The Netherlands.*

2:45 p.m.

Session 2B
BLOOD FLOW
Chair: P. Tortoli, University of Firenze

Room 2

2B-1 **Spectral Velocity Estimation using the AutocorrelationFunction and Sparse Pulse Sequences.** J. A. Jensen*, *Technical University of Denmark, Lyngby, Denmark.*

2B-2 **Exploiting the Dependency of the Doppler Spectrum on the Position and Insonation Direction of an Intra-Vascular Doppler Wire to Estimate Volumetric Flow.** M. Mc Laughlin*[1], J. Wauters[2], W. Hillewaert[3], P. Verdonck[4], P. Devos[3], A. Wilmer[2], B. Bijnens[1], P. Segers[4], and P. Claus[1], *[1]K.U.Leuven,, Leuven, Belgium, [2]University Hospitals Gasthuisberg, Leuven, Belgium, [3]Hogeschool, Ghent, Belgium, [4]Ghent University, Ghent, Belgium.*

Session 3B
NDE IMAGING AND SIGNAL PROCESSING
Chair: J. Saniie, Illinois Institute of Technology

Room 3

3B-1 **Thermoacoustic Tomography using Integrating Line Detectors.** P. Burgholzer*[1], C. Hofer[1], G. Paltauf[2], M. Haltmeier[3], and O. Scherzer[3], *[1]Upper Austrian Research, Linz, Austria, [2]Department of Physics, Karl-Franzens-Universität Graz, Graz, Austria, [3]Department of Computer Science, Universität Innsbruck, Innsbruck, Austria.*

3B-2 **Acoustic Impedance Micro-imaging for Biological Tissue Using a Focused Acoustic Pulse with a Frequency Range up to 100 MHz.** N. Hozumi*[1], M. Nagao[1], S. Yoshida[1], K. Kobayashi[2], and Y. Saijo[3], *[1]Toyohashi University of Technology, Toyohashi, Japan, [2]Honda Electronics Co. Ltd., Toyohashi, Japan, [3]Tohoku University, Sendai, Japan.*

Session 4B
OPTICAL INTERACTIONS
Chair: B. Sinha, Schlumberger-Doll Research

Room 4

4B-1 **Approach to Inverse Acoustooptic Problem Based on the Coherent Combining of Several Optical Beams into One Optical Channel.** V. Proklov*[1], S. Antonov[1], and Y. Rezvov[2], *[1]Institute of Radio Engineering and Electronics, Russian Academy of Sciences, Moscow, Russia, [2]Novomoscovskii Institute of Radio Chemistry of Technical University, Novomoskovsk of Tula Region.*

4B-2 **Analysis of Serial versus Simultaneous XY Acoustooptic Deflectors.** D. Hecht*, *DLH Laboratories, Palo Alto, CA.*

Session 5B
THIN FILM BAW MATERIALS I
Chair: K. Lakin, TriQuint

Room 5

5B-1 **(Invited) Piezoelectric / Ferroelectric Films For Microwave / MEMS Applications: Historic Perspective.** S. V. Krishnaswamy*, *Electronics Sensor Sector, Northrop Grumman Systems Corporation, Baltimore, MD 21090.*

Session 6B
PIEZOELECTRIC SINGLE CRYSTAL TRANSDUCERS
Chair: T. Shrout, The Pennsylvania State University

Room 6

6B-1 **A 7.0 MHz 0.15mm pitch Phased Array Ultrasonic Probe Using PMN-PT Single Crystal.** S. M. Rhim*[1], H. Jung[1], J.-S. Jun[2], and J.-S. Hwang[2], *[1]HUMANSCAN Co., Ltd., Ansan, Kyunggi-do, [2]Medison Co., Ltd., Seoul, Korea.*

6B-2 **$Pb[(In_{1/2}Nb_{1/2})_{0.24}(Mg_{1/3}Nb_{2/3})_{0.42}Ti_{0.34}]O_3$ Piezoelectric Single Crystal for Medical Array Transducer.** Y. Hosono* and Y. Yamashita, *Advanced Electron Devices Laboratory, Corporate R&D Center, Toshiba Corporation, 1 Komukai, Toshiba-cho, Saiwai-ku, Kawasaki 212-8582, Japan.*

3:00 p.m.	1B-2 **Forward Looking IVUS Imaging Using an Annular-Ring CMUT Array.** F. L. Degertekin[1], M. Karaman*[2], and R. O. Guldiken[1], [1]*Georgia Institute of Technology, Atlanta, GA*, [2]*Isik University, Istanbul, Turkey.*	2B-3 **A Novel Dual Beam Approach for Removing Doppler Angle Ambiguity.** P. Tortoli*, G. Bambi, and S. Ricci, *Department of Electronics and Telecommunications, University of Florence, Firenze, Italy.*	3B-3 **A Novel Back Scattering Arrayed Ultrasound Transducer for Non-destructive Acoustic Imaging and Defect Inspection.** C.-H. Chung* and Y.-C. Lee, *Department of Mechanical Engineering, National Cheng Kung University, Tainan, Taiwan.*	4B-3 **High Speed Laser Tuning using Acousto-Optic Techniques.** I. C. Chang*, *Accord Optics, Sunnyvale, CA.*	5B-2 **C-Axis Inclined ZnO Films Deposited by Reactive Sputtering using an Additional Blind for Shear BAW Devices.** M. Link*[1,2], M. Schreiter[1], J. Weber[1], D. Pitzer[1], R. Primig[1], M. B. Assouar[2], and O. Elmazria[2], [1]*Siemens AG / Corporate Technology, Munich, Germany,* [2]*Université Henri Poincaré / Laboratoire de Physique des Milieux Ionisés et Applications, Nancy, France.*	6B-3 **Single Crystal vs. PZT Ceramics for Medical Ultrasound Applications.** M. Lu* and T. Proulx, *Siemens Medical Solutions, Mountain View, CA.*
3:15 p.m.	1B-3 **Intravascular Photoacoustic Imaging to Detect and Differentiate Atherosclerotic Plaques.** S. Sethuraman[1], S. Aglyamov[1], J. Amirian[2], R. Smalling[2], and S. Emelianov*[1], [1]*University of Texas at Austin, Austin, TX,* [2]*University of Texas Health Science Center, Houston, TX.*	2B-4 **Doppler, Multigate Measurements of Ultrasonic Scattering, Attenuation and Hematocrit of Blood in the Human Artery.** W. Secomski*[1], A. Nowicki[1], R. Olszewski[2], J. Adamus[2], P. Fidanzati[3], and P. Tortoli[3], [1]*Polish Academy of Sciences, Warsaw, Poland,* [2]*Main Military Medical Academy, Warsaw, Poland,* [3]*University of Florence, Florence, Italy.*	3B-4 **Acoustic Impedance Measurement using PLSR Based Analysis of Ultrasonic Signals.** R. Schaefer* and P. Hauptmann, *Institute of Micro- and Sensor Systems (IMOS), Magdeburg, Sachsen-Anhalt, Germany.*	4B-4 **High Resolution Optical Beating Brillouin Spectroscopy of Solid and Gas Materials.** K. Sakai*, T. Yogi, Y. Minami, and K. Takagi, *Institute of Industrial Science, University of Tokyo, Tokyo , Japan.*	5B-3 **High-Q Thin Film Bulk Acoustic Wave Resonator Using Highly <111>-Oriented Aluminum Electrode.** R. Ohara*, K. Sano, N. Yanase, T. Yasumoto, T. Kawakubo, and K. Itaya, *Corporate R&D Center, Toshiba Corporation, Kawasaki, Japan., Kawasaki, Kanagawa, Japan.*	6B-4 **Ultrabroadband Single Crystal Composite Transducers for Underwater Ultrasound.** S. Cochran*, M. Parker, and P. Marin-Franch, *University of Paisley, Paisley, Scotland, UK.*
3:30 p.m.	1B-4 **Arterial Lipid Characterization by High Resolution TSI.** K. Kim*, R. Witte, and M. O'Donnell, *University of Michigan, Biomedical Engineering Department, Ann Arbor, MI.*	2B-5 **Vector Velocity Estimation using Aperture Domain Data.** H.-L. Wang* and P.-C. Li, *Department of Electrical Engineering, National Taiwan University, Taipei, Taiwan, ROC.*	3B-5 **Low Voltage Operation of 2D Ultrasonic Arrays for NDT.** K. Streibel*[1], S. Cochran[1], K. Kirk[1], D. Cumming[2], L. Wang[2], and J. Wallace[2], [1]*University of Paisley, Paisley, Scotland, UK,* [2]*University of Glasgow, Glasgow, Scotland, UK.*	4B-5 **Optical Label Recognition in Spectral and Time Domains with Collinear Acoustooptic Devices for Photonic Router.** N. Goto*[1] and Y. Miyazaki[2], [1]*Toyohashi University of Technology, Toyohashi, Aichi, Japan,* [2]*Aichi University of Technology, Gamagori, Aichi, Japan.*	5B-4 **Volume Manufacturing Aspects of BAW Filters on a Production Cluster System.** R. Lanz*[1], C. Lambert[1], C. Muller[2], and M.-A. Dubois[2], [1]*UNAXIS BALZERS AG, Balzers, Liechtenstein,* [2]*Centre Suisse d'Electronique et de Microtechnique SA, Neuchatel, Switzerland.*	6B-5 **(Invited) Commercialization of Piezoelectric Single Crystals for Medical Imaging Applications.** J. Chen* and R. Panda, *Philips Medical Systems, Andover, MA.*
3:45 p.m.	1B-5 **Harmonic Intravascular Contrast Ultrasound: A Feasibility Study for Vasa Vasorum Imaging.** D. E. Goertz*[1,2], M. E. Frijlink[1], L. C. A van Damme[1], R. Krams[1,2], N. de Jong[1,3], and A. F. W van der Steen[1,2], [1]*Erasmus MC, Rotterdam,* [2]*Interuniversity Cardiac Inst. Netherlands, Utrecht,* [3]*Physics of Fluids, Univ. Twente, Enschede.*	2B-6 **In-Vivo 2-D Blood Velocity Estimation using an Autocorrelation Approach.** J. Udesen*[1,2] and J. A. Jensen[1], [1]*Center for Fast Ultrasound Imaging, ørsted DTU, Bldg. 348, Technical University of Denmark, Lyngby, Denmark,* [2]*B-K Medical A/S, Mileparken 34, Herlev, Denmark.*	3B-6 **High Temperature Phased Array Ultrasonic System with Integrated Front End Electronics.** O. Vermesan*[1], B. Froelich[2], L. Gomez-Ullate Alvear[3], O. Martinez[3], J.-L. Guey[4], L.-C. Blystad[1], G. Fleury[4], K. Liang[5], D. Mercier[6], R. Bahr[7], P. Schoeb[7], C. Fritsch Yusta[3], and J. Mc Hugh[8], [1]*SINTEF, Norway,* [2]*Schlumberger-Riboud Product Center, France,* [3]*CSIC, Spain,* [4]*IMASONIC, France,* [5]*Schlumberger-Doll Research, CT,* [6]*TRONICO, France,* [7]*STATICE, France,* [8]*BAM, Germany.*	4B-6 **New Technology for Control of Light Intensity using Acoustical Activity in Gyrotropic Crystals.** F. R. Akhmedzhanov*, *Samarkand State University, Samarkand, Samarkand, Uzbekistan.*	5B-5 **Improving Manufacturability of AlN Deposition Used in Making Bulk Acoustic Wave Devices.** S. Mishin*, B. Sylvia, and D. Marx, *Advanced Modular Sputtering, Inc., Goleta, CA.*	

	Session 1C **IVUS II** Chair: C. De Korte, Nymegen University MC	Session 2C **ULTRASOUND 19th CENTURY TO 21st CENTURY** Chair: J. Greenleaf, Mayo Clinic	Session 3C **NDE-WAVE PROPAGATION** Chair: D.Yuhas, Industrial Measurement Systems	Session 4C **ULTRASONIC MOTORS** Chair: R White, University of California-Berkeley	Session 5C **THIN FILM BAW MATERIALS II** Chair: J. Larson, Agilent	Session 6C **TRANSDUCERS AND MATERIALS MODELING** Chair: M. Schafer, Sonictech
	Room 1	**Room 2**	**Room 3**	**Room 4**	**Room 5**	**Room 6**
4:30 p.m.	1C-1 **Harmonic Intravascular Ultrasound Imaging with a Dual-Frequency Catheter.** M. E. Frijlink*[1], D. E. Goertz[1,2], H. J. Vos[1,3], E. Droog[1,4], G. Blaquière[3,4], A. Gisolf[3], and A. F. W. van der Steen[1,2], [1]*ErasmusMC, Rotterdam, the Netherlands,* [2]*Interuniversity Cardiology Institue of the Netherlands, Utrecht, the Netherlands,* [3]*Delft University of Technology, Delft, the Netherlands,* [4]*TNO-TPD, Delft, the Netherlands.*	2C-1 **(Invited) Lord Rayleigh.** P. N. T. Wells*, *Cardiff University, Cardiff, UK.*	3C-1 **Development of Wide Frequency Range Ultrasound Exposure System for Dispersion of Nano Diamond Particles.** T. Uchida*, A. Hamano, N. Kawashima, and S. Takeuchi, *Toin University of Yokohama, Yokohama, Kanagawa, Japan.*	4C-1 **Design and Testing of Rotors for a Cylindrical Micro-machined Micro Ultrasonic Motor.** T. Kanda*, Y. Oomori, A. Makino, K. Suzumori, and A. Kobayashi, *Okayama University.*	5C-1 **(Invited) Is There a Better Material for Thin Film BAW Applications Than AlN?** P. Muralt*, *Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland.*	6C-1 **A Time Domain Approach for the Analysis of Periodic Structures using Finite Element Analysis.** S. Ballandras*, V. Laude, S. Clatot, and M. Wilm, *FEMTO-ST, CNRS, Besançon, France.*
4:45 p.m.	1C-2 **On the Potential of the Lagrangian Speckle Model Estimator for Endovascular Elastography: In vivo Human Coronary Artery Study.** R. L. Maurice*[1], J. Fromageau[1], É. Brusseau[2], G. Finet[3], and G. Cloutier[1], [1]*University of Montreal Hospital, Montreal, Quebec, Canada,* [2]*INSERM, Lyon, France,* [3]*Claude Bernard University, Lyon, France.*		3C-2 **Defect Modes for a Promising Acoustic Wave-Guide in Two-Dimensional Sonic/Phononic Crystals.** T. Miyashita*, *Department of Electronics and Informatics, Ryukoku University, Ohtsu, Japan.*	4C-2 **Friction Drive Dyanamics of Surface Acoustic Wave Motor.** T. Shigematsu* and M. Kurosawa, *Tokyo Institute of Technology, Yokohama, Japan.*		6C-2 **A Fast Algorithm for the Optimization of Arrays.** E. Kuehnicke*, *Technical University, Institute Acoustic and Speach Communication, Dresden, Saxonya, Germany.*

5:00 p.m.	1C-3 **Deformable Bezier Curves for Young's Modulus Reconstruction and Delineation of Vulnerable Atherosclerotic Plaque Components.** R. A. Baldewsing*[1], F. Mastik[1], J. A. Schaar[1], and A. F. W. van der Steen[1,2], [1]*Biomedical Engineering, Thoraxcenter, ErasmusMC, Rotterdam, The Netherlands,* [2]*Interuniversity Cardiology Institue of the Netherlands (ICIN), Utrecht, The Netherlands.*	2C-2 **Targeted Chemotherapy Delivery with Ultrasound.** M. Shortencarier*[1], T. Matsunaga[2], P. Schumann[2], R. LaBell[2], and K. Ferrara[1], [1]*University of California at Davis, Davis, CA*, [2]*ImaRx Therapeutics, Inc., Tuscon, AZ.*	3C-3 **An Evaluation Method of Bonding Strength at a Bonded Solid-Solid Interface by Contact Acoustic Nonlinearity.** D. Zhang*, J. Chen, and Y. Mao, *Nanjing University, Nanjing,Jiangsu, P.R.China.*	4C-3 **Design Optimization Analysis of a Standing Wave Ultrasonic Linear Actuator.** J. M. Fernandez* and Y. Perriard, *Ecole Polytechnique Fédérale de Lausanne, 1015 Lausanne, Switzerland.*	5C-2 **Synthesis of Textured Thin Piezoelectric AlN Films with a Nonzero C-Axis Mean Tilt for the Fabrication of Shear Mode Resonators.** J. Bjurström*, G. Wingqvist, and I. Katardjiev, *Uppsala University, Uppsala, Sweden.*	6C-3 **Numerical Prototyping of Piezocomposite Arrays: From Material Characterization to Array Performances.** G. Ferin*[1,2], D. Certon[2], F. Patat[2], R. Dufait[1], and N. Felix[1], [1]*VERMON, Tours, France,* [2]*LUSSI \ GIP Ultrasons, Tours, France.*
5:15 p.m.	1C-4 **Motion Compensation for Intravascular Ultrasound Ppalpography for *In Vivo* Vulnerable Plaque Detection.** K.Y.E. Leung*[1], R. A. Baldewsing[1], F. Mastik[1], J. A. Schaar[1,2], A. Gisolf[3], and A. F. W. van der Steen[1,2], [1]*Erasmus MC, Rotterdam, the Netherlands,* [2]*ICIN, Interuniversity Cardiology Institute of the Netherlands, Utrecht, the Netherlands,* [3]*Delft University of Technology, the Netherlands.*	2C-3 **Improving the Use of Vibro-Acoustography for Bone Imaging.** F. Mitri*, J. Greenleaf, and M. Fatemi, *Mayo Clinic, Rochester, MN.*	3C-4 **Nonlinear Interaction of Ultrasound with an Unbounded Rough Interface.** P. Wu*, *Signals and Systems Group, Uppsala University, Uppsala, Sweden.*	4C-4 **Performance Evaluation of Traveling Wave Ultrasonic Motor Based on a Model with Frictional Layer on Stator Surface.** J. Qu* and F. Sun, *Department of Mechanical Engineering, Harbin institute of Technology, Harbin City, Heilongjiang Province, China.*	5C-3 **Evaluating ZnO Thin Film Transducers through Contact Bonding of Glass Blocks.** F. Hickernell*, *University of Arizona, Tucson, AZ.*	6C-4 **Derivation of the Impulse Response of Ultrasonic Transducers by Experimental System Identification.** T. Gehrke*, F. Cheikhrouhou, and H. M. Overhoff, *University of Applied Sciences Gelsenkirchen, Gelsenkirchen, Germany.*
5:30 p.m.	1C-5 **Shear Stress and 3D Intravascular Ultrasound Palpography in Human Coronary Arteries.** F. Gijsen*, J . Wentzel, A. Thury, J. Schuurbiers, J. Schaar, F. Mastik, A. van der Steen, P. Serruys, and C. Slager, *Erasmus MC, Rotterdam, The Netherlands.*	2C-4 **Tissue Microscopy using Optical Generation and Detection of Ultrasound.** S. Ashkenazi*, R. Witte, K. Kim, Y. Hou, and M. O'Donnell, *University of Michigan.*	3C-5 **Numerical Study of the Wire Form Function Versus Surrounding Liquid Density.** J. Mathieu[1] and P. Schweitzer*[2], [1]*LAIN, Univ. Montpellier 2, Montpellier Cedex, France,* [2]*LIEN, Univ. Henri Poincaré, Vandoeuvre-Les-Nancy, France.*	4C-5 **A New Modeling of Traveling Wave Type Rotary Ultrasonic Motor Based on Three-Dimension Contact Mechanism.** C. Zhao*, C. Chen, and J. Zeng, *Research Center of Ultrasonic Motors, Nanjing University of Aeronautics and Astronautics, Nanjing 210016,Jiangsu Province, China.*	5C-4 **Optimization of Acoustic Mirrors for Solidly Mounted BAW Resonators.** S. Marksteiner*, J. Kaitila, G. G. Fattinger, and R. Aigner, *Infineon Technologies, Munich, Germany.*	6C-5 **Design and Characterisation of 1-3 Ultrasonic Composites using ATILA and Ultra Fast Laser Measurements (20 MHz).** T. Roedig*[1], A.-C. Hladky[2], and A. Schoenecker[1], [1]*Fraunhofer - IKTS, Dresden, Germany,* [2]*ISEN – IEMN Department, Lille Cedex, France.*
5:45 p.m.	1C-6 **A Feasibility Study of Intravascular Ultrasound Elastography on Abdominal Aneurysms.** J. Fromageau*, S. Lerouge, G. Soulez, I. Salazkin, J. Raymond, and G. Cloutier, *University of Montreal Hospital, Montréal, Québec, Canada.*	2C-5 **The Sonic Window: Second Generation Prototype of Low-Cost, Fully-Integrated, Pocket-Sized Medical Ultrasound Device.** M. Fuller*, E. Brush, M. Eames, T. Blalock, J. Hossack, and W. Walker, *University of Virginia, Charlottesville, VA.*	3C-6 **Interaction of Defects with Lamb Waves in Complex Geometries.** D. Greve*, I. Oppenheim, and N. Tyson, *Carnegie Mellon University, Pittsburgh, PA.*	4C-6 **Frequency Conversion Stepping Ultrasonic Motors.** J. Jin* and C. Zhao, *Research Center of Ultrasonic Motors, Nanjing, Jiangsu, China.*	5C-5 **Shear Mode Coupling and Tilted Grain Growth of AlN Thin Films in BAW Resonators.** F. Martin*[1], M.-E. Jan[1], S. Rey-Mermet[1], M. Cantoni[2], D. Su[1], and P. Muralt[1], [1]*Ceramics Laboratory EPFL Lausanne, EPFL Lausanne, Switzerland,* [2]*CIME EPFL Lausanne, EPFL Lausanne, Switzerland.*	6C-6 **A Method for the Measurement of the *k* Factor in Lossy Piezoelectric Materials: FEM and Experimental Results.** N. Lamberti*[1], G. Caliano[2], A. Iula[2], and M. Pappalardo[2], [1]*DIIIE University of Salerno, Fisciano, (SA), Italy,* [2]*DIE University of Roma III, Roma, Italy.*

	Session 1D **MOUSE IMAGING** Chair: S. Foster, University of Toronto	Session 2D **VASCULAR** Chair: L. Masotti, University of Firenze	Session 3D **NDE-GENERAL METHODS** Chair: B. Tittman, The Pennsylvania State University	Session 4D **PHYSICAL ACOUSTICS 1** Chair: T. Shiosaki, NARA Institute of Science and Technology	Session 5D **NOVEL SAW DEVICES AND ANALYSIS** Chair: D. Malocha, University of Central Florida	Session 6D **ULTRASOUND MEMS TECHNOLOGY** Chair: F. Degertekin, Georgia Institute of Technology
	Room 1	**Room 2**	**Room 3**	**Room 4**	**Room 5**	**Room 6**
8:30 a.m.	1D-1 **Mouse Embryo Imaging with a 40 MHz Annular Array.** O. Aristizábal*[1,2], J. Ketterling[3], and D. H. Turnbull[1,2], [1]*Skirball Institute of Biomolecular Medicine, New York, NY,* [2]*New York University School of Medicine, New York, NY,* [3]*Riverside Research Institute, New York, NY.*	2D-1 **Duplex Arterial Elastic Modulus Reconstruction from In-vivo Strain Imaging and PWV.** K. Kim*[1], W. F. Weitzel[2], H. Xie[1], J. M. Rubin[3], C. Jia[1], and M, O'Donnell[1], [1]*University of Michigan, Biomedical Engineering Department, Ann Arbor, MI,* [2]*University of Michigan, Internal Medicine, Ann Arbor, MI,* [3]*University of Michigan, Radiology, Ann Arbor, MI.*	3D-1 **Strain Measurements on Carbon-Epoxy Composites by Lamb Waves Piezopolymer Interdigital Transducers.** A. Bulletti[1], O. Occhiolini*[1], L. Capineri[1], L. Masotti[1], and E. Rosi[2], [1]*Dept. Electronics and Telecommunications, University of Florence, Firenze, Italy,* [2]*Alenia Spazio, Laben/Proel, Firenze, Italy.*	4D-1 **(Invited) Ionic Conductivity in Acoustic Crystals.** E. V. Charnaya*[1], Ch. Tien[2], and A. L. Pirozerskii[1], [1]*Institute of Physics, St. Petersburg State University, Petrodvorets, St. Petersburg, Russia,* [2]*Department of Physics, National Cheng Kung University, Tainan, Taiwan, ROC.*	5D-1 **One-port SAW Resonators Using Natural SPUDT Substrates.** D. P. Morgan*[1], S. Zhgoon[2], and A. Shvetsov[2], [1]*Impulse Consulting, Northampton, Northants., UK,* [2]*Moscow Power Engineering Institute, Moscow, Russia.*	6D-1 **(Invited) cMUTs and Electronics for 2D and 3D Imaging: Monolithic Integration, In-Handle Chip Sets and System Implications.** C. Daft*, P. Wagner, B. Bymaster, S. Panda, K. Patel, and I. Ladabaum, *Sensant Corp., San Leandro, CA.*
8:45 a.m.	1D-2 **3D Perfusion Mapping in the Intact Mouse Heart after Myocardial Infarction Using Myocardial Contrast Echocardiography.** Y. Li*, Z. Yang, B. A. French, and J. A. Hossack, *University of Virginia.edu, Charlottesville, VA.*	2D-2 **A Retrospective Method for Pulse-Wave Velocity Measurement in the Mouse.** R. Williams*[1], A. Needles[1], E. Cherin[1], Y.-Q. Zhou[2], and F. S. Foster[1,2], [1]*Sunnybrook and Women's College Health Sciences Centre, Toronto, ON, Canada,* [2]*Mouse Imaging Centre, Toronto, ON, Canada.*	3D-2 **Fouling Detection in Food Vessel using Interdigital PVDF Lamb Wave Transducer.** J. Jingpin, G. Haiyan, H. cunfu*, and W. Bin, *Beijing University of Technology, Beijing, China.*		5D-2 **SAW Resonators for Temperature Stable Oscillators.** G. Martin*[1], B. Wall[2], and M. Weihnacht[1], [1]*Institute for Solid State and Materials Research Dresden, Dresden, Germany,* [2]*Vectron International Telefilter, Teltow, Germany.*	

9:00 a.m.	1D-3 **Comparing Contrast-Enhanced US to Markers of Angiogenesis in a Murine Glioma Model.** R. Ro*[1,2], F. Forsberg[1], K. Lipcan[1], J. Liu[1], M. Potoczek[1], P. Lewin[2], and B. Goldberg[1], [1]*Thomas Jefferson University, Philadelphia, PA*, [2]*Drexel University, Philadelphia, PA.*	2D-3 **New Non-Invasive Method for Intima-Media Thickness and Intima-Media Compression Measurements.** M. Cinthio*[1], T. Jansson[1], Å. Ryden Ahlgren[2], H. W. Persson[1], and K. Lindström[1], [1]*Lund Institute of Technology, Lund, Sweden*, [2]*UMAS, Lund University, Malmö, Sweden.*	3D-3 **Development of Broadband, Omnidirectional Transducers for NDE Applications.** O. Keitmann-Curdes*[1], M. Parusel[1], W. Wilkening[2], M. Mienkina[1], and H. Ermert[1], [1]*Ruhr-University Bochum, Bochum, Germany*, [2]*Krohne Altometer, Dordrecht, The Netherlands.*	4D-2 **The Application of Finite Element Analysis in the Design of High Intensity Ultrasonic Systems.** G. Harvey*, A. Gachagan, and A. McNab, *Centre for Ultrasonic Engineering.*	5D-3 **Analysis of Acoustomigration and Acoustic Loss in DMS Filters Employing FEM/BEM.** M. Mayer*, H. Zidek, T. Bauer, and K. Wagner, *EPCOS AG, Munich, Bavaria, Germany.*	6D-2 **Through-Wafer Trench-Isolated Electrical Interconnects for CMUT Arrays.** X. Zhuang*, A. Ergun, O. Oralkan, Y. Huang, G. Yaralioglu, I. Wygant, D. Yeh, and B. Khuri-Yakub, *Stanford University, Stanford, CA,*.
9:15 a.m.	1D-4 **High Resolution Quantification of Myocardial Strain in Mice using Speckle Tracking.** Y. Li*, Z. Yang, B. A. French, and J. A. Hossack, *University of Virginia, Charlottesville, VA.*	2D-4 **Development of Non-Invasive Vascular Elastography for Carotid Artery Plaque Assessments.** G. Cloutier*[1], C. Schmitt[1], R. Maurice[1], S. Lanthier[2], M.-F. Giroux[2], and G. Soulez[2], [1]*University of Montreal Hospital Research Center, Montreal, Quebec*, [2]*University of Montreal Hospital, Montreal, Quebec.*	3D-4 **3D Contour Tracking of Specularly Reflecting Surfaces.** O. Keitmann-Curdes*, P. Knoll, H. Meier[2], and H. Ermert, *Ruhr-University Bochum, Bochum, Germany.*	4D-3 **Stability Considerations for Perfectly Matched Layers in Piezoelectric Crystals.** F. Chagla and P. Smith*, *McMaster University, Hamilton, Ontario, Canada.*	5D-4 **Hexagonal SAW Devices for Enhanced Sensing.** S. Cular*[1], V. Bhethanabotla[1], and D. Branch[2], [1]*University of South Florida, Tampa, FL*, [2]*Sandia National Laboratories, Albuquerque, NM.*	6D-3 **Capacitive Micromachined Ultrasonic Transducer (cMUT) Made by a Novel "Reverse" Fabrication Process.** G. Caliano*[1], A. Caronti[1], A. Savoia[1], C. Longo[1], E. Cianci[2], V. Foglietti[2], and M. Pappalardo[1], [1]*University Roma Tre - Dept. of Electronics, Roma, Italy*, [2]*IFN-CNR, Roma Italy.*
9:30 a.m.	1D-5 **Characterization of Digital Waveforms Using Thermodynamic Analogs: Detection of Contrast Targeted Tissue in MDA 435 Tumors Implanted in Athymic Nude Mice.** M. Hughes*, J. Marsh, A. Woodson, E. Lacey, C. Carradine, G. Lanza, and S. Wickline, *Washington University, St. Louis, MO.*	2D-5 **An Instrument for Screening for Carotid Stenoses.** D. Vilkomerson*[1], T. Chilipka[1], R. Outcault[2], and K. Goldman[2], [1]*DVX, llc, Kingston, NJ*, [2]*Princeton Surgical Associates, Princeton, NJ.*	3D-5 **Ultrasonic Study of Alteration Processes in Granites by Freezing and Thawing.** L. M. Del Río*[1], F. López[1], F. J. Esteban[1], M. Mota[2], J. J. Tejado[2], I. González[2], A. Ramos[3], and J. L. San Emeterio[3], [1] *Universidad de Extremadura (UEX), Cáceres, Spain*, [2]*INTROMAC. Consejería de Infraestructura y Desarrollo Tecnológico. Junta de Extremadura, Cáceres, Spain*, [3]*Instituto de Acústica. Consejo Superior de Investigaciones Científicas (CSIC), Madrid., Spain.*	4D-4 **Obliquely Incident Rayleigh Waves at a Vertical Edge-Measured and Simulated Reflection Coefficients.** J. Kent*[1], J. D. Larson III[2], and J. L. Aroyan[3], [1]*Elo TouchSystems Inc, Menlo Park, CA*, [2]*Agilent Laboratories, Palo Alto, CA*, [3]*JRJ Simulation & Design, Soquel, CA.*	5D-5 **Low Propagation Loss of Atomically-Flat Surface AlN with Low Dislocation Density for 5-GHz Band SAW Devices.** K. Uehara*, Y. Aota, S. Kameda, H. Nakase, and K. Tsubouchi, *Research Institute of Electrical Communication, Tohoku University, Sendai, Japan.*	6D-4 **Design, Modeling and Fabrication of Piezoelectric Micromachined Ultrasonic Transducers.** B. Belgacem*, F. Calame, and P. Muralt, *Ecole Polytechnique Fédérale de Lausanne - Ceramics Laboratory, Lausanne, Switzerland.*
9:45 a.m.	1D-6 **Comparison of Two Approaches to Volume Quantification for Free-Hand Ultrasound Scanning of Mouse Hearts.** C. Garson*, J. Hossack, and Y. Li, *University of Virginia, Charlottesville, VA,*.	2D-6 **Photoacoustic Imaging to Age Deep Vein Thrombosis.** A. B. Karpiouk[1], S. R. Aglyamov[1], S. Mallidi[1], W. G. Scott[2], J. M. Rubin[3], and S. Y. Emelianov*[1], [1]*University of Texas at Austin, Austin, TX*, [2]*Winprobe Corporation, North Palm Beach, FL*, [3]*University of Michigan Medical School, Ann Arbor, MI.*	3D-6 **Speed of Sound Microscopy for Biomedical Applications.** Y. Saijo*[1], N. Hozumi[2], K. Kobayashi[3], N. Okada[3], H. Sasaki[1], E. Santos Filho[1], T. Yambe[1], and M. Tanaka[1], [1]*Tohoku University, Sendai, Japan*, [2]*Toyohashi University of Technology, Toyohashi, Japan*, [3]*Honda Electronics Co. Ltd., Toyohashi, japan.*	4D-5 **Piecewise Continuous Distribution Function Method and the Kinetic Description of Ultrasound Propagation in a Rarefied Gas.** M. Solovchuk*[1] and S. Leble[2,1], [1]*Kaliningrad State University, Kaliningrad, Russia*, [2]*Gdansk University of Technology, Gdansk, Poland.*	5D-6 **Rayleigh Wave Reflection and Scattering Calculation by Source Regeneration Method.** W. Wang[1], T. Han[2,1], X. Zhang[1], H. Wu[1], and Y. Shui*[1,2], [1]*Nanjing University, Nanjing, Jiangsu, China*, [2]*Shanghai Jiaotong University, Shanghai, China.*	6D-5 **MEMS Ultrasonic Sensor Array with Thick-Film PZT Transducers.** S. Doerner*[1], S. Hirsch[1], V. Ferrari[2], R. Lucklum[1], B. Schmidt[1], and P. R. Hauptmann[1], [1]*Otto-von-Guericke-University, Magdeburg, Germany*, [2]*University of Brescia, Brescia, Italy.*

Session P2A ***TISSUE CHARACTERIZATION***

Chair: P. Laugier, University of Paris

P2A-1 **New Tissue Mimicking Materials for Ultrasound Phantoms.** T. Kondo*[1], M. Kitatuji[1], Y. Shikinami[2], K. Tuta[2], and H. Kanda[3], [1]*Tokushima Bunri Unversity, Sanuki, Kagawa, Japan,* [2]*Medical Dev., Takiron Co., Ltd., Yasutomi-cho, Hyogo, Japan,* [3]*Hitachi Medical Corporation, Kashiwa, Chiba, Japan.*

P2A-2 **Ultrasound Harmonic Behaviour of Artificial Tissues.** S. Casciaro*[2,1], C. Demitri[1,2], R. Palmizio Errico[1,2], F. Conversano[1,3], G. Palma[1,3], E. Casciaro[2,1], and A. Distante[1,2], [1]*ISBEM (Euro Mediterranean Scientific Biomedical Institute), Brindisi, Italy,* [2]*Lecce University, Lecce, Italy,* [3]*Pisa University, Pisa, Italy.*

P2A-3 **The Effect of Volume Fraction on the Backscatter from Nucleated Cells at High Frequencies.** R. E. Baddour*[1] and M. C. Kolios[1,2], [1]*Dept. of Medical Biophysics, University of Toronto, Toronto, ON, Canada,* [2]*Dept. of Physics, Ryerson University, Toronto, ON, Canada.*

Session P2B ***CONTRAST AGENTS I***

Chair: H. Torp, Norwegian University of Science and Technology

P2B-1 **Non-linear Corruption of Ultrasound Transmission by Microbubble Contrast Agents.** R. J. Eckersley*[1] and M. X. Tang[2], [1]*Imperial College, London, U.K.,* [2]*Oxford University, Oxford, U.K.*

P2B-2 **Quadratic Pulse Inversion Ultrasonic Imaging.** M. Al-Mistarihi* and E.S. Ebbini, *University of Minnesota, Minneapolis, MN.*

P2B-3 **Contrast Echo Processing for Very Wideband Systems using Higher Order Statistics.** D. Kruse*, Y. Sun, and K. Ferrara, *University of California,, Davis.*

Session P2C ***THERAPEUTICS AND HYPERTHERMIA***

Chair: C. Cain, University of Michigan

P2C-1 **Noncavitational Mechanisms of Interactions of Ultrasound with Targeted Perfluorocarbon Nanoparticles: Implications for Drug Delivery.** N. Soman*, J. Marsh, M. Hughes, G. Lanza, and S. Wickline, *Washington University School of Medicine, St. Louis, MO.*

P2C-2 **Real-time Monitoring Transcranial Sub-Megahertz Ultrasound Thrombolysis with Phased Array Scanner.** J. Kubota*[1], M. Ogihara[1], A. Sasaki[1], T. Azuma[2], S. Umemura[2], K. Ando[3], J. Shimizu[3], T. Ishibashi[3], and H. Furuhata[3], [1]*Hitachi Medical Corporation, Kashiwa-shi, Chiba-ken, Japan,* [2]*Central Research Laboratory, Hitachi, Ltd., Kokubunnji-shi, Tokyo, Japan,* [3]*Jikei University School of Medicine, Minato-ku, Tokyo, Japan.*

P2C-3 **Quantitative Relations between Acoustic Inertial Cavitation and Gene Transfection Rate/Cell Viability.** C.-Y. Lai*, C.-H. Wu, C.-C. Chen, and P.-C. Li, *National Taiwan University, Taipei, Taiwan, ROC.*

P2C-8 **Ultrasound Imaging Feedback of Tissue Liquefaction in Ultrasound Surgery.** T. Hall*, B. Fowlkes, and C. Cain, *University of Michigan, Ann Arbor, MI.*

P2C-9 **The Generation of Inertial Cavitation in Constrained Media, In Vitro and Ex Vivo Investigations.** P. M. Ma*[1], W. S. Chen[1], C. K. Yeh[2], and M. S. Chen[1], [1]*National Taiwan University, Taipei, Taiwan,* [2]*Yuan Ze University, Taoyuan, Taiwan.*

P2C-10 **Selective Liver Vessel Occlusion with an Ultrasound-Guided HIFU Phased Array.** V. Zderic*, L. Crum, and S. Vaezy, *University of Washington, Seattle.*

P2C-11 **Development of a High Intensity Focused Ultrasound (HIFU) Hydrophone System.** M. Schafer*[1], J. Gessert[2], and W. Moore[2], [1]*Sonic Tech, Inc., Ambler, PA,* [2]*Sonora Medical Systems, Longmont, CO.*

P2D-1 **Elastographic Imaging of the ACL-Bone Interfaces In Vitro.** E. Konofagou*, J. Spalazzi, and H. Lu, *Columbia University, New York, NY.*

P2D-2 **Estimation of Pressure-Distribution Effects upon Elasticity Imaging.** T. Matsumura*[1], R. Shinomura[1], T. Mitake[1], H. Kanda[1], M. Yamakawa[2], and T. Shiina[2], [1]*Hitachi Medical Corporation, Kashiwa, Chiba, Japan,* [2]*University of Tsukuba, Tsukuba, Ibaraki, Japan.*

P2D-3 **Fast Reconstruction of Quantitative Tissue Elasticity Image Based on Modified 3-D Finite-Element Model.** M. Yamakawa*[1], T. Shiina[1], T. Matsumura[2], and T. Mitake[2], [1]*University of Tsukuba, Tsukuba, Ibaraki, Japan,* [2]*Hitachi Medical Corporation, Kashiwa, Chiba, Japan.*

P2D-4 **Automatic Measurement of Regional Elasticity of Carotid Artery Intima-Media Complex.** H. Hasegawa* and H. Kanai, *Graduate School of Engineering, Tohoku University, Sendai, Japan.*

P2E-2 **Efficient Hardware Realization of Frequency-Diverse Ultrasonic Flaw Detection using Zero-Phase IIR Filters.** E. Oruklu*, F. Martinez Vallina, and J. Saniie, *Illinois Institute of Technology, Chicago, IL.*

P2E-3 **Application of the Empirical Mode Decomposition to the Ultrasonic Echo-Signal Processing.** Z. Qi*, Q. Peiwen, L. Qingkun, and C. Tianlu, *Institute of Automatic Detection, Shanghai Jiaotong University, Shanghai, China.*

P2E-4 **A Technique for Accurate Time Identification of Noisy and Overlapping Ultrasonic NDT Echoes.** C. Tianlu*, Q. Peiwen, and L. Huaming, *Institute of Automatic Detection, Shanghai, China.*

P2E-5 **A New Ultrasonic Ascillosensor and its Application to Extraction of Sleep State.** Y. Kamozaki*[1], S. Kobashi[1], K. Kondo[1], Y. Hata[1], T. Sawayama[2], and K. Taniguchi[3], [1]*University of Hyogo, Hyogo, Japan,* [2]*New Sensor Incorporated, Hyogo, Japan,* [3]*Kinden Corporation, Kyoto, Japan.*

P2A-4 **Ultrasonic Measurement of the Human Achilles Tendon Stress during Loading : Preliminary Experimental and Theoretical Results.** C. Roux* and M. Defontaine, *GIP Ultrasons - LUSSI, Tours, 37032, France.*

P2B-4 **High Frequency Ultrasonic Imaging and Attachment of Contrast Agents under Flow Conditions.** M. Butler*, C. Moran, C. Cunningham, T . Anderson, J. Ross, K. Fox, and N. McDicken, [1]*University of Edinburgh, Edinburgh.*

P2C-4 **A Cylindrical Phased-Array Ultrasound Transducer for Breast Tumor Thermal Therapy.** C.-S. Ho*, K.-C. Ju, Y.-Y. Chen, and W.-L. Lin, *National Taiwan University, Taipei,Taiwan.*

P2C-12 **Effect of Ultrasonic Intensity on the Amyloid-β Induced Apoptosis of PC12 Cells.** C.Y. Chiu, S.-H. Wang*, S.H. Chen, and W.-T. Li, *Dept. of Biomedical Engineering, Chung Yuan Christian University, Taiwan, Taiwan.*

P2D-5 **Our Recent Ultrasonic Strain-Measurement-Based Shear Modulus Reconstruction.** C. Sumi*, *Sophia University, Tokyo, Japan.*

P2E-6 **Pattern Recognition Method for Ultrasound-Based PIDS.** J. Peralta*, M. Casas, and A. Ruggeri, *Universidad Nacional de Santiago del Estero, Santiago del Estero, Argentina.*

P2A-5 **Characterization of *in vitro* Health and Pathological Human Liver Tissue Periodicity Applying Singular Spectrum Analysis to Backscattered Ultrasound.** C. B. Machado*[1], W. C. A. Pereira[1], M. Meziri[2], and P Laugier[3], [1]*COPPE/UFRJ, Rio de Janeiro, RJ, Brazil,* [2]*Universita Badji Mokhtar, BP 12, Annaba, Algarie,* [3]*Laboratoire da Imagerie Paramatrique CNRS, Paris, France.*

P2B-5 **Acoustic Radiation Force Enhances Ultrasound Contrast Agent Retention to P-selectin In Vivo.** J. Rychak[1], A. Klibanov[2], and J. Hossack, [1]*University of Virginia Department of Biomedical Engineering, Charlottesville, VA,* [2]*University of Virginia Department of Internal Medicine, Charlottesville, VA.*

P2C-5 **The Investigation of Contrast-Agent Enhanced Ultrasound Thermal Effect.** Y. S. Tung*[1], C. C. Wu[1], H. L. Liu[2], K. C . Ju[1], W. S. Chen[1], and W. L. Lin[1], [1]*National Taiwan University, Taipei, Taiwan,* [2]*Chang-Gung University, Taoyuan, Taiwan.*

P2C-13 **Development of a 50MHz Optical Fibre Hydrophone for the Characterisation of Medical Ultrasound Fields.** P. Morris*[1], A. Hurrell[2], and P. Beard[1], [1]*University College London, Dept. Medical Physics and Bioengineering, London, UK,* [2]*Precision Acoustics Limited, Dorcherster, Dorset, UK.*

P2D-6 **Evaluation of Shift Estimation Techniques for Spectral-Based Elastography.** K. Hoyt*[1,2], F. Forsberg[2], and J. Ophir[3], [1]*Drexel University, Philadelphia, PA,* [2]*Thomas Jefferson University, Philadelphia, PA,* [3]*University of Texas Medical School, Houston, TX.*

P2E-7 **New Insights and Extensions of Split-Spectrum Algorithms from an Optimum Distributed Detection Perspective.** I. Bosch*, L. Vergara, and R. Miralles, *Departamento de Comunicaciones, Universidad Politécnica de Valencia, Valencia, Spain.*

P2A-6 **A Feasible Study on the Determination of Blood Hematocrit with Nakagami Parameter Calculated from Backscattered Signals.** P.-H. Tsui*[1,2], C.-C. Huang[1], and S.-H. Wang[1], [1]*Dept. of Biomedical Engineering, Chung Yuan Christian University, Taiwan,* [2]*Department of Biomedical Engineering, Yuan Pei Institute of Science and Technology, Taiwan.*

P2B-6 **Shell Rupture Threshold, Fragmentation Threshold, Blake Threshold.** M. Postema*[1], N. de Jong[2,3], and G. Schmitz[1], [1]*Ruhr-Universität Bochum, Bochum, Germany,* [2]*University of Twente, Enschede, The Netherlands,* [3]*Erasmus MC, Rotterdam, The Netherlands.*

P2C-6 **Acoustic Hemostasis and Therapeutic Ultrasound at UW, Seattle WA: An Update.** S. Vaezy*, *University of Washington, Seattle, WA.*

P2C-14 **Intravascular Ultrasound Array for Imaging and Ablation of Atrial Fibrillation.** S. Wong*, G. Scott, S. Conolly, and D. Liang, *Stanford University.*

Session P2E
NDE SIGNAL PROCESSING AND MODELING
Chair: J. Saniie, Illinois Institute of Technology

P2E-8 **Airborne Ultrasound Data Communications: The Core of an Indoor Positioning System.** S. Holm*[1,2], [1]*University of Oslo, Oslo, Norway,* [2]*Sonitor Technologies, Oslo, Norway.*

P2A-7 **Determination of Damping and Dispersion Parameters with a Combined Measurement-Simulation Technique.** L. Bahr*, M. Kaltenbacher, and R. Lerch, *Department of Sensor Technology, Erlangen, Bavaria, Germany.*

P2C-7 **Ultrasound Self-Calibration and Real-Time Quality Control for Interventions.** E. M. Boctor*, G. D. Hager, and G. Fichtinger, *The Johns hopkins University, Baltimore, MD.*

Session P2D
ELASTICITY IMAGING
Chair: H. Kanai, Tohoku University

P2E-1 **Spatio-Temporal Deconvolution of Pulsed Ultrasonic Fields Received by a Transducer of Linear Aperture: A Simulation Study.** W. Djerir[1], T. Boutkedjirt*[1], M. O. Si-Chaib[2], and H. Djelouah[1], [1]*Université des Sciences et de la Technologie Houari Boumediene, Algiers, Algeria,* [2]*Université de Boumerdes, Boumerdes, Algeria.*

Session P2F ***BAW PIEZOELECTRIC FILMS*** Chair: A. Ballato, U.S. Army	P2G-1 **Performance Degradation Effects in FBAR Filters and Resonators Due to Lamb Wave Modes.** R. C. Ruby*[1], J. D. Larson, III[2], R. S. Fazzio[3], and C. Feng[3], [1]*Agilent Semiconductor Products Group, San Jose, CA*, [2]*Agilent Laboratories, Palo Alto, CA*, [3]*Agilent Semiconductor Products Group, Ft. Collins, CO.*	P2H-2 **Experimental Verification of the Basic Scattering Theorem.** G. Pashkevich[1], M. Sychev[1], I. Mitelman[2], and B. Sveshnikov*[2], [1]*Rodos, Ltd., Kiev, Ukraine*, [2]*Nizhny Novgorod State University, Russia.*	P2I-1 **Effect of Substrate Thickness on Quasi-Longitudinal Leaky SAW Propagation on Quartz.** M. Oshio*, S. Kanna, and K. Iizawa, *SEIKO EPSON Corporation, Suwa-shi, Nagano-Pref., Japan.*	P2J-2 **Accurate Methods for Piezocomposite Material Assessment.** G. Ferin*[1,2], D. Certon[2], and N. Felix[1], [1]*VERMON, Tours, France*, [2]*LUSSI \ GIP Ultrasons, Tours, France.*	P2K-4 **Implementation of Master Curves for CMUT arrays Design.** F. Teston*[1], D. Certon[1], F. Patat[1], and N. Felix[2], [1]*LUSSI, Tours, France*, [2]*VERMON, Tours, France.*
P2F-1 **Assessment of the Piezoelectric Response of Sputtered AlN Films by X-Ray Diffraction.** E. Iborra*, A. Sanz-Hervás, M. Clement, L. Vergara, J. Olivares, and J. Sangrador, *Depto. Tecnología Electrónica, Universidad Politécnica de Madrid, Madrid, Spain.*	P2G-2 **Fabrication and Evaluation of an "Electrodeless" Solidly Mounted Thin Film Electroacoustic Resonator.** J. Enlund*, I. Katardjiev, and D. Martin, *Uppsala University, Ångström Laboratory, Uppsala, Sweden.*	P2H-3 **Analysis of Surface Acoustic Wave's Thermal Behaviors on Langasite Using Lagrangian Effective Material Constants.** T. Han*, X. Ji, and W. Shi, *Department of Instrumentation Engineering, Shanghai Jiaotong University, Shanghai, P.R.China.*	P2I-2 **Investigation of Al/Ti Metallization Performance in Terms of Acoustomigration Stability.** H. Schmidt*[1,2], M. Pekarcikova[1], S. Menzel[1], M. Hofmann[1], and R. Kunze[1], [1]*Institute for Solid State and Materials Research Dresden, Dresden, Saxony, Germany*, [2]*VI Tele Filter, Teltow, Brandenburg, Germany.*	P2J-3 **Material Property Variation as a Factor in Commercial Adoption of Piezocrystals for Composite Transducer Manufacture.** M. Parker*[1], P. Marin-Franch[1], S. Cochran[1], D. Choi[2], and M. Walsh[2], [1]*University of Paisley, Paisley, Scotland, UK*, [2]*PCT Ltd, Aberdeen, Scotland, UK.*	P2K-5 **The Characterisation of cMUTs at Low Gas Pressures.** L. Davis*[1], D. Hutchins[1], R. Noble[2], and D. Banfield[3], [1]*University of Warwick, Coventry, UK*, [2]*QinetiQ Ltd, Malvern, UK*, [3]*Cornell University, Ithaca, NY.*
P2F-2 **Resonant Electromechanical Device Fabrication with New Thin Film Materials.** J. McPhillips*[1], N. Donnelly[3], M. Gregg[1], R. Bowman[1], A. Abrar[4], G. McRobbie[2], K. Kirk[2], D. Cornez[2], and S. Cochran[2], [1]*Queens University, Belfast, Belfast, Northern Ireland, UK*, [2]*University of Paisley, Paisley, Scotland, UK*, [3]*Pennsylvania State University, State College, PA*, [4]*Pakistan Institute of Engineering and Applied Sciences, Islamabad, Pakistan.*	P2G-3 **Design and Fabrication of a Surface Micromachined Frequency Tunable Film Bulk Aacoustic Resonator with an Exetended Electrostatic Tuning Range.** W. Pan*[1,2], P. Soussan[1], B. Nauwelaers[3], and H. Tilmans[1], [1]*IMEC-MCP, Leuven, Belgium*, [2]*ESAT-INSYS, Katholieke Universiteit Leuven, Leuven, Belgium*, [3]*ESAT-TELEMIC, Katholieke Universiteit Leuven, Leuven, Belgium.*	P2H-4 **Temperature Characteristics of SH-Type Acoustic Waves in a Rotated *Y*-Cut $LiTaO_3$ Thin Plate.** H. Fujiwara, D. Yamazaki, and K. Nakamura*, *Graduate School of Engineering, Tohoku University, Sendai, Miyagi, Japan.*	P2I-3 **Excellent Frequency Stability and High-Q and Small SH-Type Quartz SAW Resonators.** T. Owaki* and T. Morita, *Toyo Communication Equipment Co., Ltd., Kanagawa, Japan.*	P2J-4 **Enhancement of the Piezoelectric Response in Perovskites by External Bias Fields.** M. Budimir*, D. Damjanovic, and N. Setter, *Ecole Polytechnique Federale de Lausanne - EPFL, 1015 Lausanne, Switzerland.*	P2K-6 **CMUT Design Charts to Maximize the Gain-Bandwidth Product.** S. Olcum* and A. Atalar, *Bilkent University, Ankara, Turkey.*
P2F-3 **ZnO for Thin Film BAW Applications.** J. Molarius*[1], T. Pensala[1], A. Nurmela[1], M. Ylilammi[1], and A. Dommann[2], [1]*VTT Technical Research Centre of Finland, Espoo, Finland*, [2]*CSEM Centre Suisse d'Electronique et de Microtechnique SA, Neuchâtel, Switzerland.*	P2G-4 **Design of Bulk Acoustic Wave RF Resonators and Filters Based on Advanced Bragg Reflector.** G. Caruyer*[1], A. Devos[2], J. F. Carpentier[1], R. Vélard[1], N. Casanova[1], A. Lefevre[3], F. Dumont[1], G. Parat[3], and P. Ancey[1], [1]*ST Microelectronics, Crolles, France*, [2]*Institut d'Electronique de Microélectronique et Nanotechnologie, dept. ISEN, Lille Cedex, France*, [3]*CEA-LETI, Grenoble, France.*	P2H-5 **Theoretical and Experimental Investigation of PSAW and SAW Properties of AlN Films on Isotropic Diamond Substrates.** M. Benetti[1], D. Cannata[1], F. Di Pietrantonio[1], V. I. Fedosov[2], and E. Verona*[1], [1]*Consiglio Nazionale delle Ricerche - Istituto di Acustica, Roma, Italy*, [2]*Russian Academy of Sciences - Institute of Radioengineering and Electronics, Moscow, Russia.*	P2I-4 **SAW Analogs of Brewster's Angles: The Dependence on the Strip Shape.** S. V. Biryukov*[1,2] and M. Weihnacht[1], [1]*Leibniz Institute for Solid State and Materials Research Dresden, Dresden, Germany*, [2]*Mints Radiotechnical Institute, Moscow, Russia.*	P2J-5 **Optimization of the Transverse Piezoelectric Coefficient by Domain Engineering.** M. Davis*, D. Damjanovic, and N. Setter, *Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland.*	P2K-7 **Fabrication and Characterization of a Micromachined Ultrasonic Transducer.** C. Jia*[1], M. Wiemer[2], J. Mehner[2], T. Otto[2], and T. Gessner[1], [1]*Center for Microtechnologies, Chemnitz, Germany*, [2]*Fraunhofer Institute for Reliability and Microintegration, Chemnitz, Germany.*

P2F-4 **Control of Effective Electromechanical Coupling Coefficient and Quality Factor ina 1.8 GHz Range Film Bulk Acoustic Wave Resonator Featuring Multi-Layers Using ZnO, SiO_2 and Al_2O_3 Thin Films.** M. Takeuchi*, H. Yamada, H. Kawamura, Y. Yoshino, T. Makino, and S. Arai, *Murata Mfg. Co., Ltd., Yasu City, Shiga Pref., Japan.*

P2F-5 **Electromechanical Coupling Coefficient k_{15} of (11-20) Textured ZnO Films.** T. Yanagitani*, N. Mishima, M. Matsukawa, Y. Watanabe, and T. Otani, *Doshisha University, Kyotanabe, Kyoto, Japan.*

P2F-6 **Higher-order Shear Mode FBAR Using Polarization-inverted Layers of (11-20) Textured ZnO Films.** Y. Miyamoto*, T. Yanagitani, M. Matsukawa, Y. Watanabe, and T. Otani, *Doshisha University, Kyotanabe, Kyoto, Japan.*

Session P2G
BAW MATERIALS AND PROPAGATION II
Chair: J. Brown, JB Consulting

P2G-5 **Spurious Resonance Suppression in ZnO Based Thin-Film BAW Resonators: FEM Modeling and Experiment.** T. Pensala*[1], T. Makkonen[2], and M. Ylilammi[1], [1]*VTT Information Technology, Microelectronics, Espoo, Finland*, [2]*Helsinki University of Technology, Materials Physics Laboratory, Espoo, Finland.*

P2G-6 **Beveling AT-Cut Quartz Resonator Design by an Efficient Numerical Method.** S. Y. Pao*[1], M. K. Chao[2], C. H. Chiu[2], C. S. Lam[2], and P. Z. Chang[1], [1]*Institute of Applied Mechanics, National Taiwan University, Taipei, Taiwan*, [2]*TXC Corporation, Ping Cheng City, Taoyuan County, Taiwan.*

Session P2H
SAW MATERIALS AND PROPAGATION
Chair: R. Potter, Vectron International

P2H-1 **Electro-Acoustic Slip and Gap Waves in Piezoelectric Structures of General Anisotropy.** A. Darinskii[1] and M. Weihnacht*[2], [1]*Institute of Crystallography, Moscow, Russia*, [2]*Leibniz Institute for Solid State and Materials Research, Dresden, Germany.*

P2H-6 **Temperature Sensitive Cuts for Temperature Sensors.** V. I. Cherednick* and M. Yu. Dvoesherstov, *Nizhny Novgorod State University, Russia, Nizhny Novgorod, Russia.*

P2H-7 **Approximation of Propagation Loss in Rotated Y-Cuts of Lithium Tantalate with a Periodic Grating.** N. F. Naumenko*[1] and B. P. Abbott[2], [1]*Moscow Steel and Alloys Institute, Moscow, Russia*, [2]*Sawtek Inc., Apopka, FL.*

P2H-8 **Pressure Characteristics of Spherical Ball SAW Device.** D. Y. Sim*[1], N. Takeda[1], S. Akao[2], N. Nakaso[2], Y. Ebi[3], H. Kazato[3], T. Mihara[4], and K. Yamanaka[4], [1]*Ball Semiconductor Inc., Allen, TX.*, [2]*Toppan Printing Co., Sugitomachi, Saitama, Japan*, [3]*Yamatake Co., Fujisawa, Kanagawa, Japan*, [4]*Tohoku Univ., Sendai, Miyagi, Japan.*

Session P2I
SAW DEVICES II
Chair: M. Mayer, EPCOS AG

P2I-1 **AFM Characterization of 1-3 Piezocomposite Arrays.** F. Marinozzi[1,4], F. Bini[1], D. Passeri[2], and A. Grandoni*[3], [1]*Eudossiana, Rome, Italy*, [2]*A. Scarpa, Rome, Italy*, [3]*Transducer Manufacturing Engineer, Industrial Engineering Group ESAOTE S.p.A, Caciolle , Florence, Italy*, [4]*Neurological Rehabilitation Hospital S. Giovanni Battista ACISMOM, L. E. Morselli , Rome, Italy.*

Session P2K
MICROMACHINED TRANSDUCERS
Chair: C. Daft, Siemens

P2I-5 **Transfer Effects of Induced Carriers by SAW.** C. Kaneshiro*[1], K. Koh[1], K. Hohkawa[1], K. Nishumura[2], and N. Shigekawa[2], [1]*Kanagawa Institute of Technology, Kanagawa, Japan*, [2]*Nippon Tetelegraph & Telephone Co., Kanagawa, Japan.*

P2I-6 **AlN-on-Si SAW Filters: Influence of Film Thickness, IDT Geometry and Substrate Conductivity.** M. Clement*, L. Vergara, E. Iborra, A. Sanz-Hervas, J. Sangrador, and J. Olivares, *Depto. Tecnología Electrónica, Universidad Politécnica de Madrid, Madrid, Spain.*

Session P2J
TRANSDUCER MATERIALS AND COMPOSITE MATERIALS
Chair: K. Shung, University of Southern California

P2K-1 **Photoacoustic Imaging Using a Two-Dimensional CMUT Array.** I. Wygant*, P. Kuo, X. Zhuang, D. Yeh, O. Oralkan, M. Fejer, and B. Khuri-Yakub, *E. L. Ginzton Laboratory, Stanford University, Stanford, CA.*

P2K-2 **Improving the Performance of Capacitive Micromachined Ultrasound Transducers using Modified Membrane and Support Structures.** S. Zhou and J. Hossack*, *University of Virginia, Charlottesville, VA.*

P2K-3 **A Lumped Circuit Model for the Radiation Impedance of a 2D cMUT Array Element.** A. Bozkurt*[1] and M. Karaman[2], [1]*Sabanci University, Istanbul, Turkey*, [2]*Isik University, Istanbul, Turkey.*

P2K-8 **Design, Fabrication and Characterisation of Capacitive Micromachined Ultrasonic Transducers Based on a 2D-Like Architecture.** S. Clatot*[1], P. Blind[2], V. Pétrini[1], L. Gauthier-Manuel[1], M. Wilm[1], R. Berriet[3], J.-C. Jeannot[1], and S. Ballandras[1], [1]*FEMTO-ST, CNRS, Besançon, France*, [2]*CTMN, Besançon, France*, [3]*IMASONIC SA, Besançon France.*

P2K-9 **Backing Requirements for CMUT Arrays on Silicon.** S. Berg* and A. Rønnekleiv, *Norwegian University of Science and Technology, NTNU, Trondheim, Norway.*

P2K-10 **Bandwidth Improvement in a cMUT Array with Mixed Sized Elements.** C. Bayram* and A. Atalar, *Bilkent University, Ankara, Turkey.*

P2K-11 **Enhanced Echographic Images Obtained Improving the Structural Membrane Layer of the cMUT Probe.** A. Savoia*[1], G. Caliano[1], R. Carotenuto[1], C. Longo[1], P. Gatta[1], A. Caronti[1], E. Cianci[2], V. Foglietti[2], and M. Pappalardo[1], [1]*University Roma Tre - Dept. of Electrinics, Roma, Italy*, [2]*CNR-IFN, Roma, Italy.*

	Session 1E **PORTABLE DEVICES AND OTHER NEAT STUFF** Chair: K. Bom, Erasmus MC	Session 2E **CARDIOVASCULAR** Chair: M. O'Donnell, University of Michigan	Session 3E **NDE SIGNAL PROCESSING** Chair: E. Furgason, Purdue University	Session 4E **PHYSICAL ACOUSTICS 2** Chair: G. Mansfield, IREE-Russian Academy of Sciences	Session 5E **RF FILTERS AND MODULES** Chair: C. Ruppel, EPCOS AG	Session 6E **cMUTS** Chair: C. Daft, Siemens
	Room 1	**Room 2**	**Room 3**	**Room 4**	**Room 5**	**Room 6**
11:30 a.m.	1E-1 **(Invited) TeleMedicine: What Is In Place Today? What Are the Challenges for the Future?** J. Souquet*, *Philips Medical Systems.*	2E-1 **A Statistical Model-Based Approach for the Detection of Abnormal Cardiac Deformation.** F. Aoued*[1], E. Eroglu[1], L. Herbots[1], F. Rademakers[1], and J. D'hooge[1,2], *[1]Cardiac Imaging Research- Department of cardiology, Catholic University of Leuven, Leuven, Belgium, [2]Medical Image Computing- Department of electrical engineering, Catholic University of Leuven, Leuven, Belgium.*	3E-1 **Chirplet Transform for Ultrasonic Signal Analysis and NDE Applications.** Y. Lu*, G. Cardoso, R. Demirli, and J. Saniie, *Illinois Institute of Technology, Chicago, IL.*	4E-1 **Acoustic Scattering from Stiffened Plate Immersed in Water: Bloch-Floquet Phenomenon.** G. Maze*, R. Lietard, and D. Decultot, *LAUE UMR CNRS 6068, IUT, Place Robert Schuman, Le Havre, 76610, France.*	5E-1 **(Invited) Trends in Integrated Front-End Modules for Cellular Handsets.** P. Wright*, *TriQuint Semiconductor, Hillsboro, OR.*	6E-1 **Analysis and Design of Dual-electrode Capacitive Micromachined Ultrasonic Transducers.** R. O. Guldiken* and F. L. Degertekin, *Georgia Institite of Technology, Atlanta.*
11:45 a.m.		2E-2 **Full Strain Tensor Characterization for Angle-Independent Strain Mapping in Myocardial Elastography.** E. Konofagou*, W.-N. Lee, and S. Fungkee-fung, *Columbia University, New York, NY.*	3E-2 **Computationally Efficient Sparse Deconvolution of B-Scan Images.** T. Olofsson*, *Signals and Systems Group, Department of Engineering Sciences, Uppsala University, Uppsala, Sweden.*	4E-2 **Borehole Flexural Waves in Formations with Radially Varying Properties.** B. Sinha*, H. P. Valero, T. Ikegami, and J. Pabon, *Schlumberger-Doll Research, Ridgefield, CT.*		6E-2 **Investigation of the Nonlinear CMUT Behavior.** A. Lohfink*[1,2] and P.-C. Eccardt[1], *[1]Siemens AG, CT PS 8, Munich, Germany, [2]IMSAS, University of Bremen, Bremen, Germany.*

12:00 p.m.	1E-2 **Reconfigurable Arrays for Portable Ultrasound.** R. Fisher*[1], K. Thomenius[1], R. Wodnicki[1], D. Mills[1], C. Hazard[1], S. Cogan[1], R. Thomas[1], B. Khuri-Yakub[2], A. Ergun[2], and G. Yaralioglu[2], [1]*GE Global Research, Niskayuna, NY*, [2]*Stanford University, Stanford, CA.*	2E-3 **Intravascular Shear Stress Imaging Based on Ultrasonic Velocity Vector Measurement.** N. Nitta*[1], K. Homma[1], and T. Shiina[2], [1]*National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Ibaraki, Japan*, [2]*Univ. of Tsukuba, Tsukuba, Ibaraki, Japan.*	3E-3 **Stepped Sine Versus Coded Pulse as Excitation Signals for Ultrasonic Transducer Calibration in a Non-Linear Propagation Field.** R. P. B. Costa-Felix*[1] and J. C. Machado[2], [1]*INMETRO, Duque de Caxias, RJ, Brasil*, [2]*COPPE/UFRJ, Rio de Janeiro, RJ, Brasil.*	4E-3 **Ultrasonic and Sonochemical Reaction Studies of O-Cresols in Different Solvent Mixtures.** S. V. Ranga Nayakulu*[1], S. Venkateswar[2], C. Sreenivasa Reddy[2], and D. Linga Reddy[2], [1]*Tellakula Jalayya Polisetty Somasundaram College, Guntur-522006, Andhra Pradesh, India*, [2]*Osmania University, Hyderabad-500 007,A.P.,India.*	5E-2 **Temperature Compensated $LiTaO_3$ / Sapphire SAW Substrate for High Power Applications.** 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., Akashi, Hyogo, Japan*, [2]*Fujitsu Media Devices Limited, Yokohama, Kanagawa, Japan*, [3]*National Institute of Advanced Industrial Science and Technology, Tsukuba, Ibaraki, Japan.*	6E-3 **Capacitive Micromachined Ultrasonic Transducers (cMUTS) with Piston-Shaped Membranes.** Y. Huang, E. Hæggström, X. Zhuang, A. Ergun, and B. T. Khuri-Yakub*, *Stanford University, Stanford, CA.*
12:15 p.m.	1E-3 **SCREAM - A Discrete Time Microbeamformer for cMUT Arrays.** T. Halvorsrød*, L. R. Cenkeramaddi, T. Ytterdal, and A. Rønnekleiv, *Institute of Electronics and Telecommunication, Norwegian University of Science and Technology, Trondheim, Norway.*	2E-4 **Time-Averaged High Contrast Ultrasound Imaging with Motion Correction.** H. Yoshikawa*, T. Azuma, K.-I. Kawabata, K. Sasaki, and S.-I. Umemura, *Central Research Laboratory, Hitachi Ltd., Kokubunji, Tokyo 185-8601.*	3E-4 **Adaptive Thresholding Technique for Denoising and Compressing Ultrasonic Signals.** G. Cardoso* and J . Saniie, *Illinois Institute of Technology, Chicago, IL.*	4E-4 **Effective Substitution of Aluminum for Gallium in Langasite-Type Crystals for a Sensor Use at High Temperature.** H. Takeda*, S. Tanaka, S. Izukawa, H. Shimizu, T. Nishida, and T. Shiosaki, *Graduate School of Materials Science, Nara Institute of Science and Technology, 8916-5 Takayama, Ikoma, Nara 630-0192, Japan.*	5E-3 **Design Study on a Compact, High Performance SAW Duplexer.** A. Fleckenstein*[2], J. E. Kiwitt[1], F. M. Pitschi[1], M. Jakob[1], K. Ch. Wagner[1], and W. Menzel[2], [1]*EPCOS AG, Munich, Germany*, [2]*Microwave Techniques, University of Ulm, Ulm, Germany.*	6E-4 **Analysis of Crosstalk Between Fluid Coupled CMUT Membranes.** P.-C. Eccardt*[1], A. Lohfink[1,2], and H.-G. von Garssen[1], [1]*Siemens AG, CT PS 8, Munich, Germany*, [2]*IMSAS, University of Bremen, Bremen, Germany.*
12:30 p.m.	1E-4 **Dual-Arrays Bbrain Imaging Prototype: Experimental In Vitro Results.** F. Vignon[1], J. Aubry[1], M. Tanter[1], A. Margoum[2], J. Lecoeur[3], and M. Fink*[1], [1]*Laboratoire Ondes et Acoustique, Paris, France*, [2]*ESME Sudria, Ivry, France*, [3]*Lecoeur Electronique, Chuelles, France.*	2E-5 **Exact and Weak Scattering Models for the Complex Acoustic Field Near to Cylindrical Walls and Boundaries in Tissue.** R. S. Thompson*, C. Macaskill, and L. Farnell, *University of Sydney, Sydney, NSW, Australia.*	3E-5 **Parametric Modeling of Wave Propagation in Gas Mixtures - A System Identification Approach.** J. Martinsson* and J. E. Carlson, *Lulea University of Technology / EISLAB, Lulea, Sweden.*	4E-5 **Probing High Frequency Phonon Modes in Nanoscale Features.** C. M. Flannery*[1], S. Kim[1], W. Johnson[1], and C. S. Soles[2], [1]*National Isntitute of Standards and Technology, Materials Reliability Division, Boulder, CO*, [2]*National Isntitute of Standards and Technology, Polymers Division, Gaithersburg, MD.*	5E-4 **Double-Resonance SAW Filters.** J. Meltaus*[1], V. P. Plessky[2,1], and S. S. Hong[3], [1]*Helsinki University of Technology, Materials Physics Laboratory, Espoo, Finland*, [2]*GVR Trade SA, Bevaix, Switzerland*, [3]*Samsung Electro-Mechanics Co., Ltd., Suwon, Korea.*	6E-5 **Improved Performance of cMUT with Nonuniform Membranes.** M. N. Senlik* and A. Atalar, *Electrical and Electronics Engineering Department, Bilkent University, Ankara, Turkey.*
12:45 p.m.	1E-5 **In Vivo Ultrasound Biomicroscopy of Skin with 20 MHz and 100 MHz Range Ultrasound: Inverse Echo Signal Filtering Optimization.** M. Vogt*[1,3], B. Paul[2,3], S. Scharenberg[2,3], R. Scharenberg[2,3], and H. Ermert[1,3], [1]*Ruhr-University Bochum, Bochum, Germany*, [2]*taberna pro medicum GmbH, Lueneburg, Germany*, [3]*Ruhr Center of Excellence for Medical Engineering KMR, Bochum, Germany.*	2E-6 **Windkessel Modeling of Pulsatile Ultrasonic Strain Wave.** L. Y. Huang*, B. Dunmire, J. Kucewicz, P. Vicini, and K. Beach, *University of Washington, Seattle, WA.*	3E-6 **High Resolution Ultrasonic Array Imaging using Positivity Constraints on the Scattering Amplitudes.** F. Lingvall*[1] and T. Olofsson[2], [1]*University of Oslo, Oslo, Norway*, [2]*Uppsala University, Uppsala, Sweden.*	4E-6 **Physical Properties of Lanthanum Gallium Tantalate Crystals for High-Temperature Applications.** S. A. Sakharov*[1], A. N. Zabelin[1], and D. V. Roshchupkin[2], [1]*FOMOS Technology Co, Moscow, Russia*, [2]*Institute of Microelectronics Technology RAS, Chernogolovka, Moscow District, Russia.*	5E-5 **SAW Duplexer for US-PCS that is Composed of Temperature Compensated Filters with SiO2/IDT/LT System.** R. Takayama*, Y. Iwasaki, K. Fujii, Y. Hamaoka, H. Nakanishi, and K. Nishimura, *Panasonic Electronic Devices Co., Ltd., Kadoma, Osaka, Japan.*	6E-6 **Characterization of Cross-Coupling in cMUTs.** B. Bayram*, M. Kupnik, G. Yaralioglu, D. Lin, A. Ergun, O. Oralkan, and B. Khuri-Yakub, *Stanford University, Stanford, CA.*

	Session 1F **ELASTICITY DYNAMIC** Chair: S. Emelianov, University of Texas at Austin	Session 2F **CONTRAST AGENTS: IMAGING I** Chair: A. Bouakaz, University of Tours	Session 3F **GAS-LIQUID SENSORS** Chair: M. Pappalardo, University of Roma TRE	Session 4F **MEDICAL TRANSDUCERS I** Chair: K. Shung, University of Southern California	Session 5F **SAW ANALYSIS** Chair: P. Smith, McMaster University	Session 6F **INDUSTRIAL MEASUREMENTS AND APPLICATIONS** Chair: J. Tsujino, Kanagawa University
	Room 1	**Room 2**	**Room 3**	**Room 4**	**Room 5**	**Room 6**
2:30 p.m.	1F-1 **Peripheral Vascular ARFI Imaging: *In Vivo* Clinical and Phantom Results.** D. Dumont*, J. D. Allen, E. Miller, C. Moyer, S. Hsu, and G Trahey, *Duke University, Durham, NC.*	2F-1 **Ultrasonic Molecular Imaging of Primordial Angiogenic Vessels in the Papilloma Virus Transgenic Mouse With avb3-Integrin Targeted Nanoparticles Using Information-Theoretic Signal Detection.** M. Hughes*, J. Marsh, J. Arbeit, R. Neumann, R. Fuhrhop, A. Woodson, G. Lanza, and S. Wickline, *Washington University, St. Louis, MO.*	3F-1 **(Invited) Diffraction-Free Propagation of Collimate Surface Acoustic Wave on a Sphere Applied for Innovative Gas Sensors.** K. Yamanaka*[1], D. Y. Sim[2], I. Satoh[3], T. Miyagishi[3], H. Tanaka[3], T. Fukiura[3], H. Kazato[3], S. Akao[4], T. Ohgi[4], N. Nakaso[4], T. Tsuji[1], T. Mihara[1], Y. Ebi[3], and T. Nakatsukasa[4], [1]*Tohoku University, Sendai, Miyagi, Japan*, [2]*Ball Semiconductor, Allen, TX*, [3]*Yamatake, Fujisawa, Kanagawa, Japan*, [4]*Toppan Printing, Sugito, Saitama, Japan.*	4F-1 **Development and Clinical Evaluation of a 10MHz Linear Array Catheter for Endobronchial Imaging.** O. Cladé*[1], F. Tranquart[2], P. Palanchon[2], M. Olar[2], E. Hazouard[2], and D. Dinet[1], [1]*VERMON, Tours, France*, [2]*CIT Ultrasound, University Hospital-Bretonneau, Tours, France.*	5F-1 **Identification of New LTO HVPSAW Orientations Considering Finite Thickness Electrodes.** T. Kenny* and M. Pereira da Cunha, *University of Maine, Orono.*	6F-1 **Finite Element Simulation of a Long Narrow Workload Immersed in an Ultrasonic Cleaning Bath: Practical Comparisons and Implications for Cleaning Efficacy.** J. P. Lewis*[1], S. Gardner[1], and I. Corp[2], [1]*University of Glamorgan, Pontypridd, Rhondda Cynnon Taff, United Kingdom*, [2]*Ultrawave Limited, Cardiff, United Kingdom.*
2:45 p.m.	1F-2 **A Combined Indenter/ARFI Imaging System.** L. Zhai*, R. Bouchard, M. Palmeri, R. Nightingale, and K. Nightingale, *Department of Biomedical Engineering, Duke University, Durham, NC.*	2F-2 **Pulse Inversion Fundamental Imaging with Liposome Microbubbles at 25-50 MHz.** C.-H. Li[1], A.-H. Liao[1], J.-A. Ho[2], and P.-C. Li*[1], [1]*Department of Electrical Engineering, National Taiwan University, Taipei, Taiwan, ROC*, [2]*Department of Applied Chemistry, National Chi Nan University, Nantou, Taiwan, ROC.*		4F-2 **2D Arrays Performances Optimization to Address High Quality Volumetric Imaging.** L. Ratsimandresey*, N. Felix, D. Dinet, and R. Dufait, *VERMON, Tours, France.*	5F-2 **Optimisation and Improved Convergence of Coupled Finite Element/Boundary Element Analyses.** S. Ballandras*[1], R. Lardat[2], V. Laude[1], A. Reinhardt[1], M. Wilm[1], W. Steichen[2], and T. Pastureaud[2], [1]*FEMTO-ST, CNRS, Besançon, France*, [2]*TEMEX, Sophia Antipolis, France.*	6F-2 **Numerical Simulation of Ultrasonic Waves in Cavitating Fluids with Special Consideration of Ultrasonic Cleaning.** N. Bretz*[1,2], J. Strobel[1,2], M. Kaltenbacher[2], and R. Lerch[2], [1]*Robert Bosch GmbH, Stuttgart, Germany*, [2]*Dept. of Sensor Technology, Friedrich-Alexander-University Erlangen-Nuremberg, Erlangern, Germany.*

3:00 p.m.	1F-3 **(Invited) Dynamic MR-Elastography as a Non-Invasive Imaging Modality: In-Vivo Application to Breast, Liver and Brain.** R. Sinkus*, *Laboratoire Ondes et Acoustique, Ecole Supérieur Physique Chimie Industrielle, Paris, France.*	2F-3 **Contrast Enhanced Subharmonic Breast Imaging: Work in Progress.** F. Forsberg*[1], C. W. Piccoli[1], R. J. Ro[1], K. J. Lipcan[1], D. A. Merton[1], J. B. Liu[1], R. Soparawala[1], W. T. Shi[1], and A. L. Hall[2], [1]*Thomas Jefferson University, Philadelphia, PA*, [2]*GE Healthcare, Milwuakee, WI.*	3F-2 **Design of Micromachined Resonators for Fish Identification.** A. Rønnekleiv*[1,3], J. Brungot[3], D. Wang[4], R. Bernstein[4], V. Jahr[3], K. Kjølerbakken[3], L. Hoff[2,3], and S. Holm[5,3], [1]*Norwegian University of Science and Technology, Trondheim, Norway*, [2]*Vestfold University College, Horten, Norway*, [3]*VivID AS, Ås, Norway*, [4]*SINTEF, Oslo, Norway*, [5]*University of Oslo, Oslo, Norway.*	4F-3 **Calibrated Tomographic Schlieren System for Characterization of Medical Probes.** J. Le Floc'h*, P. Gatta, G. Caliano, R . Carotenuto, and M. Pappalardo, *University Roma Tre, University Roma Tre, Rome, Italy.*	5F-3 **Analysis of SAW Propagation under a Periodic Multi-Electrode-Type Grating.** Th. Pastureaud*, R. Lardat, W. Steichen, and P. Ventura, *TEMEX, Sophia Antipolis Cedex.*	6F-3 **Welding Characteristics and Temperature Rises of Various Frequency Ultrasonic Plastic Welding.** J. Tsujino*, M. Hongoh, M. Yoshikuni, H. Miura, and T. Ueoka, *Kanagawa University, Yokohama, Japan.*
3:15 p.m.		2F-4 **High Frequency Subharmonic Pulsed-wave Doppler and Color Flow Imaging of Microbubble Contrast Agents.** A. Needles*[1], D. E. Goertz[2], A. S. Brown[1], and F. S. Foster[1], [1]*Sunnybrook and Women's College Health Sciences Centre, Toronto, Ontario, Canada*, [2]*Erasmus MC, Rotterdam, The Netherlands.*	3F-3 **A Lateral Field Excited Acoustic Wave Pesticide Sensor*.** W. Pinkham*, L. French, D. Frankel, and J. Vetelino, *University of Maine, Orono, ME.*	4F-4 **High-Resolution Imaging with High-Frequency 1-D Linear CMUT Arrays.** D. Yeh*, O. Oralkan, I. Wygant, A. Ergun, J. Wong, and B. Khuri-Yakub, *Stanford University, Stanford, CA.*	5F-4 **3D Piezoelectric Surface Green's Function.** V. Laude*[1], C. Jerez Hanckes[2,1], and S. Ballandras[1], [1]*Département LPMO, Institut FEMTO-ST, CNRS UMR 6174, Besançon, France*, [2]*CMAP, Ecole Polytechnique, CNRS UMR 7641, Palaiseau, France.*	6F-4 **Torsional Wave Transduction using Obliquely-bonded Magnetostrictive Nickel Strips in Cylinders.** C. I. Park*, S. H. Cho, and Y. Y. Kim, *Seoul National University, Kwanak-Gu, Seoul, KOREA.*
3:30 p.m.	1F-4 **Stress Field Formation for Multi-frequency Vibro-Acoustography.** M. Urban*[1], G. Silva[2], R. Kinnick[1], M. Fatemi[1], and J. Greenleaf[1], [1]*Mayo Clinic College of Medicine, Rochester, MN*, [2]*Universidade Federal de Alagoas, Maceio, AL, Brazil.*	2F-5 **Optimized Contrast Agent Imaging Considering Different Sources of Nonlinearity.** W. Wilkening*[2], Th. Hoelscher[3,2], Ch. Hansen[1,2], Ch. Fischer[1], and H. Ermert[1,2], [1]*Ruhr-Universitaet Bochum, Bochum, Germany*, [2]*Ruhr Center of Excellence for Medical Engineering, Bochum, Germany*, [3]*University of California San Diego, San Diego, CA.*	3F-4 **Nanomaterial Sensing Layer Based Surface Acoustic Wave Sensors.** K. Srinivasan[1], S. Cular*[1], V. Bhethanabotla[1], S. Yup Lee[2], M. T. Harris[2], and J. N. Culver[3], [1]*University of South Florida, Tampa, FL*, [2]*Purdue University, West Lafayette, IN*, [3]*University of Maryland Biotechnology Institute, College Park, MD.*	4F-5 **(Invited) Advances in Catheter-Based Ultrasound Imaging.** T. Proulx*, D. Bergman, D. Tasker, and J. Bartlett-Roberto, *Siemens Medical Solutions USA, Ultrasound Division, Mountain View, CA.*	5F-5 **Modeling Longitudinal Leaky SAW Propagation under Periodic Electrode Arrays.** T. Makkonen*[1] and V. Plessky[2], [1]*Helsinki University of Technology, Materials Physics Laboratory, P.O. Box 2200, 02150 TKK, Finland*, [2]*GVR Trade SA, CH-2022 Bevaix, Switzerland.*	6F-5 **Welding of Thick Coated Wire Specimens Using a 19 kHz Ultrasonic Complex Vibration Welding System.** J. Tsujino*, T. Ueoka, R. Karatsu, G. Kishimoto, and T. Kawasaki, *Kanagawa University, Yokohama, Japan.*
3:45 p.m.	1F-5 **Spatially Mapping the Elastic Properties of the Intraocular Lens using Bubble-Based Acoustic Radiation Force.** T. Erpelding*, K. Hollman, and M. O'Donnell, *University of Michigan, Ann Arbor, MI.*	2F-6 **Phase-Shift Nanoparticle System For Ultrasonic Imaging and Therapy.** K.-I. Kawabata*, N. Sugita, A. Yoshizawa, T. Azuma, H. Yoshikawa, and S.-I. Umemura, *Central Research Laboratory, Hitachi, Ltd., Kokubunji, Tokyo, Japan.*	3F-5 **Characterization of PIB as a Chemically Sensitive Layer in Liquid Environments Using TSM Resonators.** O. Amu*, S. Schneider, F. Josse, J. Hossenlopp, and Y. Jones, *Marquette University, Milwaukee, WI.*		5F-6 **Anelastic Relaxation Effects and Elastic Instabilities in CGG-Type Compounds.** J. Schreuer*[1] and C. Thybaut[2], [1]*Institute of Crystallography, University of Frankfurt, Frankfurt, Germany*, [2]*Laboratory of Crystallography, ETH Zurich, Zurich, Switzerland.*	6F-6 **27 kHz Small Diameter Ultrasonic Complex Vibration Source with Multiple Transducers.** J. Tsujino*, T. Ueoka, Y. Kikuchi, T. Aoyama, and T. Kyuzen, *Kanagawa University, Yokohama, Japan.*

	Session 1G **ELASTICITY** Chair: K. Nightingale, Duke University	Session 2G **CONTRAST AGENTS: IMAGING II** Chair: K. Ferrara, University of California, Davis	Session 3G **ULTRASONIC FLOWMETERS** Chair: L. Lynnworth, General Electric	Session 4G **INTERVENTIONAL ULTRASOUND** Chair: G. Lockwood, Queen's University	Session 5G **SAW SYSTEM APPLICATIONS** Chair: R. Potter, Vectron International	Session 6G **TISSUE CHARACTERIZATION** Chair: G. Berger, CNRS
	Room 1	**Room 2**	**Room 3**	**Room 4**	**Room 5**	**Room 6**
4:30 p.m.	1G-1 **Applying *In Vitro* Elasticity Imaging Results to Optimize *In Vivo* Breast Lesion Characterization using a Combined 3D US/ Digital X-Ray System.** R. Booi*[1,2], P. Caron[1,2], R. Erkamp[1], H. Xie[1], A. Kapur[2], G. LeCarpentier[1], M. Roubidoux[1], J. Fowlkes[1], and M. O'Donnell[1], [1]*University of Michigan, Ann Arbor,* [2]*General Electric Global Research Center, Schenectady, NY.*	2G-1 **Intraoperative Contrast Enhanced Perfusion Imaging of Cerebral Tumors.** Ch. Hansen*[1,2], M. Engelhardt[3,2], W. Wilkening[2], K. Schmieder[3,2], and H. Ermert[1,2], [1]*Institute of High Frequency Engineering, Ruhr-Universitaet Bochum, Bochum, Germany,* [2]*Ruhr Center of Excellence for Medical Engineering, Bochum, Germany,* [3]*Department of Neurosurgery, Ruhr-Universitaet Bochum, Bochum, Germany.*	3G-1 **Transit Time Ultrasonic Flowmeter: Velocity Profile Estimation.** E. Mandard*[1], D. Kouamé[1], R. Battault[2], J. P. Remenieras[1], and F. Patat[1], [1]*LUSSI FRE 2448, Tours, France,* [2]*Faure Herman, La Ferté Bernard, France.*	4G-1 **(Invited) A Glimpse into the Future of Intravascular Ultrasound Technology.** S. Fry*, *Strategic Business Development, Inc., El Dorado Hills, CA.*	5G-1 **(Invited) SAW and optical signal processing.** M. Lewis*, *Consultant, Malvern, Worcs, UK.*	6G-1 **Ultrasonic Tissue Characterization for the Differentiation of Parotid-Gland Tumors.** U. Scheipers*[1], S. Siebers[1], M. Ashfaq[1], F. Gottwald[2], A. Bozzato[2], J. Zenk[2], H. Iro[2], and H. Ermert[1], [1]*Ruhr-University Bochum, Bochum, NRW, Germany,* [2]*University Hospital for Otorhinolaryngology, University Erlangen, Erlangen, Bavaria, Germany.*
4:45 p.m.	1G-2 **3D Strain Estimation for Isotropic and Anisotropic Materials.** R. G. P. Lopata*[1], M. M. Nillesen[1], I. H. Gerrits[1], J. M. Thijssen[1], L. Kapusta[2], and C. L. de Korte[1], [1]*Clinical Physics Laboratory, Radboud University Medical Center, Nijmegen, The Netherlands,* [2]*Children's Heart Center, Radboud University Medical Center, Nijmegen, The Netherlands.*	2G-2 **In Vivo Contrast-Enhanced Imaging of Mouse Vascular Development.** D. H. Turnbull*[1,2] and O. Aristizábal[1,2], [1]*Skirball Institute of Biomolecular Medicine, New York, NY,* [2]*New York University, New York, NY.*	3G-2 **Estimation of the Influence of the Integral Ultrasonic Flowcell Configurations on the Efficiency of the Velocity Profile Averaging.** V. K. Hamidullin*, *Laboratory of ultrasonics, VZLJOT, Incorporated, St. Petersburg, Russia.*			6G-2 **New Developments in Tissue-Type Imaging (TTI) of Prostate Cancer Based on Combined Ultrasonic and Magnetic-Resonance Methods.** E. Feleppa*[1], C. Porter[2], S. Dasgupta[1], A. Kalisz[1], J. Ketterling[1], S. Ramachandran[1], D. Dail[2], M. LaCrampe[2], D. Sparks[2], F. Arias-Mendoza[3], T. Liu[3], and P. Schiff[3], [1]*Riverside Research Institute, New York, NY,* [2]*Virginia Mason Medical Center, Seattle, WA,* [3]*Columbia University Medical Center, New York, NY.*

5:00 p.m.	1G-3 **A Quantitative Study of Mechanical Properties of Human Dermis In-Vivo using 2D High Frequency Elastography.** Y. Mofid*[1], S. Gahagnon[1], C. Imberdis[2], F. Patat[1,3], and F. Ossant[1,3], [1]*LUSSI FRE 2448 CNRS, Tours, France,* [2]*LMARC UMR 6604 CNRS, Besançon, France,* [3]*University Hospital Bretonneau, Tours, France.*	2G-3 **Microbubble Contrast Agent Destruction using 25 MHz Ultrasound.** E. Cherin*[1], A. Needles[1], S. Stapleton[1], R. Williams[1], J. Tavakkoli[1,2], J. Mehi[1,2], and F.S. Foster[1], [1]*Sunnybrook and Women's College Health Sciences Centre, Toronto, Ontario, Canada,* [2]*Visualsonics Inc., Toronto, Ontario, Canada.*	3G-3 **A Novel Boundary Integral Formulation for Acoustic Radiation in a Nonuniform Flow: Coupling to FEM and Applications.** M. Bezdek*[1,2], A. Rieder[2], H. Landes[1], and R. Lerch[1], [1]*Department of Sensor Technology, University of Erlangen-Nuremberg, Erlangen, Germany,* [2]*Endress+Hauser GmbH+Co. KG, Freising, Germany.*	4G-2 **3-D Ultrasound Imaging Using Forward-Viewing CMUT Ring Arrays for Intravascular and Intracardiac Applications.** D. Yeh*[1], O. Oralkan[1], I. Wygant[1], M. O'Donnell[2], and B. Khuri-Yakub[1], [1]*Stanford University, Stanford, CA,* [2]*University of Michigan, Ann Arbor.*	5G-2 **Ultra-Low Power UWB Communication System using SAW Matched Filters.** T. Sugiura*, T. Sato, E. Otobe, K. Tanji, N. Otani, H. Nagasaka, M. Hasegawa, and T. Shimamori, *Samsung Yokohama Research Institute, Yokohama, Kanagawa, Japan.*	6G-3 **Cyclic Generation of Strain Inside Object Using Dual Acoustic Radiation Force.** H. Hasegawa*, Y. Nishio, and H. Kanai, *Graduate School of Engineering, Tohoku University, Sendai, Japan.*
5:15 p.m.	1G-4 **The Inverse Problem of Elasticity: A Reconstruction Procedure to Determine the Shear Modulus of Tissue.** W. Khaled*, S. Reichling, O. T. Bruhns, and H. Ermert, *Ruhr-University Bochum, Bochum, NRW, Germany.*	2G-4 **Acoustical Investigation and Simulation of Freely Moving Single Microbubbles.** H. Vos*, F. Guidi, E. Boni, and P. Tortoli, *Department of Electronics and Telecommunications, Universita di Firenze, Firenze, Italy.*	3G-4 **Phase Velocity Measurement in Pulp Fiber Suspensions Containing Fibers and Fines.** J. Niemi*, Y. Aitomäki, and T. Löfqvist, *Department of Computer Science and Electrical Engineering, Luleå University of Technology, Luleå,Sweden.*	4G-3 **Components for Focused Integrated pMUTs for High Resolution Medical Imaging.** A. Fleischman*[1], C. Chandrana[1,3], J. Fan[1,2], J. Talman[1], S. Garverick[2], G. Lockwood[4], and S. Roy[1], [1]*The Cleveland Clinic Foundation, Cleveland, OH,* [2]*Case Western Reserve University, Cleveland, OH,* [3]*Cleveland State University, Cleveland, OH,* [4]*Queens University, Kingston, Ontario, Canada.*	5G-3 **The Rounded Shape Spiral Transmission Line Phase Shifter for Miniaturized SAW W-CDMA Antenna Duplexers.** O. Hikino*, M. Ohki, S. Kondo, J. Hamasaki, T. Endo, T. Shiba, and Y. Fujita, *Hitachi Media Electronics Co., Ltd.*	6G-4 **Ultrasound Doppler for Improved Diagnosis of Disease in the Paranasal Sinuses.** T. Jansson*[1], H. W. Persson[1], P. Sahlstrand-Johnson[2], N.-G. Holmer[3], and M. Jannert[2], [1]*Lund University, Lund, Sweden,* [2]*Malmo University Hospital, Malmo, Sweden,* [3]*Lund University Hospital, Lund, Sweden.*
5:30 p.m.	1G-5 **Ultrasonic Mechanical Relaxation Imaging and the Material Science of Breast Cancer.** M. Insana*[1,2], M. Sridhar[2], J. Liu[1], and C. Pellot-Barakat[2], [1]*University of Illinois at Urbana Champaign, Urbana, IL,* [2]*University of California at Davis, Davis, CA.*	2G-5 **A New Model for the Ultrasound Reflectivity Enhancement Due to the Presence of Micron-Sized Particles on a Surface.** O. Couture*, P. B. Bevan, K. Cheung, and F. S. Foster, *Sunnybrook and Women's College Health Sciences Centre, University of Toronto, Toronto, Ontario, Canada.*	3G-5 **On-line Ultrasonic Measurements of Fiber Consistency in Dilute Pulp Suspensions.** Y. Jun* and L. Bin, *School of Mechanical Engineering and Automation, Shanghai University, Shanghai, China.*	4G-4 **An Endoscopic Ultrasound Imaging System Based on a Two-Dimensional CMUT Array: Real-Time Imaging Results.** I. Wygant*[1], X. Zhuang[1], D. Yeh[1], S. Vaithilingam[1], A. Nikoozadeh[1], O. Oralkan[1], A. Ergun[1], M. Karaman[2], and B. Khuri-Yakub[1], [1]*E. L. Ginzton Laboratory, Stanford University, Palo Alto, CA,* [2]*Department of Electrical Engineering, Isik University, Istanbul, Turkey.*	5G-4 **SAW Excitation on Glass Plates for a Tactile Display Application.** M. Takasaki*[1,3], H. Kotani[1], T. Nara[2], and T. Mizuno[1], [1]*Saitama University, Saitama, Japan,* [2]*University of Tokyo, Tokyo, Japan,* [3]*JST, Saitama, Japan.*	6G-5 **Detection of the Myocardial Boundary in the Left Ventricle from Simultaneously Acquired Triplane Ultrasound Images using Multi View Active Appearance Motion Models.** J. Hansegård*[1], S. Urheim[2], E. Steen[4], H. Torp[3], B. Olstad[3], S. Malm[3], and S. Rabben[4], [1]*University of Oslo, Oslo, Norway,* [2]*Rikshospitalet University Hospital, Oslo, Norway,* [3]*The Norwegian University of Science and Technology, Trondheim, Norway,* [4]*GE Vingmed Ultrasound, Horten, Norway.*
5:45 p.m.	1G-6 **Imaging Elastic Non Linear Properties of Soft Tissues: Towards Breast Cancer Characterization.** R. Sinkus[1], J. Bercoff*[1], M. Tanter[1], K. Elkoury[2], V. Servois[2], and M. Fink[1], [1]*Laboratoire Ondes et Acoustique, Paris, France,* [2]*Institut Curie, Radiology department, Paris, France.*	2G-6 **Exploiting Sstatefulness in a Contrast Bubble for Improved Contrast Imaging.** J. Borsboom*[1,2] and N. de Jong[1,2], [1]*Erasmus MC, Rotterdam, the Nethelands,* [2]*Interuniversity Cardiology Institute of the Netherlands, Utrecht, the Netherlands.*	3G-6 **Bubble Detection and Gas Volume Measurement in Bubble Loaded Liquids with Pulse Driven Measurement Devices.** M. Gulsch* and B. Henning, *University of Paderborn, Paderborn, Germany.*	4G-5 **Real-Time 3D Ultrasound Laparoscopy.** E. Light*, E. Dixon-Tulloch, S. Idriss, P. Wolf, and S. Smith, *Duke University, Durham, NC.*	5G-5 **Droplet Ejector Using Surface Acoustic Waves.** J. Bennès*, S. Alzuaga, F. Bastien, J. F. Manceau, and S. Ballandras, *FEMTO-ST INSTITUTE, LPMO Dept, 32 rue de l'Observatoire 25044 Besançon Cedex France.*	6G-6 **Two-Dimensional Simulation of Guided Ultrasound Wave Propagation in Healing Long Bones.** V. Protopappas*[1,2] and D. Fotiadis[2], [1]*Department of Medical Physics, Medical School, University of Ioannina, Ioannina, Ioannina, Greece,* [2]*Unit of Medical Technology and Intelligent Information Systems, Computer Science Department, University of Ioannina, Ioannina, Ioannina, Greece.*

	Session 1H **CONTRAST AGENTS: EFFECTS** Chair: O. Basset, Creatis	Session 2H **ACOUSTIC PROPERTIES OF CELLS AND TISSUES** Chair: G. Schmitz, Ruhr-Universitat Bochum	Session 3H **ACOUSTICAL IMAGING** Chair: R. Maev, University of Windsor	Session 4H **BAW RESONATORS** Chair: Y.-K. Yong, Rutgers University	Session 5H **SAW PROPAGATION** Chair: M. P. da Cunha, University of Maine	Session 6H **ENERGY HARVESTING & NOVEL TRANSDUCERS** Chair: Y. Takeuchi, Kagoshima University
	Room 1	**Room 2**	**Room 3**	**Room 4**	**Room 5**	**Room 6**
8:30 a.m.	1H-1 **Double Passive Cavitation Detection of Optison™ Shell Rupture.** A. Y. Ammi*[1], R. O. Cleveland[3], J Mamou[2], G. I. Wang[2], S. L. Bridal[1], and W. O. O'Brien[2], [1]*Laboratoire d'Imagerie Paramétrique, Paris, France*, [2]*Bioacoustics Research Laboratory, Urbana, IL*, [3]*Boston University, Boston, MA.*	2H-1 **Ultrasonic Detection of the Anisotropy of Protein Cross Linking in Myocardium.** S. Baldwin*, M. Yang, K. Marutyan, K. Wallace, M. Holland, and J. Miller, *Washington University in St. Louis, St. Louis, MO.*	3H-1 **Fast Noncontact Imaging of Material Microstructure using Local Surface Acoustic Wave Velocity Mapping.** S. Sharples*, M. Clark, and M. Somekh, *University of Nottingham, Nottingham, UK.*	4H-1 **Thickness Shear Mode Vibrations in Silicon Bar Resonators.** H. Chandrahalim*, D. Weinstein, and S. Bhave, *Cornell University, Ithaca, NY.*	5H-1 **Links Between Temperature Stable BAW and SAW Crystal Orientations.** M. Weihnacht*, *Leibniz Institute for Solid State and Materials Research Dresden, Dresden, Germany.*	6H-1 **Piezoelectric Micro-machined Ultrasonic Transducer (pMUT)for Energy Harvesting.** K. Dogheche*[1], B. Cavallier[1], P. Delobelle[1], L. Hirsinger[1], E. Cattan[2], D. Rèmiens[2], M. Marzencki[3], B. Charlot[3], S. Basrour[3], and S. Ballandras[1], [1]*FEMTO-ST, CNRS, Besançon, France*, [2]*IEMN, CNRS, Villeneuve d'Ascq, France*, [3]*TIMA, CNRS, Grenoble, France.*
8:45 a.m.	1H-2 **The Effect of Bubble Size Distribution and Driving Frequency on the "Subharmonic" Response from Definity Microbubbles.** K. Cheung*, O. Couture, P. D. Bevan, P. N. Burns, and F. S. Foster, *Sunnybrook and Women's Health Sciences Centre, University of Toronto, Toronto, ON, Canada.*	2H-2 **Ultrasound Characterization of Three Animal Mammary Tumors from Three-Dimensional Acoustic Tissue Models.** J. Mamou*, M. L. Oelze, W. D. O'Brien, Jr., and J. F. Zachary, *University of Illinois, Urbana, IL.*	3H-2 **Air-Coupled Ultrasonic Imaging Techniques for Painting Diagnostic.** A. Siddiolo*[1] and R. Maev[2], [1]*Dipartimento di Meccanica, University of Palermo, Palermo, Italy*, [2]*Centre for Imaging Research, Windsor, Ontario, Canada.*	4H-2 **Analysis of the Acoustic Wavefields in BAW-Resonators by Scanning Electron Microscopy Method.** D. V. Roshchupkin*[1], H. D. Roshchupkina[1], O. A. Buzanov[2], S. A. Sakharov[2], and S. V. Pyatkin[1], [1]*Institute of Microelectronics Technology RAS, Chernogolovka, Moscow District, Russia*, [2]*FOMOS Technology Co., Moscow, Russia.*	5H-2 **Experimental and Predicted TCD and SAW Parameters on LGT [0°, 132°, Ψ] Substrates.** N. Saldanha*[1], D. Puccio[1], M. Pereira da Cunha[2], and D. C. Malocha[1], [1]*University of Central Florida, Orlando*, [2]*University of Maine, Orno.*	6H-2 **Energy Harvesting using Vibrating Structures Excited by Shock.** B. Cavallier*, P. Berthelot, H. Nouira, E. Foltête, L. Hirsinger, and S. Ballandras, *FEMTO-ST, CNRS, Besançon, France.*

9:00 a.m.	1H-3 **On the Oscillation of Microbubbles in Rigid Vessels with a Diameter of 12 Microns.** C. Caskey*, P. Dayton, D. Kruse, and K. Ferrara, *University of California-Davis, Davis, CA.*	2H-3 **A New Method to Assess the Kinetics of Rouleaux Formation in Human Subcutaneous Veins using High Frequency Parametric Imaging: Preliminary Results.** F. Yu*, J.-L. Gennisson, and G. Cloutier, *University of Montreal Hospital, Montreal, Québec, Canada.*	3H-3 **Suppression of Spurious Vibration in Ultrasonic Atomic Force Microscopy and Observation of Stress-Induced Domain Switching in Ferroelectric Crystal.** T. Tsuji*, S. Ide, and K. Yamanaka, *Graduate School of Engineering, Tohoku University, Sendai, Japan.*	4H-3 **Intermediate Frequency resonators using Lamb Waves Co-Integrated with Bulk Acoustic Wave Resonators.** A. Volatier*[1,3], G. Caruyer[1,3], E. Defay[2], D. Pellissier Tanon[1], P. Ancey[1], and B. Dubus[3], [1]*STMicroelectronics, Crolles, France,* [2]*CEA-LETI/DIHS/LCRF, Grenoble, France,* [3]*IEMN, Lille, France.*	5H-3 **Silicon phononic crystal for surface acoustic waves.** S. Benchabane*[1], A. Khelif[1], W. Daniau[1], L. Robert[1], V. Pétrini[1], B. Assouar[2], B. Vincent[2], O. Elmazria[2], J. Krüger[3], and V. Laude[1], [1]*Institut FEMTO-ST, Département LPMO, Besançon, France,* [2]*LPMIA, Nancy, France,* [3]*University of Sarrebrück, Sarrebrück, Germany.*	6H-3 **Predictive Energy Harvesting from Mechanical vibration using Circular Piezoelectric Membrane.** E Minazara*[1], D Vasic[1], F Costa[1], and G Poulin[2], [1]*Système et Applications des Technologies de l'Information et de l'Energie (SATIE), ENS Cachan, Cachan cedex, FRANCE,* [2]*Laboratoire d'Automatique de Grenoble (LAG), LAG - ENSIEG, Domaine Universitaire, BP 46, 38400 Saint Martin d'Hères - FRANCE.*
9:15 a.m.	1H-4 **Estimation of Ambient Pressure Changes using Nonlinear Acoustic Properties of Ultrasound Contrast Agents.** D. Razansky*, Y. Ganor, M. Sapunar, E. Kimmel, and D. Adam, *Technion - Israel Institute of Technology, Haifa, Israel.*	2H-4 **Quantification of Red Blood Cell Aggregation using an Ultrasound Clinical Imaging System.** A. Amararene*, J.-L. Gennisson, A. Rabhi, and G. Cloutier, *University of Montreal Hospital Research Center, Montreal, Quebec, Canada.*	3H-4 **Impulse Ultrasonic Fields Radiated by a Linear Transducer through a Liquid-Solid Interface.** D. Belgroune*[1,2], J. F. Belleval[2], and H. Djelouah[1], [1]*D. Belgroune, USTHB, Algiers, Algeria,* [2]*J.F. de Belleval, UTC, Compiègne, France,* [3]*H. Djelouah, USTHB, Compiègne, France.*	4H-4 **Picosecond Ultrasonics: An Original Tool for Physical Characterization of Bragg Reflectors in Bulk Acoustic Wave Resonators.** P. Emery*[1], A. Devos[2], G. Caruyer[1], R. Velard[1], N. Casanova[1], and P. Ancey[1], [1]*ST Microelectronics, CROLLES, France,* [2]*Institut d'Electronique, de Microélectronique et de Nanotechnologie, Dpt. ISEN, LILLE CEDEX, France.*	5H-4 **Characterization of Bonded Wafer for RF Filters with Reduced TCF.** B. Abbott*[1] and N. Naumenko[2], [1]*Sawtek, Inc., Apopka, FL,* [2]*Moscow Steel and Alloys Institute, Moscow, Russia.*	6H-4 **A Comparison of Piezoelectric and Electrostatic Electromechanical Coupling for Ultrasonic Transduction and Power Generation.** M. Anderson*[1], C. Richards[2], D. Bahr[2], and R. Richards[2], [1]*University of Idaho, Moscow, ID,* [2]*Washington State University, Pullman, WA.*
9:30 a.m.	1H-5 **Dilution System Identification Methods for Contrast Ultrasound Ejection Fraction Assessment.** M. Mischi*[1], A. Jansen[2], and H. Korsten[2,1], [1]*Eindhoven University of Technology, Eindhoven, The Netherlands,* [2]*Catharina Hospital, Eindhoven, The Netherlands.*	2H-5 **Using High Frequency Ultrasound Envelope Statistics to Determine Scatterer Number Density in Dilute Cell Solutions.** A. Tunis[1,2], R. Baddour[1,2], G. Czarnota[2], A. Giles[2], A. Worthington[2], M. Sherar[1,2], and M. Kolios*[1,3], [1]*University of Toronto, Toronto, Ontario, Canada,* [2]*Ontario Cancer Institute, University Health Network, Toronto, Ontario, Canada,* [3]*Ryerson University, Toronto, Ontario, Canada.*	3H-5 **Morpho-Mechanical Analysis of the Dentin-Cement Interface Strength using a Scanning Acoustic Microscope.** L. Denisova*[1], R. Maev[2], F. Rusanov[1], A. Denisov[1], E. Bakulin[2], D. Gavrilov[1], F. Severin[2], and G. Grayson[3], [1]*Institute for Biochemical Physics, Moscow, Russian Federation,* [2]*Windsor University, Windsor, Ontario, Canada,* [3]*Ultradent Clinical Research Ltd., Windsor, Ontario, Canada.*	4H-5 **Effects of Non-Homogeneous Thermal Stresses on the Frequency-Temperature Behavior of AT-cut Quartz Resonators.** M. Patel*[1], Y.-K. Yong[1], and M. Tanaka[2], [1]*Rutgers University, Piscataway, NJ,* [2]*Seiko Epson Corporation, Suwa City, Nagano Prefecture, Japan.*	5H-5 **New Theoretical and Experimental Results on High Frequency Surface Acoustic Waves Excited on Oriented LiNbO3 Single Crystal Layers Transferred onto Silicon.** T. Pastureaud*, B. Biasse[3], B. Aspar[3], W. Daniau[1], W. Steichen[2], V. Laude[1], R. Iardat[2], A. Laens[2], J.-B. Briot[2], J.-M. Friedt[1], and S. Ballandras*[1], [1]*FEMTO-ST, CNRS, Besançon, France,* [2]*TEMEX, Sophia Antipolis, France,* [3]*CEA-DRT-LETI, Grenoble, France.*	6H-5 **Adapting a cMUT Transducer to Detect Acoustic Emissions.** D. Ozevin[2], S. Pessiki[2], D. Greve*[1], and I. Oppenheim[1], [1]*Carnegie Mellon University, Pittsburgh, PA,* [2]*Lehigh University, Bethlehem, PA.*
9:45 a.m.	1H-6 **The Longevity of Contrast Enhancement Following In Vivo Injection is Influenced by an Unsuspected Interaction with the Liver.** M. Matsumura[1,3], R. Karshafian[1], M. Banerjee[2], and P. Burns*[1,2], [1]*University of Toronto, Toronto, ON, Canada,* [2]*Sunnybrook and Women's College HSC, Toronto, ON, Canada,* [3]*Daiichi Pharmaceutical Co, Tokyo, Japan.*	2H-6 **Visualization of Apoptotic Cells using Scanning Acoustic Microscopy.** S. Brand*[1,2], E. C. Weiss[3], G. Czarnota[1,2], R. Lemor[3], and M. C. Kolios[1], [1]*Ryerson University, Toronto, Ontario, Canada,* [2]*Princess Margaret Hospital, Toronto, Ontario, Canada,* [3]*Fraunhofer Institut fuer Biomedizinische Technik, St.-Ingbert, Germany.*	3H-6 **Improvement of Velocity Measurement Accuracy of Leaky Surface Acoustic Wave for Materials with Highly Attenuated Waveform of V(z) Curve by the LFB Ultrasonic Material characterization system.** Y. Ohashi*, M. Arakawa, and J. Kushibiki, *Tohoku University, Sendai, Miyagi, Japan.*		5H-6 **Electro-Acoustical Constants and Reighly SAW Propagation Characteristics of Rare-Calcium Oxoborate Single Crystals.** T. Shiosaki*[1], H. Shimizu[1], A. Kondo[1], M. Nishida[2], H. Takeda[1], and T. Nishida[1], [1]*Garaduate School of Materials Science, Nara Institute of Science and Technology (NAIST), Ikoma, Nara, Japan,* [2]*Research Development Division, Sakai Chemical Industry Co., Ltd, Sakai, Osaka, Japan.*	6H-6 **DNA Microarray Fabrication Using Directional Self-Focusing Acoustic Transducer Array.** S. Kamal-Bahl* and E. Sok Kim, *University of Southern California, University of Southern California, Los Angeles, CA 90089, USA.*

Session P3A **BEAMFORMING** Chair: J. Hossack, University of Virginia	P3A-8 **Nonlinear Pulsed Pressure Field from Focused Rectangular Apertures: Experimental and Numerical Results.** T. Kujawska*, J. Wojcik, and A. Nowicki, *Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland.*	*Session P3C* **BONE** Chair: W. O'Brien, University of Illinois	P3D-2 **An Eikonal Equation Based Scheme for Refraction Compensation in Time-of-Flight Tomography.** M. Ashfaq* and H. Ermert, *Institute of High Frequency Engineering, Ruhr-University Bochum, Bochum, Germany.*	P3E-2 **High Frequency Imaging using Coded Golay Transmission.** A. Nowicki*, M. Lewandowski, W. Secomski, and J. Litniewski, *Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland.*	P3F-3 **Digital Processing for an Air-Coupled Ultrasound NDT System using Concave Arrays.** Y. Yañez*, M. J. García-Hernández, A. Turó, J. Salazar, J. García-Alvárez, C. Ballabriga, and J. A. Chávez, *Politechnical University of Catalonia, Barcelona, Barcelona, Spain.*
P3A-1 **Fast 3D Simulation of 2nd Harmonic Ultrasound Field from Arbitrary Transducer Geometries.** S. Dursun*, T. Varslot, T. Johansen, B. Angelsen, and H. Torp, *Norwegian University of Science and Technology, Trondheim, Norway.*	*Session P3B* **CONTRAST AGENTS II** Chair: W. Wilkening, Ruhr University Bochum	P3C-1 **A 60 Days Bedrest Study: Preliminary QUS BUA and SOS Changes at the Calcaneus Site.** M. Defontaine*[1], M. Nasser-Eddin[1], J. Rittweger[2], and M. Lazerges[3], [1]*GIP Ultrasons - LUSSI, Tours, France*, [2]*Benjamin Franklin Kliniküm, Berlin, Germany*, [3]*ESTEC - ESA, Noordwijk, Netherlands.*	P3D-3 **Computer Modelling of Iterative Technique Application for Tissue Thermal Imaging.** K. Bograchev* and W. M. D. Wright, *Ultrasonics Research Group,Department of Electrical and Electronic Engineering, University College Cork, Cork, Ireland.*	P3E-3 **Investigation of Nonlinear Propagation in a Tissue of a Chirp-Modulated Ultrasound Pulse Signal.** Z. Benenson*, N. Kulberg, A. Elizarov, and T. Yakovleva, *Computer Center of Russian Academy of Sciences, Moscow. Russia.*	P3F-4 **Magnetostrictive Grating Transducers: Effects of Grating Size and Shape.** I. K. Kim* and Y. Y. Kim, *Seoul National University, Seoul, Korea.*
P3A-2 **Velocity Sensitivity Mapping in Tissue Doppler Imaging.** S. Aase*, T. Bjåstad, and H. Torp, *Department of Circulation and Medical Imaging, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway.*	P3B-1 **High Frequency Characterisation of Commercial Contrast Agents.** C. Moran*, M. Butler, V. Sboros, T. Anderson, D. Anderson, and W. McDicken, *Medical Physics, University of Edinburgh, Edinburgh, United Kingdom.*	P3C-2 **Nonlinear Resonant Ultrasound Spectroscopy (NRUS) for Bone Micro-Damage Assessment.** M. Muller*[1], J. Tencate[2], T. Darling[2], A. Sutin[3], R. Guyer[4], M. Talmant[1], P. Laugier[1], and P. Johnson[2], [1]*Université Paris, Paris, France*, [2]*Los Alamos National Laboratory, Los Alamos, NM*, [3]*Stevens Institute of technology, Hoboken, NJ*, [4]*University of Massachussets, Amherst, MA.*	P3D-4 **Ultra-Fast Ultrasound 3D Imaging Simulator.** T. Hergum*[1], S. Rabben[2], and H. Torp[1], [1]*Norwegian University of Science and Technology, Trondheim, Norway*, [2]*GE Vingmed Ultrasound, Horten, Norway.*	P3E-4 **Rapid Tracking of Submicron Displacements with Ultrasound.** G. Pinton*, J. Dahl, and G. Trahey, *Duke University, Durham, NC.*	P3F-5 **Innovations in Monitoring Fluid and Particulate Flow With Special Emphasis on Drilling Operations Using Multi Sensor Data Fusion with an Array of AE sensors and Temperature Sensors.** K. J. Alme[2] and S. Mylvaganam*[1,2], [1]*Telemark University College, Porsgrunn, Norway*, [2]*Tel-Tek, Porsgrunn, Norway.*
P3A-3 **Comparing Interpolation Schemes in Dynamic Receive Ultrasound Beamforming.** J. Kortbek*[1,2], H. Andresen[1], K. Gammelmark[2], and J. Jensen[1], [1]*Technical University of Denmark, Lyngby, Denmark*, [2]*B-K Medical, Herlev, Denmark.*	P3B-2 **Coating Monodisperse Microbubbles Formed by a Flow Focusing Device.** E. Talu*, M. Lozano, P. Dayton, K. Ferrara, and M. Longo, *University of California, Davis, CA.*	P3C-3 **Numerical Simulation of Uultrasound Transmission and Backscattering in Cancellous Bone.** F. Padilla*[1], E. Bossy[2], G. Haiat[1], F. Jenson[1], and P. Laugier[1], [1]*Laboratoire d'Imagerie Paramétrique, CNRS UMR 7623 – Université Paris 6, Paris, France*, [2]*Laboratoire d'Optique Physique, CNRS UPR A0005 – ESPCI, Paris, France.*	P3D-5 **First Images with a 3D-Prototype for Ultrasound Computer Tomography.** N. Ruiter*, M. Zapf, R. Stotzka, T. Müller, K. Schlote-Holubek, G. Göbel, and H. Gemmeke, *Forschungszentrum Karlsruhe, 76133 Karlsruhe, Germany.*	P3E-5 **The Effect of Initialization and Registration on the Active Shape Segmentation of the Myocardium in Contrast Enhanced Ultrasound.** J. Pickard*, S. Acton, and J. Hossack, *University of Virginia, Charlottesville, VA.*	P3F-6 **A New Transducer for Torsional Guided Wave Generation and Defect Detection.** Z.-H. Liu*, B. Wu, C.-F. He, X.-Y. Wang, and S.-M. Yang, *Beijing University of Technology, Beijing, People's Republic of China.*

P3A-4 **Fourier Bbased Imaging Method with Steered Plane Waves and Limited-Diffraction Array Beams.** J. Cheng and J.-Y. Lu*, *The University of Toledo,, Toledo, OH.*

P3B-3 **Investigating the Potential for Thermal Damage Posed by Microbubble Ultrasound Contrast Agents: Experimental Results.** E. Stride*[1], V. Wilkens[2], and N. Saffari[1], [1]*University College London, London, UK*, [2]*Physikalisch-Technische Bundesanstalt, Braunschweig, Germany.*

P3C-4 **Precision of the Estimation of Scatterers Size in Cancellous Bone using Spectral Backscatter Measurements.** F. Padilla*, F. Jenson, and P. Laugier, *Laboratoire d'Imagerie Paramétrique, CNRS UMR 7623 – Université Paris 6, Paris, France.*

P3D-6 **Multi-Volume Rendering for Three-Dimensional Power Doppler Imaging.** R. Managuli*[1,2], Y. M. Yoo[1], and Y. Kim[1], [1]*Image Computing Systems Laboratory, Department of Bioengineering, University of Washington, Seattle, WA*, [2]*Hitachi Medical Systems of America, Twinsburg, OH.*

P3E-6 **Gaseous and Solid Emboli Differentiation using Radiation Force.** G. Souchon*[1], M. Biard[1], J. M. Girault[1], D. Kouame[1], and F. Tranquart[2], [1]*LUSSI, Tours, France*, [2]*INSERM U619, Tours, France.*

P3F-7 **Designing and Evaluating Transducers for Narrowband Ultrasonic Spectroscopy.** M. Jonsson and T. Stepinski*, *Uppsala University, Signals and Systems, Uppsla, Sweden.*

P3A-5 **Adaptive Signal Processing in Medical Ultrasound Beamforming.** F. Viola* and W. F. Walker, *University of Virginia, Charlottesville, VA.*

P3B-4 **Harmonic Imaging of Targeted Contrast Agents with Intravascular Ultrasound.** D. E. Goertz*[1,2], A. van Wamel[1,2], M. E. Frijlink[1], N. de Jong[1,3], and A. F. W. van der Steen[1,2], [1]*Erasmus MC, Rotterdam*, [2]*Interuniversity Cardiac Inst. Netherlands, Utrecht*, [3]*Physics of Fluids, Univ. Twente, Enschede.*

P3C-5 **Comparison of Various In Vitro Ultrasonic Velocity Measurements in Bone: Effect of Frequency-Dependent Attenuation and of Velocity Dispersion.** G. Haïat*[1], F. Padilla[1], R. Barkmann[2], C.-C. Glüer[2], R. O. Cleveland[3,1], and P. Laugier[1], [1]*Laboratoire d'Imagerie Paramétrique, France*, [2]*Universitäts-klinikum Schleswig-Holstein, Germany*, [3]*Boston University, Boston , MA.*

P3D-7 **Tracking of Regional Left Ventricular Rotation by Tissue Doppler Imaging.** J. Crosby*[1], T. Helle-Valle[2], B. H. Amundsen[1], and H. Torp[1], [1]*Norwegian University of Science and Technology, Trondheim, Norway*, [2]*Rikshospitalet University Hospital, Oslo, Norway.*

P3E-6 **Gaseous and Solid Emboli Differentiation using Radiation Force.** G. Souchon*[1], M. Biard[1], J. M. Girault[1], D. Kouame[1], and F. Tranquart[2], [1]*LUSSI, Tours, France*, [2]*INSERM U619, Tours, France.*

Session P3F
NDE TRANSDUCERS
Chair: R. Addison, Rockwell Scientific Company

P3F-8 **Measuring the Inner Body Temperature using a Wireless Temperature SAW-Sensor-Based System.** G. Martin[1], P. Berthelot[1], A. Lambert[2], W. Daniau[1], V. Blondeau-Patissier[1], and S. Ballandras*[1], [1]*FEMTO-ST, CNRS, Besançon, France*, [2]*INSERM, Strasbourg, France.*

P3A-6 **Computation of Steered Nonlinear Fields using Offset KZK Axes.** P. D. Fox*[1], A. Bouakaz[2], and F. Tranquart[1], [1]*INSERM U619 & CIT, CHU Bretonneau, Tours, Centre, France.*, [2]*INSERM U619, CHU Bretonneau, Tours, Centre, France.*

P3B-5 **Modeling Microbubble Response to Coded, Multi-Pulse, Non-Linear Pulse Sequences.** K. Chetty* and R. J. Eckersley, *Imperial College, London, U.K.*

Session P3D
MODELING AND VISUALIZATION
Chair: J. Jensen, Danisa Tecnical University

Session P3E
SIGNAL PROCESSING
Chair: W. Walker, University of Virginia

P3F-1 **Nonlinear Ultrasonic Phased Array for Imaging Closed Cracks by Super- and Subharmonics.** Y. Ohara*, R. Sasaki, T. Ogata, T. Mihara, and Kazushi Yamanaka, *Department of Materials Processing, Graduate School of Engineering, Tohoku University, Sendai-City, Miyagi, Japan.*

P3F-9 **Undersurface Photoacoustic Imaging of Plane Solid Specimens by the use of a Line Laser Beam.** T. Hoshimiya*[1] and M. Suzuki[2], [1]*Tohoku Gakuin University, Tagajyo,, Japan*, [2]*New Inductrial Creation Hachery Center, Tohoku University, Sendai,, Japan.*

P3A-7 **Optimization of Frequency Dependent Receive Apodization.** R. Schwann*, N. Stache, and T. G. Noll, *Chair of Electrical Engineering and Computer Systems, Aachen, Germany.*

P3B-6 **Low Microbubble Concentrations Signal Enhancement Varying Echograph Electrical Power.** R. Palmizio Errico[1,3], S. Casciaro*[2,1], C. Demitri[1,3], F. Conversano[1,4], G. Palma[1,4], E. Cascіaro[2,1], and A. Distante[1,2], [1]*Euro Mediterranean Scientific Biomedical Institute, Brindisi, Italy*, [2]*National Council of Research - Institute of Clinical Physiology, Lecce, Italy*, [3]*Lecce University, Lecce, Italy*, [4]*Pisa University, Pisa, Italy.*

P3D-1 **Sound Fields for Coded Excitations in Water and Tissue.** J. Litniewski*, A. Nowicki, Z. Klimonda, M. Lewandowski, and I. Trots, *Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland.*

P3E-1 **Coronary Plaque Classification through Intravascular Ultrasound Radiofrequency Data Analysis using Self-organizing map.** T. Iwamoto*[1], A. Tanaka[2], Y. Saijo[1], and M. Yoshizawa[1], [1]*Tohoku University, Sendai, Miyagi, JAPAN*, [2]*Fukushima University, Fukushima, Fukushima, JAPAN.*

P3F-2 **Multiple Flaws Location by Means of NDE Ultrasonic Arrays Placed at Perpendicular Planes.** M. A. Rodriguez[1], A. Ramos[2], and J. L. San Emeterio*[2], [1]*Universidad Politecnica Valencia, Valencia, Spain*, [2]*Instituto Acustica CSIC, Madrid, Spain.*

Session P3G GENERAL PHYSICAL ACOUSTICS

Chair: V. Proklov, IREE Russian Academy of Sciences

P3G-1 **Theory of One-Dimensional Acoustic Wave Phase Conjugation.** A. Merlen[2,3] and Q. Zhang*[1,2], [1]*Université des sciences et techniques de Lille, Villeneuve d'Ascq, France*, [2]*Laboratoire de mécanique de Lille UMR CNRS 8107, Villeneuve d'Ascq, France*, [3]*Joint European Magneto-Acoustics Laboratory, Villeneuve d'Ascq, France.*

P3G-2 **Flow Velocity Measurements by Means of Nonlinear Interaction of Phase Conjugate Ultrasonic Waves.** Y. Pylnov[1,2], V. Preobrazhensky[2,3], P. Pernod*[2], and N. Smagin[1,2], [1]*Moscow Institute of Radioengineering, Electronics and Automation/LEMAC, Moscow, Russia*, [2]*Institut d Electronique, de Microelectronique et de Nanotechnologie (IEMN-DOAE UMR CNRS 8520/LEMAC), Lille, France*, [3]*Wave Research Center of General Physics Institute RAS/LEMAC, Moscow, Russia.*

P3G-3 **Time Reversal Interactivity: Experiment and Modelization.** G. Ribay*[1], R. K. Ing[2], N. Quieffin[2], D. Clorennec[1], S. Catheline[1], and M. Fink[1], [1]*Laboratoire Ondes et Acoustique, ESPCI, Université Paris VII,, Paris, France*, [2]*Sensitive Object, Research & Development Department, Paris, France.*

Session P3H BAW MATERIALS AND PROPAGATION I

Chair: J. Brown, JB Consulting

P3H-1 **Propagation of Acoustic Waves Through Periodic Structures Containing Phase Discontinuity.** Y. Gulyaev[1], V. Pustovoit[2], G. Mansfeld*[1], and V. Dmitriev[3], [1]*Institute of Radioengineering and Electronics RAS, Moscow, Russia*, [2]*Scientific and Technological Center for Unique Instrumentation RAS, Moscow, Russia*, [3]*Institute of System Engineering, St.Peterburg.*

P3H-2 **Influence of Acoustic Wave on Forming and Characteristics of Silicon p-n Junction.** J. Olikh*[1], A. Evtukh[1], B. Romanyuk[1], and O. Olikh[2], [1]*Institute of Semiconductor Physics, National Academy of Science of Ukraine, Kiev, Ukraine*, [2]*Kyiv Taras Shevchenko National University, Kyiv, Ukraine.*

P3H-3 **Thin-Film Composite Resonators on Crystalline Substrates.** A. Ballato*, *US Army CERDEC, Fort Monmouth, NJ.*

Session P3I SAW FILTERS AND DEVICES

Chair: V. Plessky, Helsinki University of Technology

P3I-1 **Investigation of High-Attenuation Characteristics at Lower-Side Frequency Bands for RF-Filter-Integrated Modules.** M. Hikita*[1], N. Shibagaki[2], and K. Sakiyama[3], [1]*Kogakuin University, Shinjuku, Tokyo, Japan*, [2]*CRL Hitachi Ltd., Kokubunji, Tokyo, Japan*, [3]*Hitachi Media Electronics Ltd., Totsuka, Yokohama, Japan.*

P3I-2 **Use of Second Order Information in the Auto Regressive Moving Average Technique for the Design of Linear Phase SAW Filters.** B. Panwar*, P. Ujalayan, and S. Joshi, *Indian Institute of Technology Delhi, Hauz-Khas, New-Delhi, India.*

P3I-3 **Design of SAW Filters with Nonequal Input and Output Impedances.** V. S. Orlov*, V. B. Chvets, A. O. Kustova, A. L. Schwartz, and V. T. Sviridov, *Moscow Radiocommunication Research Institute, Moscow, Russia.*

P3I-8 **An Improvement of SAW Resonator Cascade Connection by Capacitive Coupled Resonator.** H. Nakamura*, S. Seki, K. Nishimura, and T. Ishizaki, *Panasonic Electronic Devices Co., Ltd., Kadoma City, Osaka, Japan.*

P3I-9 **Dispersive Delay Lines Based on the Use of Narrow Open Metal Rreflectors and Fan Transducers.** S. M. Balashov*[1], V. P. Plessky[2], C.-U. Kim[3], C.-W. Nam[4], and V. I. Grigorievsky[5], [1]*SAWDES Ltd, Campinas, San-Paulo, Brazil*, [2]*GVR Trade SA, Bevaix, Switzerland*, [3]*C&C Tech Plus, Seoul, South Korea*, [4]*University of Ulsan, Ulsan, South Korea*, [5]*IRE RAS, Fryazino, Moscow region, Russia.*

P3I-10 **5–10 GHZ SAW Resonators and Low Loss Wide Band Resonator Filters using Zero TCF High Electromechanical Coupling SAW Substrates.** K. Yamanouchi*, Y. Satoh, H.i Isono, and D. Kawasaki, *Tohoku Institute of Technology, Sendai, Japan.*

P3I-11 **High Frequency SAW Devices Based on Third Harmonic Generation.** L. Le Brizoual*[1], Th. Pastureaud[2], F. Sarry[1], O. Elmazria[1], S. Ballandras[3], V. Laude[3], and P. Alnot[1], [1]*Laboratoire de Physique des Milieux Ionisés et Applications, Vandoeuvre Lès Nancy, France*, [2]*TEMEX, Sophia Antipolis , France*, [3]*Institut FEMTO-ST, Besançon, France.*

Session P3J SAW SYSTEM APPLICATIONS

Chair: J. Kosinski, US Army REDCOM

P3J-1 **Development of a Monolithic CMOS-SAW Oscillator.** M. Furuhata*[1], A. Yajima[1], K. Goto[1], H. Sato[1], T. Funasaka[1], S. Kawano[1], T. Higuchi[1], M. Ueno[1], T. Karaki[2], and M. Adachi[2], [1]*Seiko Epson Corporation, Suwa, Nagano, Japan*, [2]*Toyama Prefecture University, Tonami, Toyama, Japan.*

P3J-2 **Switchable SAW Filter Bank with 78% Bandwidth.** S. He*, J. Liu, S. Li, and Y. Liang, *Institute of Acoustics, Chinese Academy of Sciences, Beijing 100080, China.*

P3J-3 **Pulling of SAW Resonators for Wireless Sensor Application.** E. Guliyev and S. Klett*, *Technische Universität Ilmenau, Ilmenau, Germany.*

P3K-3 **Destructive and Nondestructive Investigation of Bondlines for High-Power Multilayer Ultrasonic Transducers for Underwater Sonar.** Z. Wu, S. Cochran*, G.. McRobbie, and K. Kirk, *University of Paisley, Paisley, Scotland, UK.*

Session P3L HIGH FREQUENCY TRANSDUCERS

Chair: M. Schafer, Sonic Tech

P3L-1 **High Frequency Ultrasonic Transducer Based on Integrated Piezoelectric Structure.** P. Marechal*[1], F. Levassort[1], L.-P. Tran-Huu-Hue[1], J. Holc[2], M. Kosec[2], and M. Lethiecq[1], [1]*Francois Rabelais University, LUSSI, Tours, France*, [2]*Jozef Stefan Institute, Ljubljana, Slovenia.*

P3L-2 **PMN-PT High Frequency Ultrasonic Needle Transducers for Pulsed Wave Doppler Measurements in the Eye.** E. Gottlieb*, B. Lai, X. Xu, Q. Zhou, J. Cannata, and K. Shung, *University of Southern California, Los Angeles, CA.*

P3G-4 **On the Forces Acting in Micromanipulation of Particles at Low Frequencies.** F. Perales* and I. Gonzalez, *Acustic Institute, CSIC, Madrid, Spain.*

P3H-4 **Experimental Proof of Temperature Compensated Cut in GaPO4 Beam Resonator Vibrating in Length Extension.** F. Sthal*, E. Bigler, M. Becker, J. Dopeux, L. Delmas, and R. Bourquin, *FEMTO-ST dept LCEP, ENSMM, 26 Chemin de l'Epitaphe 25030 BESANCON Cedex, Besançon, France.*

P3I-4 **Design of Low-Loss SAW Filters with Constant Group Delay using Resonant SPUDTs.** H. Li*[1], J. Wen[2], T. Omori[2], K. Hashimoto[2], and M. Yamaguchi[2], [1]*Venture Business Laboratory, Chiba University, Chiba-shi, 263-8522, Japan*, [2]*Dept. Electronics and Mechanical Eng., Chiba University, Chiba-shi, 263-8522, Japan.*

P3I-12 **Investigation of RF Ladder-type SAW Filters Incorporating Packaging Effects.** S. Wang, I. Chen*, C. Tai, and C. Choi, *Department of Electrical Engineering, I-Shou University, Dashu Township,kaohsiung County, Taiwan R.O.C.*

P3J-4 **Super-wideband high bit-rate SAW correlator.** Y. Abramov*, *Soliton, Holon, Israel.*

P3L-3 **Ink-jet Micro-Printing of Patterned P(VDF-TrFE) Microdevices.** S. H. Zhang, Z. Q. Liang, Q. Wang, and Q. M. Zhang*, *The Pennsylvania State University, University Park, PA.*

P3G-5 **Direct Optical Measurement of the Q Values of RF-MEMS Resonators.** O. Holmgren*[1], K. Kokkonen[1], V. Kaajakari[2], A. Oja[2], and J. V. Knuuttila[1], [1]*Materials Physics Laboratory, Helsinki University of Technology, Espoo, Finland*, [2]*VTT Information Technology, Espoo, Finland.*

P3H-5 **The Mass-Loading Influence on Electrical Characteristics of GaPO4 and LGS Resonators.** I. Mateescu*[1], C. Bran[1], F. Krispel[2], K. Scott[3], and G. Johnson[3], [1]*National Institute of Materials Physics, Bucharest, Romania*, [2]*Piezocryst Advanced Sensorics GmbH, Graz, Austria*, [3]*Sawyer Technical Materials, Conroe, TX.*

P3I-5 **Use of Non-Synchronous Resonators on Leaky Substrates as Impedance Elements for Ladder and Notch Filters.** J. Meltaus*[1], V. P. Plessky[2,1], and S. S. Hong[3], [1]*Materials Physics Laboratory, Helsinki University of Technology, Espoo, Finland*, [2]*GVR Trade SA, Bevaix, Switzerland*, [3]*Samsung Electro-Mechanics Co., Ltd, Suwon, Korea.*

P3I-13 **A Novel Weighted Method for Wide-Band SAW Filters Using Slanted Finger Interdigital Transducers on Layered Piezoelectric Substrates.** Y.-Y. Chen*, C.-M. Lin, and T.-T. Wu, *Institute of Applied Mechanics, National Taiwan University, Taipei, Taiwan.*

Session P3K
TRANSDUCER FABRICATION TECHNOLOGY
Chair: M. Schafer, Sonic Tech

P3L-4 **Hydrothermal PZT Thick Film Ultrasonic Transducer for 2 to 40 MHz Frequency Band.** M. Ishikawa*[1], M. Kurosawa[1], A. Endoh[2], T. Hasegawa[2], and S. Takeuchi[2], [1]*Tokyo Institute of Technology, Nagatutamati, Midori-ku, Yokohama, Kanagawa, JAPAN*, [2]*Toin University of Yokohama, Kurogane-cho, Aoba-ku, Yokohama, Kanagawa, JAPAN.*

P3G-6 **Estimation of the 3rd-Order Elastic Constants of Polymeric Materials using a Brillouin Scattering Technique.** K. Kadowaki* and M. Matsukawa, *Doshisha University, Kyotanabe, Kyoto, Japan.*

P3H-6 **Rebuilding of Defect Structure in Gamma-Irradiated n-Type Si Crystals, Stimulated by Ultrasonic.** J. Olikh*[1], M. Tymochko[1], V. Khivrich[2], and M. Pinkovska[2], [1]*Institute of Semiconductor Physics, National Academy of Science of Ukraine, Kyiv, Ukraine*, [2]*Institute for Nuclear Research, National Academy of Science of Ukraine, Kyiv, Ukraine.*

P3I-6 **Operation Mechanism of DMS Filters with Pitch-Modulated IDTs and Reflectors.** K. Hashimoto*, T. Omori, and M. Yamaguchi, *Chiba University, Chiba, Japan.*

P3I-14 **Design of SAW Bandpass Filters Using Weighted Least Mean Squares (WLMS) Technique.** Alexander S. Rukhlenko*, *Institute of Microtechnology, Neuchatel, Switzerland.*

P3K-1 **Field Induced Piezoelectric Transducer for Generation of Controlled Diffraction Ultrasonic Field.** M. H. Lente*[1], A. L. Zanin[1], D. Garcia[1], L. Leija[2], A. Vera[2], H. Calas[3], and E. Moreno[3], [1]*Universidade Federal de São Carlos - Departamento de Física - Grupo de Cerâmicas Ferroelétricas, São Carlos, São Paulo, Brazil*, [2]*Seccion de Bioelectronica, CINVESTAV, Mexico*, [3]*Instituto de Cibernética Matemática y Física - Grupo de Ultrasónica, La Habana, Cuba.*

Session P3M
MEDICAL TRANSDUCERS II
Chair: C. Oakley, W. Gore, Inc.

P3G-7 **The Interaction of Ultrasound with Mud in Between Hard Solid and Ideal Liquid.** N. F. Declercq*, J. Degrieck, and O. Leroy, *Soete Laboratory, Department of Mechanical Construction and Production, Ghent University, Sint Pieternsnieuwstraat, Gent, Belgium.*

P3H-7 **Analytical and Experimental Study on Second Harmonic Response of FBAR for Oscillator Application.** W. Pang*, H. Zhang, and E. S. Kim, *University of Southern California, Los Angeles, CA.*

P3I-7 **SAW Band Reject Filter Performance at 850 MHz.** C.-Y. Jian* and S. Beaudin, *Nortel, Wireless Technology Laboratory.*

P3I-15 **Single-To-Balanced BAW Filter Combining CRF with Lattice Filter.** T.-Y. Wu, T.-K. Shing*, and H.-K. Chen, *Delta Electronics, Inc., Toyuan, Taiwan.*

P3K-2 **Needle Type Miniature Hydrophone with PZT Poly-Crystalline Film Deposited by Hydrothermal Method Having Wide Directivity.** H. Kitsunai[1], N. Kawashima[1], S. Takauchi*[1], E. Ohdaira[3], M. Ishikawa[2], and M. Kurosawa[2], [1]*Toin University of Yokohama, Yokohama, Kanagawa, Japan*, [2]*Tokyo Institute of Technology, Yokohama, Kanagawa, Japan*, [3]*Musashi Institute of Technology, Setagaya, Tokyo, Japan.*

P3M-1 **Thin-Profile HIFU Applicators for Intraoperative Hemostasis.** V. Zderic*[1], S. Burgess[1,2], and S. Vaezy[1,2], [1]*Center for Industrial and Medical Ultrasound, Applied Physics Laboratory, University of Washington, Seattle, WA*, [2]*Department of Bioengineering, University of Washington, Seattle, WA.*

P3M-2 **Multilayer PZT Ultrasound Arrays Showing Improved Thermal Performance.** M. Zipparo*, *Tetrad Corporation, Englewood, CO.*	P3M-6 **Biplane Ultrasound Arrays with Integrated Multiplexing Solution for Enhanced Diagnostic Accuracy in Endorectal and Transvaginal Imaging.** N. Felix*, R. Dufait, D. Voisin, S. Maitre, and P. Auclair, *VERMON, Tours - France.*				
P3M-3 **Comparison of Three Different Transducer Concepts for Acoustic Bladder Volume Assessment.** E. J. W. Merks*[1], G. Matte[1], N. Bom[1], A. F. W. van der Steen[1,2], and N. de Jong[1,2], [1]*Erasmus MC, Rotterdam, The Netherlands*, [2]*ICIN, Utrecht, The Netherlands.*	P3M-7 **Spatial Focalization using Temporal Inversion in Chaotic Cavities: Influence of Surface Roughness.** N. Pérez[1], C. A. Negreira[1], G. Montaldo*[2], and M. Fink[2], [1]*Facultad de Ciencias, Montevideo, Uruguay,* [2]*Ecole Superieure de Physique et de Chimie, Paris, Francia.*				
P3M-4 **High Element Count (3600), Fully Sampled, Two Dimensional Transducer Array.** M. Eames*, S. Zhou, and J. Hossack, *University of Virginia, Charlottesville, VA.*					
P3M-5 **A Knowledge Based Approach for Design Optimization of Ultrasonic Transducers and Arrays.** S. N. Ramadas* and G. Hayward, *The Centre for Ultrasonic Engineering, University of Strathclyde, Glasgow, Scotland, UK.*					

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	Room 1	**Room 2**	**Room 3**	**Room 4**	**Room 5**	**Room 6**
11:30 a.m.	1I-1 **(Invited) Bubble Acoustics: From Seas to Surgeries.** T. Leighton*, *Institute of Sound and Vibration Research, University of Southampton, Southampton, Hants, UK.*	2I-1 **Ultrasound Induced Antivascular Therapy of Mouse Tumors.** C. M. Sehgal*, S. Ansaloni, L. S. Zimer, W. M. F. Lee, M. D . Feldman, and A. K. W. Wood, *University of Pennsylvania, Philadelphia, PA.*	3I-1 **Characterization on the Material Properties of Hydrogen-Charged Zircaloy Based on a Laser Ultrasound Technique.** C.-H. Yang* and Y.-A. Lai, *Chang Gung University, Taoyuan, Taiwan.*	4I-1 **Observation and Interpretation of SAW-Induced Regular and Chaotic Dynamics of Droplet Shape.** B. A. Korshak, V. G. Mozhaev, and A. V. Zyryanova*, *M.V. Lomonosov Moscow State University, Faculty of Physics, Moscow, Russian Federation.*	5I-1 **Low-Loss SAW Filter on $Li_2B_4O_7$ using Novel-Shape Apodized Structure for 1 GHz RF-ID System.** S. Inoue*[1], T. Matsuda[1], S. Matsuda[1], M. Ueda[1], Y. Satoh[1], K. Wada[2], S. Mitobe[2], and Y. Ebata[2], [1]*Fujitsu Laboratories Ltd., Akashi, Hyogo, Japan,* [2]*Fujitsu Media Devices Ltd., Yokohama, Kanagawa, Japan.*	6I-1 **Advanced Piezoelectric Single Crystal Based Transducers for Naval Sonar Applications.** K. Snook*[1], P. Rehrig[1], X. Jiang[1], W. Hackenberger[1], R. Meyer[2], and D. Markley[2], [1]*TRS Technologies, Inc., State College, PA*, [2]*Applied Research Laboratory, State College, PA.*
11:45 a.m.		2I-2 **The Feasibility of Focused Ultrasound to Temporarily Inhibit Nerve Conduction.** V. Colucci, F. Jolesz, and K. Hynynen*, *Brigham and Women's Hospital, Boston, MA.*	3I-2 **An Automated Instrument for the Measurement of Mechanical Properties of Thin Materials.** E. Lafond*, T. Jackson, and X. Zhang, *Georgia Institute of Technology, Atlanta, GA.*	4I-2 **Development of SAW Thermocycler for Small Liquid Droplets.** J. Kondoh*[1], N. Shimizu[1], Y. Matsui[1], M. Sugimoto[1], and S. Shiokawa[2], [1]*Shizuoka University, Hamamatsu-shi, Shizuoka , Japan,* [2]*SAW&SPR-Tech, Hamamatsu-shi, Shizuoka, Japan.*	5I-2 **Balance Characteristics Studies using Wigner Distribution Analysis for SAW Devices.** T. Shiba*, T. Ishizakil, and S. Oosawa, *Hitachi Media Electronics Co., Ltd., Yokohama, Kanagawa, Japan.*	6I-2 **Relations between Single Domain and Multidomain Piezoelastic Properties in Piezoelectric Single Crystals.** T. Delaunay*, E. Le Clezio, and G. Feuillard, *LUSSI GIP Ultrasons Université F. Rabelais, EIVL Blois, France.*

12:00 p.m.	1I-2 **A Model for Large Amplitude Oscillations of Coated Bubbles Accounting for Buckling and Rupture.** P. Marmottant[1], S. van der Meer*[1], M. Emmer[2], M. Versluis[1], N. de Jong[2,1], S. Hilgenfeldt[1], and D. Lohse[1], [1]*Physics of Fluids, Enschede, The Netherlands,* [2]*Erasmus MC, Rotterdam, The Netherlands.*	2I-3 **Feasibility of Transcranial, Localized Drug-Delivery in the Brain of Alzheimer's-Model Mice using Focused Ultrasound.** J. Choi, M. Pernot, S. Small, and E. Konofagou*, *Columbia University, New York, NY.*	3I-3 **Laser Ultrasonics at Twenty Meters Per Second in the Production Environment and on a Budget: From Dream to Reality.** T. Jackson[1], E. Lafond*[1], P. Ridgway[2], G. Baum[1], X. Zhang[1], and R. Russo[2], [1]*Georgia Institute of Technology, Atlanta, GA,* [2]*Lawrence Berkeley National Laboratory, Berkeley, CA.*	4I-3 **Microfuidic Device based on Surface Acoustic Wave.** D. Beyssen*, L. Le Brizoual, O. Elmazria, and P. Alnot, *Laboratoire de Physique des Milieux Ionisés et Applications, F-54506 Vandoeuvre les Nancy, France.*	5I-3 **Improved Pure SHSAW Tranduction Efficiency on LGS using Finite Thickness Gratings.** T. Pollard* and M. Pereira da Cunha, *University of Maine, Orono, ME.*	6I-3 **Performance of Periodic Piezoelectric Composite Arrays Incorporating a Passive Phase Exhibiting Anisotropic Properties.** A. C. S. Parr*, A. Troge, R. L. O'Leary, R. A. Pethrick, and G. Hayward, *University of Strathclyde, Glasgow, Scotland, UK.*
12:15 p.m.	1I-3 **Creating Antibubbles with Ultrasound.** M. Postema*[1], N. de Jong[2,3], G. Schmitz[1], and A. van Wamel[3], [1]*Ruhr-Universität Bochum, Bochum, Germany*, [2]*University of Twente, Enschede, The Netherlands,* [3]*Erasmus MC, Rotterdam, The Netherlands.*	2I-4 **Fibrin-Targeted Thrombolytic Therapy Using Acoustically Reflective Perfluorocarbon Nanoparticles.** J. Marsh*, A. Pan, G. Hu, K. Crowder, M. Scott, M. Hughes, S. Wickline, and G. Lanza, *Washington University School of Medicine, St. Louis, Missouri.*	3I-4 **Guided Waves Attenuation Due to Deposits on the Pipe Wall.** M. El Moussaoui[1], F. Chati[1], F. Leon[1], A. Klauson[2], and G. Maze*[1], [1]*Laboratoire d'Acoustique Ultrasonore et d'Electronique LAUE UMR CNRS 6068, Université du Havre, Le Havre, France,* [2]*Dept. of Mechanics, Tallinn Tech. Univ., Tallinn, Estonia.*	4I-4 **Surface Liquid Droplet Motion on Silicon Ultrasonic Horn Actuators.** X. Chen* and A. Lal, *Cornell University, Ithaca, NY.*	5I-4 **Enhanced SPUDT Cells for High Coupling Substrates.** J. Galipeau* and J. Kim, *Sawtek Inc. A Triquint Company, Apopka, FL.*	6I-4 **Bismuth-Layer Structured Ferroelectric $(Sr,Ca)_2Bi_4Ti_5O_{18}$ Ceramics for Lead-Free Piezoelectric Resonator Applications.** T. Takenaka*, Y. Hiruma, S. Horiuchi, and H. Nagata, *Tokyo University of Science, Noda, Chibaken, Japan.*
12:30 p.m.	1I-4 **Optical Investigation of Ultrasound Induced Encapsulated Microbubble Oscillations: Threshold and Hysteresis Effects.** M. Emmer*[1,2], J. Borsboom[1], A. van Wamel[1], M. Versluis[2], and N. de Jong[1,2], [1]*Dept. of Experimental Echocardiography, Thoraxcentre, Erasmus MC, Rotterdam, the Netherlands,* [2]*Physics of fluids, University of Twente, Enschede, the Netherlands.*	2I-5 **1 kHz Low Power Sound Stimulates ATDC5 Chondrocytes.** H. Argadine*, R. Kinnick, M. Bolander, and J. Greenleaf, *Mayo Clinic College of Medicine, Rochester, MN.*	3I-5 **Experimental Evidence of S1 Mode Quasi-Resonance in Thin Plate using a Laser Based Acoustic Microscope.** C. Prada*[2,1], O. Balogun[1], and T. W. Murray[1], [1]*AME Department, Boston University, Boston, MA,* [2]*Laboratoire Ondes et Acoustique, CNRS, Paris, France.*	4I-5 **Effects of Fluid Medium on Stator and Rotor of Ultrasonic Motor Driving Fluid Directly.** C. Xia*, B. Li, M. Wang, and W. Yu, *School of Electrical Engineering and Automation,Tianjin University, Tianjin, People's Republic of China.*	5I-5 **Suppression of Transverse Mode Responses for Ultra-Wideband and Low-Loss SAW Filters on a Cu-grating/15°YX-LiNbO$_3$ Structure.** T. Omori*[1], N. Yokoyama[2], K. Matsuda[2], K. Hashimoto[1], and Y. Yamaguchi[1], [1]*Faculty of Engineering, Chiba University, Chiba 263-8522, Japan,* [2]*Graduate School of Science and Technology, Chiba University, Chiba 263-8522, Japan.*	6I-5 **Piezoelectric Property of Epitaxial Lead Titanate ($PbTiO_3$) Thin Film Deposited by Hydrothermal Method.** T. Morita* and Y. Cho, *RIEC. Tohoku University, 2-1-1 Katahira, Aobaku, Sendai, JAPAN.*
12:45 p.m.	1I-5 **Microbubble Nano-Interrogation using the Atomic Force Microscope.** V. Sboros*[1], E. Glynos[1], M. Butler[1], C. M. Moran[1], J. Ross[1], S. D. Pye[2], W. N. McDicken[1], and V. Koutsos[1], [1]*University of Edinburgh, Edinburgh, UK,* [2]*Royal Infirmary of Edinburgh, Edinburgh, UK.*		3I-6 **Microwave Induced Phonons Imaging by Brillouin Microscopy.** B. Vincent*[1,2], J. K. Krüger[1,3], O. Elmazria[1,2], L. Le Brizoual[1,2], L. Bouvot[1,2], M. Kolle[1,2], D. Rouxel[1,2], and P. Alnot[1,2], [1]*Laboratoire Européen de Recherche Universitaire: Saarland-Lorraine, Sarrebrücken/Nancy, Germany/France,* [2]*Laboratoire de Physique des Milieux Ionisés et Applications, Nancy, France,* [3]*Rimentalphysik, Universität des Saarlandes, Saarbrücken, Germany.*	4I-6 **Cantilever Resonance Induced In Situ by Magnetostriction for Active Flow Control.** O. Ducloux*[1], N. Tiercelin[1], Y. Deblock[1], P. Pernod[1], V. Preobrazhensky[1,2], and A. Merlen[3], [1]*LEMAC / IEMN-DOAE – UMR CNRS 8520, Ecole Centrale de Lille, Cité Scientifique - Av Poincaré, Villeneuve d'Ascq, France,* [2]*LEMAC / Wave Research Center - GPI-RAS, 38, Vavilov street, Moscow, Russia,* [3]*LEMAC / LML UMR CNRS 8107, Boulevard Paul Langevin, Villeneuve d'Ascq, France.*	5I-6 **Low Loss Recursive Filters for Basestation Applications without Spurious Modes.** M. Mayer*, A. Bergmann, G. Kovacs, and K. Wagner, *EPCOS AG, Munich, Bavaria, Germany.*	6I-6 **Calotte PZT Thin Film Structures for Micromechanics.** F. Calame* and P. Muralt, *Ecole Polytechnique Federale de Lausanne, Ceramics Laboratory, Lausanne, Switzerland.*

	Session 1J **QUANTITATIVE CARDIAC IMAGING** Chair: J. Miller, Washington University	Session 2J **THERAPY MONITORING** Chair: L. Crum, University of Washington	Session 3J **MATERIALS CHARACTERIZATION** Chair: W. Arnold, Fraunhofer Institute for Nondestructive Testing	Session 4J **ULTRASONIC MICROFLUIDICS AND BULK EFFECTS** Chair: J. Vig, US Army	Session 5J **BAW RESONATOR DESIGN AND ANALYSIS** Chair: E. Schmidhammer, EPCOS	Session 6J **BEAMFORMING II** Chair: K. Thomenius, GE
	Room 1	**Room 2**	**Room 3**	**Room 4**	**Room 5**	**Room 6**
2:30 p.m.	1J-1 **Electromechanical Imaging of the Myocardium at Normal and Pathological States.** M. Pernot and E. Konofagou*, *Columbia University, New York, NY.*	2J-1 ***In Vivo* Intra-Cardiac Acoustic Radiation Force Impulse Imaging of Radiofrequency Ablations.** S. Hsu*, P. Wolf, B. Fahey, G. Pinton, D. Dumont, and G. Trahey, *Duke University, Durham, NC.*	3J-1 **(Invited) Surface Characterization using Ultrasonic Vibration Modes of Atomic Force Microscope Cantilevers.** U. Rabe*, *Fraunhofer Institute for Nondestructive Testing, IZFP, Saarbruecken, Germany.*	4J-1 **A Silicon Micromachined Ultrasonic Atomizer Based on a Liquid Horn Structure.** J. M. Meacham*, M. Varady, A. G. Fedorov, and F. L Degertekin, *Georgia Institute of Technology, Atlanta.*	5J-1 **Optimization of Acoustic Dispersion for High Performance Thin Film BAW Resonators.** G. G. Fattinger*, S. Marksteiner, J. Kaitila, and R. Aigner, *Infineon Technologies AG, Munich, Bavaria, Germany.*	6J-1 **Minimum Variance Adaptive Beamforming Applied To Medical Ultrasound Imaging.** J. Synnevaag*, A. Austeng, and S. Holm, *Department of Informatics, University of Oslo, Oslo, Norway.*
2:45 p.m.	1J-2 **In Vivo Viscoelasticity Estimation of Myocardium.** H. Kanai*, *Tohoku University, Sendai, Japan.*	2J-2 **High-Throughput HIFU Treatment for Intraoperative Resection of Solid Organs.** V. Zderic*[1], J. Foley[1,2], G. O'Keefe[3], L. Crum[1,2], and S. Vaezy[1,2], [1]*Center for Industrial and Medical Ultrasound, Applied Physics Laboratory, University of Washington, Seattle, WA,* [2]*Department of Bioengineering, University of Washington, Seattle, WA,* [3]*Department of Surgery, University of Washington, Seattle, WA.*		4J-2 **An Ultrasonic MEMS Particle Separator with Thick Film Piezoelectric Actuation.** M. Hill*[1], N. R. Harris[2], R. J. Townsend[1], N. M. White[2], S. P. Beeby[2], and J. Ding[3], [1]*School of Engineering Sciences, University of Southampton, Southampton, U K,* [2]*School of Electronics and Computer Science, University of Southampton, Southampton, U K,* [3]*School of Mechatronics, University of Electronics Science&Technology, Chengdu, China.*	5J-2 **Suppression of Spurious Modes in Mirror-Type Thin Film BAW Resonators Using an Appropriate Shape of the Active Area.** A. Link*[1,2], E. Schmidhammer[2], H. Heinze[2], M. Schmiedgen[2], M. Mayer[2], B. Bader[2], K. Wagner[2], and R. Weigel[1], [1]*Institute for Electronics Engineering, University of Erlangen-Nuremberg, Erlangen, Germany,* [2]*EPCOS AG, Munich, Germany.*	6J-2 **Experimental Comparison of the (Linear) 2f Field Transmitted with Fully Realized Two-Dimensional Effective Apodization and the (Nonlinear) 2f Harmonic Field.** J. Miller*, T. Krueger, M. Holland, and K. Wallace, *Washington University in St Louis, Saint Louis, MO.*

3:00 p.m.	1J-3 **The Ultrasonic Non-Invasive Assessment of Radial, Longitudinal and Circumferential Cardiac Strain in Normal Pigs.** S. Langeland*, S. Coenen, M. Wu, F. Rademakers[1], and J. D'hooge, *Catholic University of Leuven, Leuven, Belgium.*	2J-3 **Measurement of Output Intensities of Multiple-Mode Diagnostic Ultrasound Systems using Thermoacoustic Sensors.** V. Wilkens*, *Physikalisch-Technische Bundesanstalt, Braunschweig, Germany.*	3J-2 **Statistical Characterization of Metals from Ultrasonic Aberrations.** J. A. Hernández*, M. Clark, S. Sharples, and M. Somekh, *University of Nottingham, Nottingham, UK.*	4J-3 **Ultrasonic Atomization Using Silicon-Based High-Frequency Multiple-Fourier Horn Nozzles.** S. C. Tsai[1], Y. L. Song[2,3], Y. F. Chou[3], J. H. Cheng[3], N. Wang[2], Y. C. Huang[2], and C. S. Tsai*[2,3], [1]*California State University, Long Beach,* [2]*University of California, Irvine,* [3]*National Taiwan University, Taipei, TAIWAN.*	5J-3 **Simulation and Experimental Measurements of High-Overtoned Bulk Acoustic Resonators (H-BAR).** S. Alzuaga*, J.-M. Friedt, N. Vercelloni, J. Masson, L. Robert, N. Ratier, D. Gachon, W. Daniau, B. Guichardaz, N. Bazin, and S. Ballandras, *FEMTO-ST, CNRS, Besançon, France.*	6J-3 **Application of a Cystic Contrast Based Resolution Metric to Guide Ultrasound System Design.** K. Ranganathan* and W. Walker, *University of Virginia, Charlottesville, VA.*
3:15 p.m.	1J-4 **Multi-Dimentional Strain Rate Imaging Based on Vector Doppler.** A. Criton*[1,2], J. Powers[1], N. McDicken[2], and P. Hoskins[1], [1]*Philips Ultrasound, Bothell, WA,* [2]*Department of Medical Physics, Edinburgh, UK.*	2J-4 **A Classification System for Monitoring Thermal Therapies.** S. Siebers*[1], U. Scheipers[1], J. Haensler[2], M. Frieser[2], D. Strobel[2], C. Welp[1], J. Werner[1], E. Hahn[2], and H. Ermert[1], [1]*Ruhr-University Bochum, Bochum, Germany,* [2]*University Erlangen-Nuernberg, Nuremberg, Germany.*	3J-3 **Thickness and Viscosity of Organic Thin Films Probed by Combined Surface Acoustic Love Wave and Surface Plasmon Resonance.** J.-M. Friedt*[1], L. A. Francis[2,3], and S. Ballandras[1], [1]*FEMTO-ST/LPMO, Besancon, FRANCE,* [2]*Université catholique de Louvain, Louvain-la-Neuve, BELGIUM,* [3]*IMEC, Leuven, BELGIUM.*	4J-4 **Calibration of Acoustic Radiation Pressure Field inside Microchannels using Microparticle Zeta Potential Measurement.** M. Araz* and A. Lal, *Cornell University, Ithaca, NY.*	5J-4 **Single-Chip Multiple-Frequency RF Microresonators based on Aluminum Nitride Contour-Mode and FBAR Technology.** G. Piazza*, P. J. Stephanou, J. P. Black, R. M. White, and A. P. Pisano, *University of California, Berkeley.*	6J-4 **Aberration Estimation using FDORT: Insights and Improved Method for Speckle Signals.** J.-L. Robert* and M. Burcher, *Philips Research USA, Briarcliff Manor, NY.*
3:30 p.m.	1J-5 **Detecting Broken Struts of a Björk-Shiley Valve using Diagnostic Ultrasound: A Feasibility Study.** P. van Neer*[1], A. Bouakaz[3], E. Vlaanderen[2], J. de Hart[1], F. van de Vosse[1], A. van der Steen[2], and N. de Jong[2], [1]*Eindhoven University of Technology, Eindhoven, Brabant, The Netherlands,* [2]*Erasmus University Medical Center, Rotterdam, Zuid-Holland, The Netherlands,* [3]*Inserm, Tours, Cedex, France.*	2J-5 **Controlled Spatio-Temporal Heating Patterns Using a Commercial, Diagnostic Ultrasound System.** K. Frinkley*, M. Palmeri, and K. Nightingale, *Duke University, Durham, NC.*	3J-4 **Decomposition of the Time-Reversal Operator Applied to Quantitative Characterization of Small Elastic Cylinders.** J. G. Minonzio*, C. Prada, and M. Fink, *Laboratoire Ondes et Acoustique, Paris, France.*	4J-5 **Improvement in Q-factor of AT-Cut Quartz Crystal Resonators using Single Wall Carbon Nanotubes (SWNTs).** A. Goyal*, S. Tadigadapa, A. Gupta, and P. Eklund, *Pennsylvania State University, University Park.*	5J-5 **Finite Element Analysis of Monolithic Filters.** M. Patel* and Y.-K. Yong, *Rutgers University, Piscataway, NJ.*	6J-5 **Beamforming Using Spatio-Temporal Filtering.** J. Liu*, K. Kim, and M. Insana, *University of Illinois at Urbana Champaign, Urbana, IL.*
3:45 p.m.	1J-6 **Non-Invasive Two Dimensional Elastography of the Carotid Artery.** H. Ribbers*[1], S. Holewijn[2], J. D. Blankensteijn[2], and C. L. de Korte[1], [1]*Clinical Physics Laboratory, UMC St Radboud, Radboud University Medical Center, Nijmegen, The Netherlands,* [2]*Department of Vascular Surgery, Radboud University Medical Center, Nijmegen, The Netherlands.*	2J-6 **Automatic Treatment Planning for Prostate HIFU Therapy.** R. Fedewa*[1], 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., Indianapolis, IN,* [2]*XDATA Corporation, Indianapolis, IN,* [3]*Indiana University, Indianapolis, IN,* [4]*CoEval Systems LLC, Indianapolis, IN.*	3J-5 **Compensation for Temperature Variation in Ultrasonic Chemical Process Monitoring.** A. Kalashnikov*, V. Ivchenko, R. Challis, and A. Holmes, *University of Nottingham, Nottingham, UK.*	4J-6 **Bulk Detection of Sound Waves Launched by Surface Micromachined Beam Resonators.** S. Ardanuc* and A. Lal, *Cornell University, Ithaca, NY.*	5J-6 **An Isoparametric Spline Method for the Vibrations of Piezoelectric Resonators.** S. Srivastava*, Y.-K. Yong, and M. Patel, *Rutgers University, Piscataway, NJ.*	6J-6 **Spatial Compounding with Tissue Harmonic Images and Monostatic Synthetic Aperture Reconstruction.** M. Ashfaq, C. Hansen*, W. Wilkening, and H. Ermert, *Institute of High Frequency Engineering, Ruhr-University Bochum, Bochum, Germany.*

	Session 1K ***3D/4D CARDIAC IMAGING*** Chair: T. Thomas, Siemens	*Session 2K* ***CAVITATION*** Chair: T. Matula, University of Washington	*Session 3K* ***ACOUSTIC SENSORS*** Chair: J. Kushibiki, Tohoku University	*Session 4K* ***PHYSICAL ACOUSTICS III*** Chair: M. Fink, ESPCI-Universite-Paris VII	*Session 5K* ***MICROMECHANICAL AND SAW RESONATORS*** Chair: D. Hauden, FEMTO-ST/LPMO	*Session 6K* ***MEDICAL SIGNAL PROCESSING AND CONTRAST*** Chair: W. Walker, University of Virginia
	Room 1	**Room 2**	**Room 3**	**Room 4**	**Room 5**	**Room 6**
4:30 p.m.	1K-1 **Dynamic 3D Echocardiography in Virtual Reality.** A. van den Bosch*[1], A. Koning[2], J. McGhie[1], F. Meijboom[1], P. van der Spek[2], and A. Bogers[3], [1]*Department of Cardiology, Erasmus MC, Rotterdam, The Netherlands*, [2]*Department of Bioinformatics, Erasmus MC, Rotterdam, The Netherlands*, [3]*department of Thoracic surgery, Erasmus MC, Rotterdam, The Netherlands.*	2K-1 **An Integrated HIFU System for the Treatment of Breast Cancer.** A. Shrestha*, H. Yao, and E. S. Ebbini, *University of Minnesota*, *Minneapolis, MN.*	3K-1 **Beam Splitter for Ball SAW Device using Diffraction by a Two Dimensional Metal Dot Array.** T. Mihara*[1], K. Atsumi[1], N. Nakaso[2], S. Akao[2], D. Y. Sim[3], and K. Yamanaka[1], [1]*Tohoku University, Sendai, Miyagi, Japan*, [2]*Toppan Printing, Kitakatsushikagun, Saitama, Japann*, [3]*Ball Semiconductor, Kanagawa, Japan.*	4K-1 **New Method of Change in Temperature Coefficient Delay of Acoustic Waves in Thin Piezoelectric Plates.** I. Kuznetsova*[1], B. Zaitsev[1], S. Joshi[2], and A. Kuznetsova[3], [1]*Institute of Radio Engineering and Electronics of RAS, Saratov Branch, Saratov, Russia*, [2]*Marquette University, Milwaukee, WI*, [3]*Saratov State University, Saratov, Russia.*	5K-1 **Small % Bandwidth Design of a 431-MHz Notch-Coupled Micromechanical Hollow-Disk Ring Mixer-Filter.** S.-S. Li*, Y.-W. Lin, Y. Xie, Z. Ren, and C. T.-C. Nguyen, *University of Michigan, Ann Arbor, MI.*	6K-1 **Separating Fetal Doppler Signals in Pregnancy using Independent Component Analysis: Application to the Extraction of Fetal Heart Rate and Global Movement.** A. Kribeche*, F. Tranquart, and L. Pourcelot, *INSERM U619, Tours, France.*
4:45 p.m.	1K-2 **A Novel Dynamic Programming Based Semi-Automatic Endocardial Border Detection Method for 4D Cardiac Ultrasound.** M. van Stralen*[1,3], M. M. Voormolen[1,2], G. van Burken[1,3], B. J. Krenning[1], R. J. M. van Geuns[1], E. Angelié[3], R. J. van der Geest[3], C. T. Lancée[1], N. de Jong[1,4], A. F. W. van der Steen[1,3], J. H. C. Reiber[2,3], and J. G. Bosch[1,3], [1]*Thoraxcenter, Erasmus Medical Center, Rotterdam, The Netherlands*, [2]*ICIN, Interuniversity Cardiology Institute of the Netherlands, Utrecht, The Netherlands*, [3]*Leiden University Medical Center, Leiden, The Netherlands*, [4]*University of Twente, Enschede, The Netherlands.*	2K-2 **A Numerical Study of Pulsed Sonication For Reducing Thermal Deposition in The Skull During Transcranial Focused Ultrasound Surgery.** X. Yin and K. Hynynen*, *Department of Radiology, Brigham and Women's Hospital, Harvard Medical School, Boston, MA.*	3K-2 **Bulk Acoustic Wave Resonator Operating at 8 GHz for Gravimetric Sensing of Organic Films.** S. Reymermet*[1], R. Lanz[2], and P. Muralt[1], [1]*Ecole Polytechnique Fédérale de Lausanne, Ceramics Laboratory, Lausanne, Switzerland*, [2]*Unaxis Balzers, Balzers, Liechtenstein.*	4K-2 **In-Plane and Out-of-Plane Particle Velocity Measurement using Electromagnetic Acoustical Transducers.** X. Jian*, S. Dixon, and S. B. Palmer, *University of Warwick, UK.*	5K-2 **Low Noise Silicon Micromechanical Bulk Acoustic Wave Oscillator.** V. Kaajakari*[1], J. Koskinen[1], T. Mattila[1], P. Rantakari[2], J. Kiihamäki[1], M. Koskenvuori[2], I. Tittonen[2], and A. Oja[1], [1]*VTT Information Technology, P.O.B. 1207, 02044 VTT, Finland*, [2]*Micronova and Center for New Materials, Helsinki University of Technology, Espoo, Finland.*	6K-2 **Waveform Synthesis and Filter Design for High Frequency Imaging of Tissue Engineered Heart Valves.** D. Liu*, H. Lee, and E. S. Ebbini, *University of Minnesota, Minneapolis, MN.*

5:00 p.m.	1K-3 **Real Time Volume Stitching in 4D Echocardiography.** S. Brekke*[1], S. Rabben[2], E. Steen[2], G. Haugen[2], A. Haugen[2], and H. Torp[1], [1]*Norwegian University of Science and Technology, Trondheim, Norway*, [2]*GE Vingmed Ultrasound, Horten, Norway.*	2K-3 **Radiation Force Imaging for Detection of Irreversible Changes Caused by High Intensity Focused Ultrasound.** T. Azuma*, K. Sasaki, K.-I. Kawabata, and S.-I. Umemura, *Central Research Laboratory, Hitachi Ltd., Kokubunnji, Tokyo, Japan.*	3K-3 **Sensor for Ambient Pressure and Material Strains using a Thin Film Bulk Acoustic Resonator.** J. Weber*, M. Link, R. Primig, D. Pitzer, and M. Schreiter, *Corporate Technology, Siemens AG, Muenchen, Germany.*	4K-3 **Decoherence of Lamb Waves by Rough Interface.** B. Morvan[1], A.-C. Hladky*[2], D. Leduc[1], M. Bavencoffe[2], and I. Jean-Louis[1], [1]*LAUE UMR CNRS 6068, Le Havre, France*, [2]*IEMN UMR CNRS 8520, Lille, France.*	5K-3 **Nanoimprint Lithography for RF SAW Manufacture.** W. Liu*, *Wuhan Research Institute of Post &Telecommunications, Wuhan, Hubei, China.*	6K-3 **Phase Correction of Skull Aberration with 1.75-D and 2-D Arrays using Speckle Targets.** J. J. Dahl*, N. M. Ivancevich, C. G. Keen, G. E. Trahey, and S. W. Smith, *Duke University, Durham, NC.*
5:15 p.m.	1K-4 **Improved Spatiotemporal Voxel Space Interpolation for 3D Echocardiography with Irregular Sampling and Multibeat Fusion.** J. G. Bosch*[1,3], M. van Stralen[2,3], M. M. Voormolen[1,2], B. J. Krenning[1], C. T. Lancée[1], J. H. C. Reiber[2,3], A. F. W. van der Steen[1,2], and N. de Jong[1,4], [1]*Erasmus MC, Rotterdam, The Netherlands*, [2]*ICIN, Utrecht, The Netherlands*, [3]*LUMC, Leiden, The Netherlands*, [4]*University of Twente, Enschede, The Netherlands.*	2K-4 **Targeted Disruption of the Blood-Brain Barrier with Focused Ultrasound: Association with Inertial Cavitation.** N. McDannold*, N. Vykhodtseva, and K. Hynynen, *Brigham and Women's Hospital, Harvard Medical School, Boston, MA.*	3K-4 **Dual Mode, Multiple Electrodes Quartz Sensor.** A. Ivan*[1,2], R. Bourquin[1], and B. Dulmet[1], [1]*FEMTO-ST/ Dep LCEP, Besancon, France*, [2]*FIE-UVT, Targoviste, Romania.*	4K-4 **Optical Measurement of Acoustic Radiation Strains in Solids.** X. Jacob[1], R. Takatsu[1,2], C. Barrière*[1], and D. Royer[1], [1]*Laboratoire Ondes et Acoustique, Université Paris 7, Paris, France*, [2]*Doshisha University, Kyoto, Japan.*	5K-4 **Low Temperature Bonding of Interface Acoustic Waves Resonators on Silicon Wafers.** H. Majjad*, V. Laude, and S. Ballandras, *Université de Franche-Comté, Institut FEMTO-ST (UMR 6174), Département LPMO, Besançon, France.*	6K-4 **Aberration and Second Harmonic Imaging.** T. Varslot*, S. E. Måsøy, and B. A. Angelsen, *Norwegian University of Science and Technology, Trondheim, Norway.*
5:30 p.m.	1K-5 **An Optical Registration Method for 3D Ultrasound Freehand Scanning.** C. Poulsen*[1], P. Pedersen[1], and T. Szabo[2], [1]*Worcester Polytechnic Institute, Worcester, MA*, [2]*Boston University, Boston, MA.*	2K-5 **Thermal Effects of HIFU at Soft Tissue-Air Interface in the Post-focal Region: A Safety Concern, and a Potential Solution using Cavitation.** S. Vaezy*[1], V. Zderic[1], J. Foley[1], W. Luo[1], F. Starr[1], and A. Lebedev[2], [1]*University of Washington, Seattle, WA*, [2]*Mirabilis Medica, Seattle, WA.*	3K-5 **Ultrasonic Sensor Development for the Semi-Solid Metal Working Process.** B. Tittmann*, M. Huang, C. Moose, and A. Niessner, *Penn State University, University Park, PA.*	4K-5 **Strong On-Axis Focal Shift and Its Nonlinear Variation in Low-Fresnel-Number Ultrasound Beams.** Y. N. Makov[1], V. Espinosa[2], V. J. Sanchez-Morcillo*[2], J. Ramis[2], J. Cruañes[2], and F. Camarena[2], [1]*Moscow State University, Moscow, Russia*, [2]*Universidad Politecnica de Valencia, Grao de Gandia, Valencia, Spain.*	5K-5 **Temperature Coefficient of Elastic Constants of Sputtered TeO2 Thin Film for Zero TCD SAW Devices.** N. Dewan*, M. Tomar, V. Gupta, and K. Sreenivas, *Department of Physics and Astrophysics, University of Delhi., Delhi, India.*	6K-5 **Quadratic B-Mode (QB-Mode) Imaging with ChirpTransmit Waveforms.** D. Cecchini, H. Yao, and E. S. Ebbini*, *University of Minnesota, Minneapolis, MN.*
5:45 p.m.	1K-6 **Efficient Quantification of the Left Ventricular Function from 3D-Echocardiography.** M. M. Voormolen*[1,2], B. J. Krenning[1], R. J. van Geuns[1], C. T. Lancée[1], W. B. Vletter[1], F. J. ten Cate[1], J. R. T. C. Roelandt[1], A. F. W. van der Steen[1,2], and N. de Jong[1,2], [1]*Thoraxcenter, Erasmus MC, Rotterdam, The Netherlands*, [2]*ICIN, Interuniversity Cardiology Institute of the Netherlands, Utrecht, The Netherlands.*	2K-6 **Quantifying Inertial Cavitation Produced in *In Vivo* Rabbit Ear Vessels with Optison®.** J. Tu, J. Hwang, A. Brayman, T. Matula*, and L. Crum, *Center for Industrial and Medical Ultrasound, Applied Physics Laboratory, University of Washington, Seattle, WA.*	3K-6 **Acoustical and Optical Characterization of Air Entrapment in Piezo-Driven Inkjet Printheads.** J. de Jong*[1], H. Reinten[2], M. van den Berg[2], H. Wijshoff[2], M. Versluis[1], G. de Bruin[1], N. de Jong[3], and D. Lohse[1], [1]*Physics of Fluids, University of Twente, Enschede, The Netherlands*, [2]*Océ Technologies B.V., Venlo, The Netherlands*, [3]*Dept. of Experimental Echocardiography, Thoraxcentre, Erasmus MC, Rotterdam, The Netherlands.*	4K-6 **Numerical Methods for Axisymmetric and 3D Nonlinear Beams.** G. Pinton* and G. Trahey, *Duke University, Durham, NC.*	5K-6 **Design of Asynchronous STW Resonators for Filters and High Stability Source Applications.** J.-M. Friedt*, S. Alzuaga, N. Ratier, N. Vercelloni, R. Boudot, B. Guichardaz, W. Daniau, V. Laude, and S. Ballandras, *FEMTO-ST/LPMO, Besancon, France.*	6K-6 **Ultrasound Contrast Agents for Bleeding Detection and Acoustic Hemostasis.** V. Zderic*[1], L. Crum[1,2], and S. Vaezy[1,2], [1]*Center for Industrial and Medical Ultrasound, Applied Physics Laboratory, University of Washington, Seattle, WA*, [2]*Department of Bioengineering, University of Washington, Seattle, WA.*

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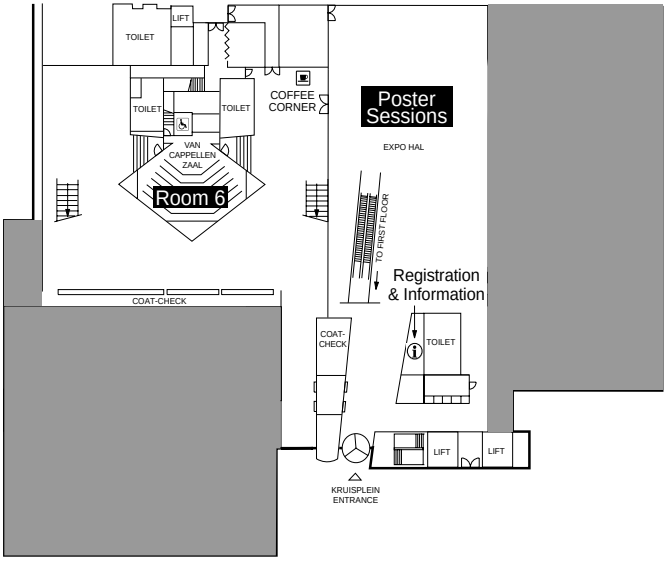
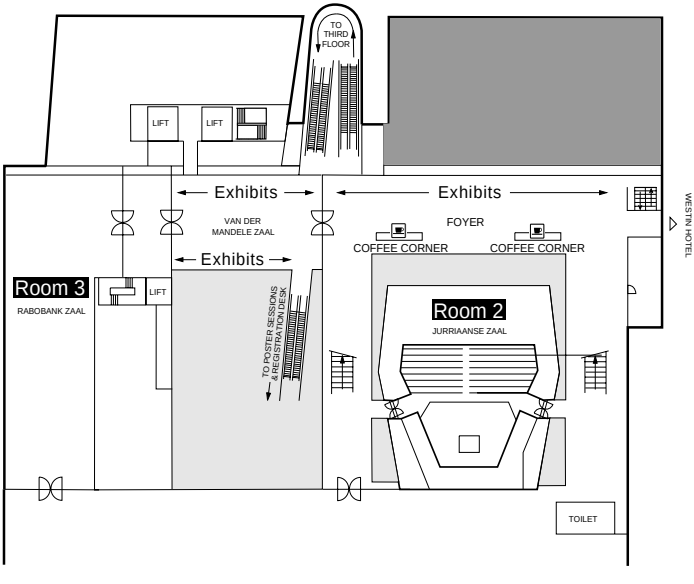
DE DOELEN FLOOR PLAN

ground floor



first floor



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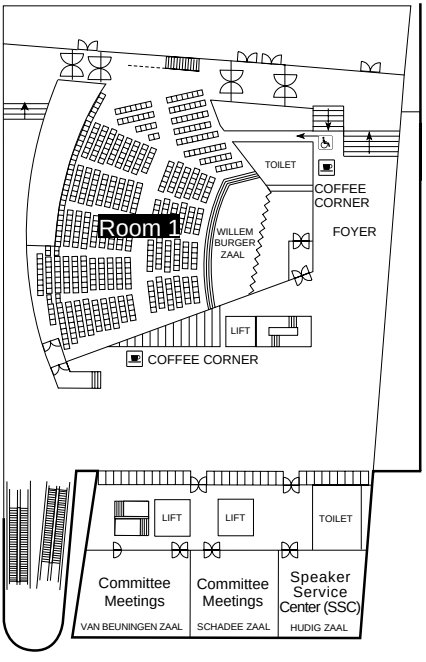
third floor



fourth floor