

Powering Sound Ideas

UIA 43: 2014 Symposium Schedule Announced

With more than 30 presentations and 20+ posters about the industrial, food handling and medical applications of ultrasonics, UIA 43 promises to offer a wide range of topics. Presentations are organized into industrial presentations on Wednesday, 23 April and medical presentations on Friday, 25 April.

“We are delighted that our Iberamerican colleagues have responded to our Call for Papers with great interest and enthusiasm,” noted **Enrique Riera**, Head of the Department of Sensors and Ultrasonics Systems, CSIC, Madrid, Spain, UIA 43 Co-Chair.



“We have papers from Brazil, Chile, Mexico, Spain and Uruguay.”

“The quality of the abstracts we have received for UIA 43 is outstanding,” added **Margaret Lucas**, Professor of Ultrasonics, School of Engineering, University of Glasgow, Scotland.



“With the additional presentations from Australia, Denmark, England, Scotland, Taiwan and United States, the geographic scope of our presentations is significant.”

Antonio Mulet, Grupo de análisis y simulación de procesos (ASPA) Departamento de Tecnología de Alimentos Universidad Politécnica de Valencia, Spain, is the invited speaker for the Industrial session on Wednesday afternoon.

Thursday will also be a full day, featuring two workshops, presentations by exhibitors and an overview of the 20+ posters in the morning and in-depth poster session and tour of the Ultrasonics Laboratory at CSIC in the afternoon. Thursday evening features dinner at the Corral de la Moreria, with a spectacular Flamenco show following.

Wagner C. S. Pereira, Federal University of Rio de Janeiro, FURI, is the invited speaker for the medical session on Friday morning.

The Symposium will be held in the Pabellón Central on the campus of CSIC, a lovely 10 minute walk from the NH Hesperia Emperatriz where UIA has reserved a block of rooms for UIA 43 participants.

You'll want to know:

- Working Groups 3 and 7 will meet during UIA 43 - see page 8
- Exhibitor/Sponsor information is on page 12
- Hotel reservation form is on page 16
- Registration form is on page 17

UIA 43: 2014 Symposium Workshops

Thursday morning, 24 April, will feature two workshops.

Sandy Cochran, Professor of Biophysical Science and Engineering and Head of Division in the Institute for Medical Science and Technology, University of

Dundee, will present **Developments in Piezocrystal Characterization and Applications**

Mitch Thompson, Chief Technology Officer, Measurement Specialities, USA, will present a workshop on **Commercial Applications for Piezoelectric**

Sensors (see page 3 for complete descriptions).

These workshops will be followed by exhibitor lightning presentations and then by brief preview of the posters available for detailed review later in the day.

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UIA 43: Industrial Presentation Schedule - Wednesday 23 April 2014

- 830 **An Objective Comparison of Cavitation Measurement Devices**, Mark Hodnett, Gianluca Memoli, Lian Wang, Dan Sarno and Bajram Zeqiri, National Physical Laboratory, UK
- 855 **On the Ultrasonic Atomization of Liquids**, L. Gaete-Garretón, Y. Vargas-Hernández, D. Briceño-Gutiérrez, V. Salinas-Barrera, Laboratorio de Ultrasonidos, Universidad de Santiago de Chile, Chile
- 920 **Continuous Flow Manufacture of Nanoemulsions by High-Amplitude Ultrasound - the Scale-up Perspective**, Alexey Peshkovsky, Industrial Sonomechanics, LLC, NY
- 945 **Ultrasonic Atomization via Plate-transducer Technology**, G. Rodríguez, I. Martín, V.M. Acosta, J.A. Gallego-Juárez, A. Pinto, E. Riera, and A. Cardoni, PUSONICS SL, Spain
- 1010 **Development of an Open Loop Control System for Power Ultrasound Transducers based on Rayleigh Model**, Nicolás Pérez Álvarez, Andrea Cardoni; Enrique Riera; Niccolò Cerisola; Marco Aurelio Brizzotti, Julio Cezar Adamowski, Polo Agroalimentario Agroindustrial, Centro Universitario de Paysandú, Universidad de la República - Uruguay, Uruguay
- 1050 **Piezoelectric Ceramics**, Eberhard Henning, PI Ceramic GmbH, Germany
- 1115 **Recent Advances in the Development and Application of Power Ultrasonic Plate Transducers in Gas Dense Extraction and Aerosol Agglomeration Processes**, Enrique Riera, Andrea Cardoni, Juan A Gallego-Juárez, Victor M Acosta, Alfonso Blanco and Germán Rodríguez, Department of Sensors and Ultrasonics Systems, CSIC, Spain
- 1140 **Efficiency of Parametric Ultrasound Generation in Relaxing Media for a Very Shallow-water Echo Sounders**, Patricia Ordóñez, Noé Jiménez, Víctor Espinosa, Vicente Puig-Pons, Ester Soliveres, Univ. Politécnica de Valencia - Campus de Gandia [EPGS], Spain
- 1200 **Ultrasonic Measurement System for Online Fuel Adulteration Control**, Nicolás Peréz; Florencia Jesus; Cecilia Pérez; Guillermo Moyna; Marco Aurelio Brizzotti; Julio Cezar Adamowski, Polo Agroalimentario Agroindustrial, Centro Universitario de Paysandú, Universidad de la República - Uruguay, Uruguay
- 1220 **Phase Velocity Method for Guided Wave Measurements in Plate Composites**, Eduardo Moreno, Nekane Galarza, Benjamin Rubio, José A Otero, Tecnalia R&I, Spain
- 1240 **Phase Transitions in Lead-Free Piezoelectric Ceramics Monitored by Resonance Method**, L. Pardo, A. García, K. Breboel, E. Mercadelli, C. Galassi, Instituto de Ciencia de Materiales de Madrid (ICMM) Consejo Superior de Investigaciones Científicas (CSIC), Spain
- 1400 **Exploring the Use of Air-borne Ultrasound in Drying Process**, J.A. Carcel, J.V. García-Pérez, E. Riera, C. Rosselló, A. Mulet, Grupo de análisis y simulación de procesos (ASPA) Departamento de Tecnología de Alimentos Universidad Politécnica de Valencia, Spain
- 1500 **Operational Conditions Affecting Low-temperature Drying Assisted by Power Ultrasound**, J.V. Santacatalina, J.A. Carcel, S. Simal, A. Mulet and J.V. Garcia-Perez, Research Group of Analysis and Simulation of Food Processes Food Technology Department, Universitat Politècnica de Valencia, Spain
- 1525 **Ultrasonic Assisted Drying of Food Materials**, Sabarez, H. T.; Riera, E. and Gallego-Juarez, J. A., CSIRO Animal, Food and Health Sciences, Australia
- 1615 **Performance of PIN-PMN-PT Single Crystal Piezoelectric Versus PZT8 Piezoceramic Materials in Ultrasonic Transducers**, Dominick A. DeAngelis and Gary W. Schulze, Kulicke & Soffa Industries, USA
- 1640 **Minimising the Excitation of Parasitic Modes of Vibration in Slender Power Ultrasonic Devices**, Andrew Mathieson; Margaret Lucas, University of Glasgow, UK
- 1705 **Operation of Ultrasonic Piezoelectric Transformers Under High Magnetic Field**, Alfredo Vazquez Carazo, Micromechatronics, Inc., USA
- 1730 **Comparison of ultrasonic cutting of PLA with servo and pneumatic systems**, David Grewell, PhD, Agricultural and Biosystems Engineering, Iowa State University of Science and Technology, USA

UIA 43: Medical Presentation Schedule - Friday 25 April 2014

- 9:00 **Transcranial Propagation with an Ultrasonic Mono-Element Focused Transducer**, P. C. Iglesias, N. Jiménez, E. Konofagou, J. Redondo, F. Camarena, Instituto para la Gestión Integrada de Zonas Costeras (IGIC), Universidad Politécnica de Valencia, Spain
- 9:25 **HIFU Induced Heating Modeling by Using the Finite Element Method**, Raquel Martínez Valdez, Arturo Vera Hernández and Lorenzo Leija Salas, Department of Electrical Engineering, Bioelectronics Section, CINVESTAV-IPN, Mexico
- 9:50 **A Geodesic Array Driven by Modular Electronics for Focused Ultrasound Surgery**, Zhen Qiu, Roderick Habeshaw, David Lines, Graeme Casey and Sandy Cochran, University of Dundee, UK
- 10:40 **Design and Characterisation of a Microtransducer for Microbubble Excitation**, Chris Fury, Pierre Gélat, Gianluca Memoli, Philip H. Jones, Mark Hodnett, National Physical Laboratory, UK
- 11:05 **Proposal to Construct a 3D Image Viewer Based on a Commercial Ultrasonic 2D Imaging System**, F. Arce, R. Martínez, L. Leija, H. Sossa and A. Vera, Department of Electrical Engineering, CINVESTAV-IPN, Mexico
- 11:30 **High Frequency Ultrasonic Imaging for Medical Applications, Annular Array Device Based on Piezoceramic Thick Films**, Andrzej Nowicki, IPPT, Warsaw, Rasmus Lou-Moeller, Wanda Wolny, Meggitt, Denmark
- 11:55 **Texture and Morphological Parameters to Quantify Breast Lesions in Ultrasonography**, Wagner C. S. Pereira, Federal University of Rio de Janeiro, FURI, Brazil
- 14:00 **Enhanced Cancer Biopsy and Regional Anaesthesia Through Ultrasound Actuation of a Standard Needle**, M. R. Sadiq, X. Liao, S. Cochran and Z. Huang, Institute of Medical Science and Technology, University of Dundee, UK
- 14:25 **Tissue Selectivity in Ultrasonic Surgical Aspiration**, Daniel J. Cotter and Prakash Manandhar, Integra LifeSciences, USA
- 14:50 **Bacterial Biofilm Removal by Ultrasonic Dental Tips**, Emilia Pecheva, Rachel Sammons, Philip Tomson, Damien Walmsley, University of Birmingham, School of Dentistry, UK
- 15:40 **High Power Longitudinal/Torsional Mode Transducers for Surgical and Dental Applications**, George Bromfield, Myra Flitcroft, Olga Jovic, Larry Clayton, Moog, USA
- 16:05 **An Ultrasonic Bone Cutting Device Driven by a Cymbal Transducer**, Fernando Bejarano, Margaret Lucas, University of Glasgow, UK

UIA 43: Schedule - Thursday 24 April 2014

- 9:00 **Piezo-sensors**, Mitch Thompson, Measurement Specialties, USA
- 10:30 **Developments in Piezocrystal Characterisation and Applications**, Sandy Cochran, Institute for Medical Science and Technology, University of Dundee, UK
- 11:30 Poster and Exhibitor Session Overview
- 14:00 Tour of Ultrasonic Laboratories and Poster Session
- 18:30 Depart for Corral de la Moreria (included in full registration only - additional tickets available for purchase)

Schedule is subject to change

UIA 43: 2014 Invited Speakers



Antonio Mulet

Industrial

Exploring the use of airborne ultrasound in drying process.

J.A. Carcel, J.V. García-Pérez, E. Riera, C. Rosselló, A. Mulet, Grupo de análisis y simulación de procesos (ASPA) Departamento de Tecnología de Alimentos Universidad Politécnica de Valencia, **Spain**

Antonio Mulet is a Chemical Engineer holding a PhD from France (IGC Toulouse) and an Engineer Degree from USA (MIT). He is author/coauthor of 200 papers and 10 patents.

Active in many research groups both at national and international level, he is the director of the Research Group ASPA (Analysis and Simulation of Agrofood Processes), gathering the activities of seven professors at Universidad Politécnica de Valencia. The group addresses issues linked to processing from environmental impact to process optimization. Interested in process intensification he has been involved in the use of power ultrasound to improve heat and mass transfer processes.



Wagner Coelho de Albuquerque Pereira

Medical

Texture and Morphological Parameters to Quantify Breast Lesions in Ultrasonography

Wagner Coelho de Albuquerque Pereira is a Physicist (from Federal University of Ceará), with M.Sc. and D.Sc. degrees in Biomedical Engineering from the Federal University of Rio de Janeiro (UFRJ), **Brazil**. He is Associate Professor at the Biomedical Engineering Program – COPPE/UFRJ. His main research interest is Biomedical Ultrasound, signal and image processing. He has fruitful scientific collaboration with Latin-American countries (mainly Uruguay, Mexico and Cuba) as well as with some European countries (mainly Spain, France and Portugal). He is presently the president of the Brazilian Society of Biomedical Engineering (SBEB).

Symposium
Presenters come
from :

Australia

Brazil

Chile

Denmark

England

Mexico

Scotland

Spain

Taiwan

Uruguay

United States

UIA 43: Thursday Workshops

Developments in Piezocrystal Characterisation and Applications - Prof. Sandy Cochran and Dr. Muhammad Sadiq

The recent development of ternary and doped-ternary compositions of relaxor-based piezocrystals has begun to open up the use of this class of material to high power applications. Two specific binary compositions have been developed since the materials were discovered approximately 20 years ago, lead magnesium niobate and lead zirconate niobate, both combined with lead titanate (respectively, PMN-PT and PZN-PT). These are sometimes called Generation I piezocrystals and have extraordinarily high piezoelectric performance in some configurations but also relatively low phase transition and Curie temperatures. They have more recently been complemented by ternary compositions, called Generation II, for example including lead indium niobate (PIN-PMN-PT), and doped ternary compositions, called Generation III, including manganese (Mn:PIN-PMN-PT). Unlike familiar and fully established piezoceramics which are usually extruded and sintered, the piezocrystals are grown in finite boules and cut to size in specific orientations. This has numerous implications for their cost and their applications. These will be discussed, including the importance of material characterisation, the exploitation of crystal structure and

anisotropy, and how the materials can be used in applications.



Sandy Cochran

Sandy Cochran is Professor of Biophysical Science and Engineering and Head of Division in the Institute for Medical Science and Technology, University of Dundee. He has been working in ultrasound for almost 30 years, including applications in non-destructive testing, underwater SONAR and medical imaging and therapy.

Commercial Applications for Piezoelectric Sensors - Mitch Thompson, CTO, Measurement Specialties, Inc.

This workshop will provide an overview of the range of piezo products sold commercially, and focused discussions centered on specific products of interest, including: description of the sensor, sensing material used, operating environment and specifications, physical structure, basic theory of operation, and interesting details highlighting complexities encountered in the design.

Disposable PZT based TEE probe (Trans Esophageal Echocardiogram)

PZT based ultrasonic air bubble detector (medical, air-in-tubing sensor)

PZT based single point harsh environment fluid level sensor (ultrasonic gap sensor)

PVDF based flexible in-road axle counting sensor (spiral wound)



Mitch Thompson

Mitch Thompson is Chief Technology Officer for Measurement Specialties, Inc., (NASDAQ: MEAS, Hampton VA) where he is responsible for managing global product development engineering along with technology and IP portfolios. MEAS acquired the Group in 1998 and he was appointed Global Piezo Engineering Director. In 2002 he earned a Ph.D. in Mechanical Engineering from Drexel University, and was appointed to his current position in 2008.

Poster Session: Thursday 24 April 2014

Acoustic Properties of Phantoms Made of PVCP with Different Concentrations of Alumina Powder as Function of Temperature, *L.E. Maggi, G. Cortela, M.A. von Krüger, W.C.A. Pereira*, Centro de Ciências Biológicas e da Natureza (CCBN), UFAC, Brazil

Assessment of bovine bone in vitro by quantitative reflection ultrasonic parameters, *D. Matusin, A. Fontes-Pereira, S. Souza, M.A. von Krüger, W.C.A. Pereira*, Biomedical Engineering Program - COPPE / Federal University of Rio de Janeiro - UFRJ, Brazil

A Driver for Piezoelectric Transducer with Control of Resonance, *F. J. Arnold, R. L. Ximenes, R. F. Socoloski, R. Arthur, S. S. Mühlen*, Faculdade de Tecnologia – UNICAMP, Brazil

Effects of Ultrasound Radiation on the Synthesis of Metal Oxide Nanostructures, *María Isabel Díez-García, Ana Korina Díaz-García, Dejan Cibrev, Milena Jankulovska, Pedro Bonete, Roberto Gómez, Teresa Lana-Villarreal*, Institut Universitari d'Electroquímica i Departament de Química Física, Universitat d'Alacant, Spain

Evaluation of diffusivities and vitamin preservation on ultrasound-assisted air drying of red apples (Gala Royal), *Fabiano A.N. Fernandes, Sueli Rodrigues, Jose Vicente Garcia-Pérez, Juan A. Carcel*, Grupo de análisis y simulación de procesos (ASPA) Departamento de Tecnología de Alimentos Universidad Politécnica de Valencia, Spain

Implementation and evaluation of elastographic techniques, *Nuria Gonzalez-Salido, Luis Medina-Valdés, J.F. Cruz, Jorge Camacho*, CSIC, Spain

Improvements in Low-cost Ultrasonic Measurements of Blood Flow in "By-passes" using Narrow & Broad Band Transit-time Procedures, *A. Ramos, H. Calas, L. Diez, E. Moreno, J. Prohías, A. Villar, E. Carrillo, A. Jiménez, W.C.A. Pereira, M.A. von Krüger*, R&D Group "Ultrasonic Systems & Technologies" Institute of Physical and Information Technologies CSIC, Spain

Monitorization of Plant Circadian Rhythm using Air-Coupled Ultrasonic Spectroscopy, *M.D. Fariñas and T.E. Gómez Álvarez-Arenas*, ITEFI. Spanish Scientific Research Council, CSIC, Spain

Multi-modal ultrasound imaging for breast cancer detection, *Luis Medina-Valdés; Maily Pérez-Liva; Jorge Camacho; José Udías; Joaquín López; Nuria González-Salido*, CSIC, Spain

Non-Invasive Ultrasonic Measurements of Small Mechanical Alterations in Sub-millimeter Walls of Arteries and Phantoms, *J. Brum, I. Bazan, A. Ramos, C. Negreira, A. Ramirez, L. Diez*, R&D Group "Ultrasonic Systems & Technologies" Institute of Physical and Information Technologies CSIC, Spain

Nonlinear Ultrasound Simulations Including Complex Frequency Dependent Attenuation, *Noé Jiménez, Javier Redondo, Victor Sanchez-Morcillo, Francisco Camarena*, Instituto para la Gestión Integrada de Zonas Costeras (IGIC), Universidad Politécnica de Valencia, Spain

On limitations of the ultrasonic characterization into pieces manufactured with highly attenuating materials, *A. Ramos, E. Moreno, B. Rubio, H. Calas, N. Galarza, J. Rubio, L. Diez, L. Castellanos, T. Gómez*, R&D Group "Ultrasonic Systems & Technologies" Institute of Physical and Information Technologies CSIC, Spain

Poster Session: Thursday 24 April 2014, continued

On the Nonlinear Effects in Focused Ultrasound Beams with Frequency Power Law Attenuation, Noé Jiménez, Javier Redondo, Víctor Sánchez-Morcillo, Pablo C. Iglesias, Francisco Camarena, Instituto para la Gestión Integrada de Zonas Costeras (IGIC), Universidad Politécnica de Valencia, Spain

Physical Factors Crosstalk Generators a Matrix Array, Israel Sánchez Domínguez, Pedro Acevedo Contla, IIMAS – UNAM, Mexico

Real Time Fast Ultrasound Imaging Technology and Possible Applications, J. F. Cruza; M. Perez; J.M. Moreno; C. Fritsch, CSIC, Spain

Real Time Ultrasonic Measurement for Suspended Sediment Concentration, Hui-Chen Yen, Chia-Chi Sung, Jau-Horng Chen, Kung-Yen Lee, You-Jyun Jhang, chin-Han Chang, Department of Engineering Science and Ocean Engineering National Taiwan University (NTU), Taiwan

Resolution of image compounding with a ring array transducer, Luis Medina-Valdés; Jorge Camacho; Nuria González-Salido; J.F. Cruza, CSIC, Spain

Torque Shared of Quadriceps During Knee Extension, V. B. Oliveira, W. C. A. Pereira, L. F. Oliveira, L. L. Menegaldo, Biomedical Engineering Program - COPPE / Federal University of Rio de Janeiro - UFRJ, Brazil

Ultrasonic Actuation On Microfluidic Devices For Early Detection Of Cancer: Optimization Of Designs, I. González, J. Berganzo, A. Castillejo, A. Martín, M. Tijero, V. Acosta, M. Bouali, J.L. Soto, Institute ITEFI of Physics-Technologies, Group RESULT Ultrasonic Resonators, CSIC, Spain

Ultrasonic Thermometry Inside Tissues based on High-resolution Detection of Spectral Shifts in Overtones of Scattering Signals, I. Bazan, A. Ramos, A. Ramírez, L. Leija, R&D Group "Ultrasonic Systems & Technologies" Institute of Physical and Information Technologies CSIC, Spain

Ultrasonic Transmitter for Positioning of the Large Underwater Neutrino Telescope KM3NeT, M. Saldaña, S. Adrián-Martínez, M. Ardid, M. Bou-Cabo, I. Felis, G. Larosa, C.D. Llorens y J. A. Martínez-Mora, Instituto para la Gestión Integrada de Zonas Costeras (IGIC), Universidad Politécnica de Valencia, Spain

Ultrasonds in bubbly liquids: unidirectional propagation and switch, Christian Vanhille and Cleofé Campos-Pozuelo, Universidad Rey Juan Carlos, Spain

The Use of Ultrasound to Overcome Issues in Micro Process Engineering, Navarro-Brull, Francisco J.; Bonete, Pedro; Poveda, Pedro; Ruiz-Femenía, Rubén; Ramis, Jaime.; Gómez, Roberto, University of Alicante, Spain

Each poster presenter will provide one slide with an overview of their presentation during the Poster Overview Session on Thursday morning at 1100. After lunch, poster presenters will be available to discuss their poster in detail with participants.

Symposium participants will be divided into two groups. One group will take the tour of the Ultrasonic Laboratories of the Department of Sensors and Ultrasonic Systems (DSUS) while the other group has the opportunity to discuss the posters with their presenters.

The Department of Sensors and Ultrasonic Systems (DSUS) builds on previous Ultrasonics Laboratory created in 1971 by Prof. Juan A. Gallego-Juárez.

Presently DSUS work is mainly dedicated towards R&D activities.



UIA 43: More About Our Host DSUS

The Department of Sensors and Ultrasonic Systems (DSUS) builds on previous Ultrasonics Laboratory created in 1971 by Prof. Juan A. Gallego-Juárez within the Acoustics Department of the Center for Physics Research (Centro de Investigaciones Fedscas, L. Torres Quevedo) at the Spanish National Research Council (CSIC). Following the creation of the Institute of Acoustics, IA (1975), the Ultrasonics Laboratory became one of the three IA research units under the name Structural Research Unit for Ultrasonics (“UEI Ultrasonidos”). In 1994 new CSIC regulations were established and the Research Unit for Ultrasonics was transformed in the Department of Ultrasonic Signals, Systems and Technologies. Finally, in 2013, such Department was integrated in the new Institute for Physics and Information Technologies

(DSUS).

Within the Ultrasonics Department the Power Ultrasonics Group (GUP) has been very active throughout decades with a large and recognized experience in the research and development of new power ultrasonic transducers for fluids and multiphase media as well as in ultrasonic processing research. The GUP has been the founder of the spin-off company PUSONICS S.L devoted to the development and commercialization of power ultrasonic technologies for industrial and environmental applications.

Presently DSUS work is mainly dedicated towards R&D activities for the development of ultrasonic sensors, actuators and corresponding electronic systems, including their physical foundations and applications. This work implies carrying

out research in advanced technologies under two main research lines:

- a) Ultrasonic sensors and systems for non-invasive analysis, modeling and testing of media (Low Intensity Ultrasonics).
- b) Ultrasonic systems and actuators for treatment and production of their effects on media. Advanced modeling and design technologies for a variety of applications (Power Ultrasonics)

The aim of the research lines cultivated in the department is to develop new knowledge, models, and effective technological solutions for the analysis of media, materials and structures as well as for the production of permanent effects within them.

IEC TC 87 - WG3 & WG7

WORKING GROUP 3 – HIGH POWER TRANSDUCERS and **WORKING GROUP 7 – ULTRASONIC SURGICAL DEVICES** will meet in Madrid, Spain on Tuesday, 22 April immediately preceding UIA43: 2014 Symposium of the Ultrasonic Industry Association.

The meeting will be held at Instituto de Tecnologías Físicas y de la Información “Leonardo Torres Quevedo” in the Sala de Juntas on the second floor. The address is Serrano 144, Madrid 28006, just in front of the Colegio Ramiro de Maeztu.

Participants and observers are welcome to register for and participate in UIA 43 and to stay at the selected hotel for UIA 43 (see page 9 for information.)

President's Message

The Beauty of Bubbles

Historically, the Ultrasonic Industry Association membership has comprised organisations that use acoustic waves to effect changes (“We power your sound ideas”), and has hence attracted folks with interest in altering manufacturing materials on the one hand, and causing beneficial effects in biological tissues on the other. The power levels applied in such disciplines are frequently accompanied by the occurrence, and prodigious power of, bubbles to cause those material changes. This is frequently through the action of cavitation – long debated, seldom characterised, sometimes sworn at and revered in equal measures. Diagnosing medical

conditions using ultrasound is also enhanced by bubbles, encapsulated spheres containing exotic gases, injected into the bloodstream, which reflect ultrasound signals strongly, and these same diagnostic agents are now being equipped with therapeutic contents, to deliver powerful drugs exactly where they're needed (Ultrasonic Payload Services, perhaps? Consider it done).

Much of science takes its inspiration from nature, and this is particularly applicable to bubbles: humpback whales and dolphins generate bubble nets to confuse and capture fish, and dolphins can actually do better than human science, in using their sonar in novel ways to ‘see’ through the bubbles they create. To make all these

things happen requires considerable control and precision, because of the intimate relationship between bubble motion and ultrasound parameters, and because of the strong dependence of bubble behaviour on the surrounding environment.

So what if we could use the bubbles themselves to tell us about their locale? Come to UIA 43 in Madrid, and you may just hear how that can be done.

This topic is just one of the many which we are delighted to unveil to you in this issue of Vibrations, and I personally look forward to seeing you in Spain in April.



**Mark Hodnett,
UIA
President, points
out the value of
UIA:**

Much of science takes its inspiration from nature, and this is particularly applicable to bubbles.

What if we could use the bubbles themselves to tell us about their locale? Come to UIA 43 in Madrid, and you may just hear how that can be done.

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UIA 43: 23 - 25 April 2014 Madrid, Spain

Ultrasonics Labs at the Institute for Physics and Information Technologies where the Thursday tour will be: drying, de-foaming, non-linear characterization of transducers, semi-anechoic chamber and more.



Map of Iberamerica

UIA is delighted to go to Madrid, Spain for the 43rd Annual Symposium.

The program will go from Wednesday, 23 April to Friday, 25 April.

Madrid was chosen by the UIA Board of Directors for many reasons:

- As an international association, UIA is committed to

meeting in different locations around the world.

- The support that CSIC (Consejo Superior de Investigaciones Científicas) can provide as a host location includes strong connections throughout Iberamerica as well as the Ultrasonics Laboratory for the Thursday afternoon tour.
- The ease of travel to Madrid

from Europe, North America and beyond. As a major European air hub, there are direct and inexpensive flights to Madrid from all major cities.

- The meeting facilities are designed well for the UIA Symposium, with our meeting facilities in the historical Residencia de Estudiantes pictured below.

More about CSIC

The Consejo Superior de Investigaciones Científicas (CSIC) (Spanish National Research Council) is the largest public institution dedicated to research in Spain and the third largest in Europe. Belonging to the Spanish Ministry of Economy and Competitiveness through the Secretary of State for Research, Development and Innovation, its mission is to foster, coordinate, develop and promote scientific and technological research, of a multidisciplinary nature, in order to contribute to advancing knowledge and economic, social and cultural development, as well as to train staff and advise public and private entities on this matter.

The CSIC has 135 Institutes or Centres distributed throughout Spain. There is also a delegation in Brussels. It has considerable experience in both participating and managing R&D projects and training grants. Under the 6th Framework Pro-

gramme, the CSIC has signed 418 actions (37 coordinated by the CSIC). Under the 7th Framework Programme, the CSIC has signed 370 actions (35 coordinated by the CSIC).

The CSIC has been the 5th organisation in Europe in project execution and funding in the 6th Framework Programme. The CSIC is the responsible of 20% of international scientific publications of Spain and 30% of the Spanish European patents. It has a staff of more than 10,000 employees, among them 3,200 scientists and about 3,800 pre and postdoctoral researchers. It also manages a range of important facilities; the most complete and extensive network of specialist libraries, and also has joint research units. Its multidisciplinary and multisectorial nature means CSIC covers all fields of knowledge. Its activity covers everything from basic research to technological development.

Below is the charming environs where our symposium meeting space is located.



Symposium Schedule

The UIA Symposium will be held Wednesday - Friday, 23 - 25 April at the Residencia de Estudiantes.

We will have full day sessions for Industrial/Research and Medical applications on Wednesday and Friday.

Thursday morning will feature workshops and special exhibitor presentations based on the Pecha Kucha format - 20 slides are presented with 20 seconds

allotted to each slide. These "Lightning Rounds" will enable exhibiting companies to share their information with all the participants. Exhibitor representatives will still have the opportunity to talk with symposium participants and share their literature during our symposium breaks.

The student and researcher poster session will also be held on Thursday. UIA will again present a cash prize to the

winning student poster.

Tours and demonstrations at the CSIC Ultrasonics Laboratory will be Thursday afternoon.

Thursday evening will conclude with a special event for UIA Symposium participants that will feature a quintessential view of Madrid. See below for more information about the Corral de la Moreria.



UIA 43: Madrid

23-25 April 2014

Staying in Madrid: Hotel Hesperia Emperatriz

As we did at our previous symposia NPL and the University of Scotland in Glasgow, we will take advantage of campus meeting space for our program. This flexibility allows delegates to chose their own accommodations, should they wish. However, UIA is arranging for a block of rooms at the Hotel Hesperia Emperatriz in Madrid that is large enough for all our participants to stay in

one location.

Room rates are just €85.25 single and €94.05 double. The hotel is just .9 mile / 1.4 km from the auditorium at CSIC - within easy walking distance after the buffet breakfast at the hotel (included in your room rate).

See page 16 for the reservation form.



Thursday Evening: Corral de la Moreria

On Thursday evening, UIA is visiting the Corral de la Moreria, a restaurant which holds one of the most famous and prestigious Flamenco shows in the world.

The evening includes a three course dinner featuring traditional Spanish cuisine. After dinner, you will be treated to a



magnificent show featuring some of the best known Flamenco dancers.

This event is included



in the full registration fees. Tickets may be purchased for your guest when you register for the symposium.

Exhibit and Sponsor Information

2014 UIA Symposium

23-25 April 2014, Madrid, Spain

CSIC - Madrid, Spain

UIA offers companies access to key influencers in the international ultrasonic community at their annual symposium. This year, we offer both exhibit and sponsorship opportunities:

Sponsorship Levels

Level One - Refreshment sponsorship - \$1,500 includes recognition in symposium literature, and logo on refreshment table;

Level Two - Reception sponsorship - \$1,995 includes recognition in symposium literature, and logo on buffet table;

Level Three - Lunch sponsorship - \$2,750 includes recognition in symposium literature, and signage at lunch;

Level Four - Proceedings sponsorship—\$2,000 includes recognition in symposium literature, and recognition in the printed and electronic proceedings.

"The UIA Symposium was very informative and interactive. Our company found it to be a valuable experience for showcasing our technology and interacting with key people in the Ultrasonic Industry. Half of the audience were already customers, and the other half were potential customers with applications for our technology."

Eric Lawrence, Polytec Inc.

Please use the form attached or contact UIA for more information

Exhibit Opportunities

Level One Exhibitor – UIA Corporate or Sustaining Member \$1,795 - includes recognition in symposium literature, opportunity to make a 6 minute presentation to participants; literature only table and one full symposium registration;

Level One Exhibitor – Non Member \$1,995 - includes recognition in symposium literature, opportunity to make a 6 minute presentation to participants; literature only table and one full symposium registration;

Level Two Exhibitor – UIA Corporate or Sustaining Member \$2,470 - includes recognition in symposium literature, opportunity to make a 6 minute presentation to participants; literature only table and two full symposium registrations.

Level Two Exhibitor – Non Member \$2,750 - includes recognition in symposium literature, opportunity to make a 6 minute presentation to participants; literature only table and two full symposium registrations.

All fees are if paid prior to 20 December, see contract...

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Phone: +1.937.586.3725
Fax: +1.937.586.3699
uia@ultrasonics.org
www.ultrasonics.org



Products and Services used by UIA members

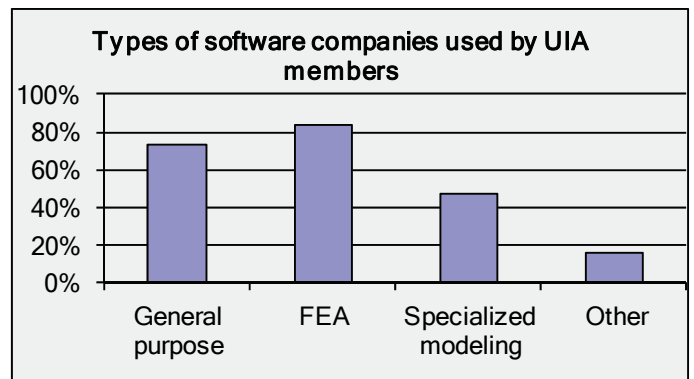
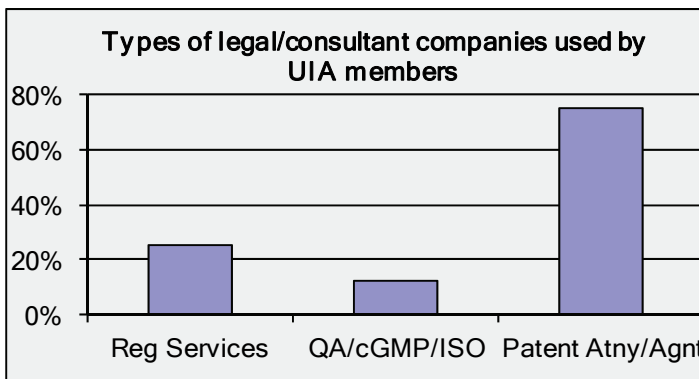
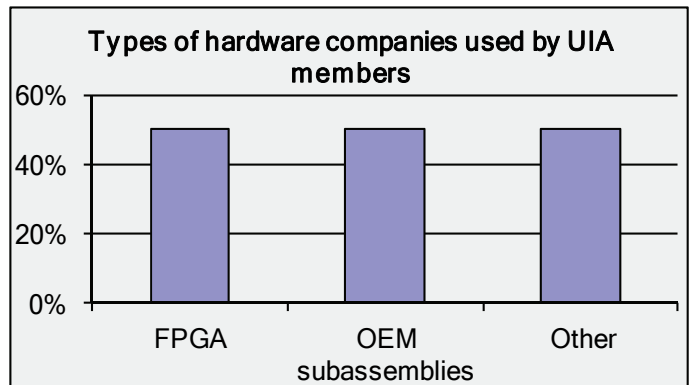
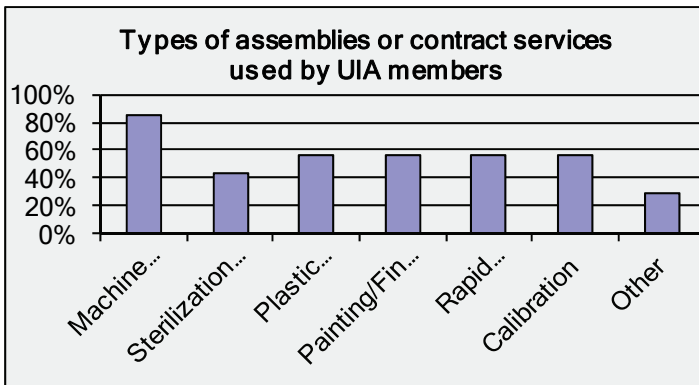
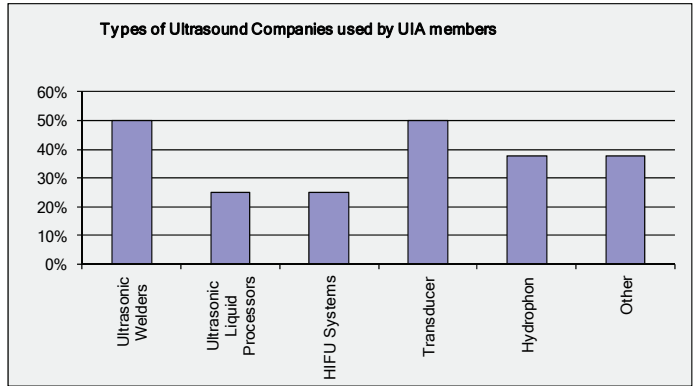
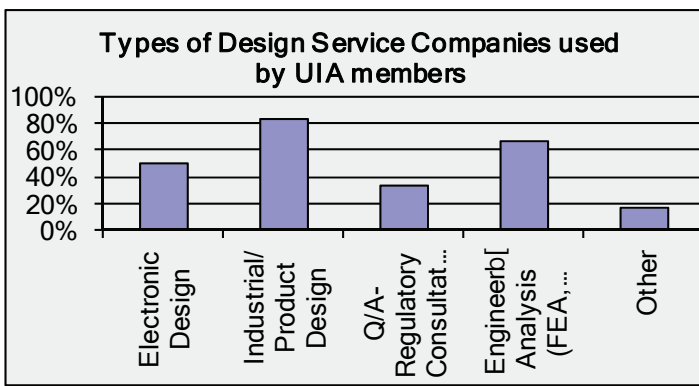
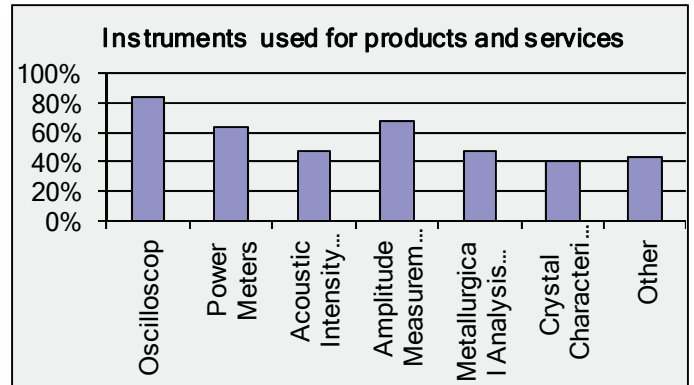
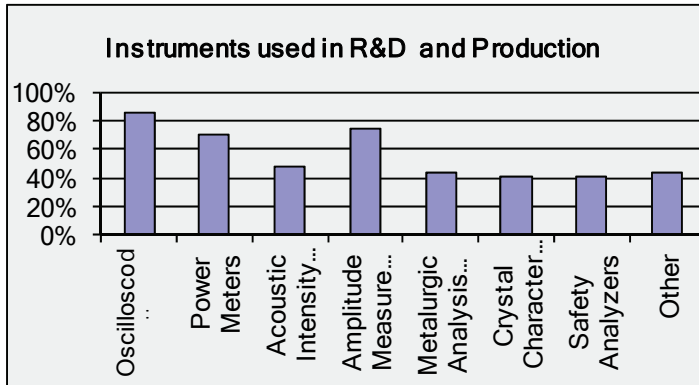


Exhibit and Sponsor Information 2014 UIA Symposium

23-25 April 2014, Madrid, Spain

NEW Exhibit Feature This Year!

Our location at the CSIC Auditorium provides UIA with the opportunity to introduce a new exhibitor program based on the Pecha Kucha concept. Simply, this is what each exhibitor gets:

- Presentation time of 400 seconds to present 20 slides, 20 seconds per each slide
- The presentation may be about any - or all - of your ultrasonic products or services
- The presentation will be made to all of the participants at an appropriate time (if your company is in the medical arena, your presentation will be scheduled the same day as the medical sessions).
- Because the lobby of the auditorium is open to the other CSIC students, displays will be limited to literature displays only.
- Exhibitors also have the opportunity to demonstrate their equipment at the CSIC Ultrasonic Laboratory during the tour on Tuesday afternoon. Space for this demonstration is limited and is available on a first come / first served basis.

WANT TO KNOW MORE ABOUT PECHA KUCHA? GO TO [HTTP://WWW.PECHAKUCHA.ORG/FAQ](http://www.pechakucha.org/faq)

**Please use the form attached or
contact UIA for more information**

P O Box 2307
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www.ultrasonics.org





43rd Annual UIA Symposium 23 – 25 April 2014

**CSIC
Madrid, Spain**

Please complete the contact information below. This person will receive all exhibitor correspondence.

Company Name: _____

Contact Person: _____

Title: _____

Address: _____

City: _____ **State:** _____ **Zip:** _____

Phone: _____ **Fax:** _____

E-mail: _____

Second Registrant: _____

EXHIBIT SCHEDULE

Wednesday, 23 April 2014	Thursday, 24 April	Friday, 25 April
800 Literature Set-up	800 - 1200 Literature Tables	800 - 1530
900 - 1600 Literature Tables	1330 – 1600 Practical demos	

PAYMENT INFORMATION

Sponsor *please indicate the sponsorship level* PLEASE SPECIFY THE EVENT YOU WISH TO SPONSOR _____ \$ _____

Exhibit I – includes one registration

BEFORE 20 December <input type="checkbox"/> Member - \$1,795	<input type="checkbox"/> Non-Member - \$1,995	
I January and after <input type="checkbox"/> Member - \$1,975	<input type="checkbox"/> Non-Member - \$2,195	\$ _____

Exhibit II – includes two registrations

BEFORE 20 December <input type="checkbox"/> Member - \$2,470	<input type="checkbox"/> Non-Member - \$2,790	
I January and after <input type="checkbox"/> Member - \$2,670	<input type="checkbox"/> Non-Member - \$3,070	\$ _____

TOTAL \$ _____

Table Top Exhibit includes literature table, company identification sign, Pecha Kucha presentation and Tuesday practical demo (on first come / first served basis) PLUS REGISTRATION(S)

METHOD OF PAYMENT:

Check Enclosed (*Make checks payable to UIA*)

Purchase Order number or attach copy _____

Please charge my credit card: MasterCard VISA Amex

Person's name on card: _____

Card #

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 Exp

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 /

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We agree to comply with all the Rules and Regulations as provided and to the conditions under which displays in Hilton Orlando LBV may be held. We understand that space is available on a first-come, paid-in-full basis.

Authorized Signature Date

Return completed contract to: UIA ♦ PO Box 2307 ♦ Dayton, OH ♦ 45401-2307
Phone: 937.586.3725 ♦ Fax: 937.586.3699

Please complete in BLOCK CAPITALS or type and print – return by fax or post

Hesperia Emperatriz Hotel Lopez de Hoyos, 4 28006 Madrid – Spain Tel: +34.915.63.80.88 Fax: +34.915.63.98.04 Contact name: Sabrina Acebal s.acebal@nh-hotels.com Loc: 188228471	RATE PER ROOM AND NIGHT excluding 10% taxes				
	BEDROOM TYPE	Double/Twin for Single Occupancy		Double/Twin for Double Occupancy	
	Standard Room Breakfast Included	77.50€		85.50€	
	10% VAT Excluded <i>For extra nights charges, please check with our reservations department for best available rate.</i>				

Date of arrival _____ Hour _____ Date of Departure _____ Hour _____

Last Name _____ First Name _____

Title _____ Company _____

Mailing Address _____

County _____

Telephone + _____ Fax + _____

Email _____

Accompanied by _____

Reservation guaranteed by my credit card:

Master/Eurocard
 American Express
 Visa
 Diners

Cardholder Name _____

Card Number _____

Exp Date _____ Security Code _____

Signature _____

Please note:

- To take advantage of these rates, please use ONLY this reservation form. No reservation will be accepted without filling all the above information and sending this form to hotel contact.
- UIA has a contracted room block in our hotel. Hotel Hesperia Emperatriz will be able to deny a room reservation request if the UIA room block has been already booked. In case of any room available hotel will by no means increase Universia contracted rate for this event.
- Any reservation request arriving after final cut off date will be confirmed at congress rate when bedrooms available.
- Check in time is 15:00H/ Check out 12:00H. Please contact the hotel to arrange an early check-in.
- Payment will be done directly at reception desk
- Credit card will be requested at reception desk during check-in process. May credit card details in this form not match credit card provided during check in process hotel Hesperia Emperatriz**** will be able to keep and use both as guarantee for reservation or/and stay.

Cancellations Policy:

- Cancellations made up to 72 hours prior to arrival are free of charge.
 - Penalty of one (1) night for cancellations made between 72 and 24 hours prior to arrival.
 - Penalty of 100% of total amount for cancellations made less than 24 hours prior to arrival or in case of no-show.
- By signing this registration form hotel is authorized to charge in credit card provided any cancellation fee incurred in this reservation.



43rd Annual UIA Symposium Registration 23 - 25 April 2014 CSIC, Madrid, Spain

First Name

Last Name, Designation

Nickname for badge

Position/Title

Employer

Employer City/State

For mailing purposes, I prefer my

- Home address as follows:
 Work address as follows:

Address

City, State, Zip, Country

Phone

E-mail

Please register me in the following manner:

Full Registration includes, Thursday evening event - please check boxes to confirm your participation

- Full conference registration
 YES, I will attend Thursday Evening

Select for which category you are registering:

- Member Nonmember Exhibitor
 Speaker Student Sponsor

Daily Registration

Thursday does NOT include Thursday Evening Event

Select which day: Select your category:

- Wednesday Member
 Thursday Nonmember
 Friday Speaker Researcher
 Student (see sidebar)

Sponsorship

Level _____

Special Events

Thursday Evening Event # of Tickets _____

Fee Schedule	By 12/31	1/1/14 & after
Full conference (Wednesday-Friday)		
Full conference - Member	\$875	\$965
Full conference - Nonmember	\$995	\$1,095
Speaker - Full conference	\$750	\$825
Student - Full conference	\$495	\$545
Daily fees (Wednesday, Thursday or Friday)		
Daily Rate - Member	\$295	\$325
Daily Rate - Nonmember	\$400	\$440
Speaker - Daily	\$295	\$325
Student - Daily	\$195	\$195
Student - Poster Presenter	\$75	\$75

Exhibit Levels - Members

I - 1 table, 1 full registration	\$1,795	\$1,975
II - 1 table, 2 full registrations	\$2,470	\$2,670

Exhibit Levels - Non members

I - 1 table, 1 full registration	\$1,995	\$2,195
II - 1 table, 2 full registrations	\$2,790	\$3,070

Sponsorship Levels

I - Refreshment Sponsor	\$1,500	\$1,500
II - Reception Sponsor	\$1,995	\$1,995
III - Lunch Sponsor	\$2,750	\$2,750
IV - Proceedings Sponsor	\$2,000	\$2,000

Special Event

Thursday Evening Event \$180 \$190
NOTE: Thursday evening is included in the FULL conference registration fee. Additional tickets may be purchased for companions.

Payment Summary *FIN for voucher use only: 13-6130371*

Registration/Sponsorship/Exhibit \$ _____
 Thursday Evening Event \$ _____
TOTAL DUE \$ _____

Method of Payment

- Payment enclosed. Make check payable to UIA.
 Charge: MasterCard Visa Amex

Exp

Date ____ / ____ Code: _____

Person's name on card: _____

My billing address is the address used for my registration

Signature

Students presenting posters on Thursday may also attend either the Wednesday or Friday session at no additional charge. Please select which additional day.

You may register on-line at www.ultrasonics.org

- MAIL registration form and payments to UIA, 11 W Monument Avenue, Ste 510, Dayton, OH USA 45402
- FAX registration form to +1.937.586.3699

Ultrasonic Industry Association

11 W Monument Avenue, Suite 510
Dayton, OH USA

Phone: +1.937.586.3725
Fax: +1.937.586.3699*
E-mail: uia@ultrasonics.org
Facebook: UIAWorld
Twitter: @UIAWorld



**VISIT US AT
ULTRASONICS.ORG**

How can ultrasonics enhance the value of your business?

UIA is the international business forum for users, manufacturers, and researchers of ultrasonics. Our members use acoustic vibrations to improve materials, industrial processes, and medical technology. We call this "powering sound ideas."

Let's work together to power your sound ideas. Contact a member consultant or company through our Referral Network, learn about ultrasonics with our online primer, or meet industry leaders at our next symposium.

Two views of the Madrid skyline and the location of UIA43 on the CSIC campus

