

Powering Sound Ideas

## UIA 44: 2015 Symposium in Washington DC USA

The 2015 Symposium will be held at the Georgetown University Hotel and Conference Center 20 - 22 April. *The symposium that UIA last held in Washington DC in 2008 drew the largest number of participants we have had in the past decade*, Dan Cotter, UIA President noted in announcing the symposium plans.

UIA 44 will feature both medical and industrial sessions. There will be workshops on ultrasonics, and a poster session featuring the work of researchers in the field.

A tour of the FDA Laboratories will also be part of the symposium. With FDA's involvement in the approval of ultrasonic

devices, this tour will help companies preparing to get their newest ultrasonic products to market.

There will also be a presentation by a noted patent attorney to explain the recent changes to US Patent law.

**Ron Manna** and **Alan Winder** are Symposium Co-Chairs, with **Robert Muratore** as Medical Session Chair, **Dominick DeAngelis** as Industrial Session Chair and **Alexy Peshkovsky** as Poster Co-Chair.

Invited speakers include:

- **Laurence Needleman, MD**, Director, Ultrasound Division, Co-Director, Vascular Center, Thomas Jefferson University

- **Flemming Forsberg, PhD**, Director of Ultrasound Physics, Division of Ultrasound, Dept. of Radiology, Thomas Jefferson University
- **Levon Nazarian, MD**, Professor of Radiology, Program Director, Diagnostic Radiology Residency, Vice Chair for Education, Thomas Jefferson University
- **Kenji Uchino, Ph. D., MS, MBA**, Professor, Electrical Engineering, Director, International Center for Actuators and Transducers, The Pennsylvania State University

Exhibits by companies that offer ultrasonic products and services will be also be showcased.

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See pages 2-3 for the invited speakers' abstracts.

See page 10 for Call for Papers.

## UIA 43: 2014 Symposium

The full recap of the recent symposium in Madrid, Spain begins on page 4. Read about what has our participants so intrigued.



## Invited Paper: Overview of Muscular-Skeletal Ultrasound



**Levon Nazarian, MD**  
Professor of Radiology,  
Program Director, Diagnostic  
Radiology Residency, Vice  
Chair for Education, Thomas  
Jefferson University

### Advanced Topics: Inter-ventional; Peripheral Nerves; Hernias

Both high level and recreational athletes are subject to many injuries, both acute and chronic. Many of these injuries are handled conservatively, and others need immediate surgical attention. Ultrasound affords the opportunity to perform real time dynamic imaging for diagnosis. Furthermore, ultrasound guided percutaneous interventions can be performed to treat the symptoms. Therapeutic injections of corticosteroid and local anesthetic

can be performed under ultrasound guidance for a wide range of symptomatic conditions such as tendinitis, tenosynovitis, arthritis, and bursitis. Real time ultrasound can monitor the installation of the medication to make sure it is reaching the proper location. Ultrasound guided aspiration can be performed for symptomatic ganglion cysts, liquefying hematomas, and Baker's cysts. Calcific tendinitis can be treated by needle fragmentation and/or lavage. Tendons that have undergone mucoid degeneration, or tendinosis, can be fenestrated using the needle tip, a technique best documented for

chronic tennis elbow. Other ultrasound-guided therapeutic approaches for tendinosis include injections of autologous blood, platelet rich plasma, and hypertonic dextrose solutions. Ultrasound guided minimally invasive therapies have also become commonplace for plantar fasciitis, trigger finger, and carpal tunnel syndrome. The procedural guidance made possible by ultrasound has opened up many new horizons in the treatment of musculoskeletal disorders. Future improvements recommended for enhancing the clinical benefits of IMUS will be presented.

## Invited Paper: Vascular Ultrasound: Current State, Current Needs, Future Directions



**Laurence Needleman, MD**  
Director, Ultrasound  
Division, Co-Director,  
Vascular Center, Thomas  
Jefferson University

Vascular ultrasound diagnoses a diverse number of diseases. In the venous system, venous ultrasound is the gold standard. Acute DVT and chronic venous insufficiency affects millions of lives. The diagnoses rely on accurate gray scale ultrasound and spectral Doppler measurements. The chronic venous examination is time consuming and difficult for sonographers and needs methods to simplify data acquisition and analysis. The diagnosis of acute DVT is straightforward but better means to grade older clot and recurrent DVT is needed. Methods such as elastography are being considered for these patients.

In the arterial system the examinations are relatively mature. Deep arterial circulations such as the renal arteries are among the hardest areas to scan. Improved imaging will help keep this examination competitive with CT and MR techniques.

The diagnosis of cervical internal carotid stenosis is straightforward. Nonetheless, correlation with "gold standard" angiography has led some to downplay the technique but all angiographic measurements have errors. Doppler has some major advantages, e.g. absence of radiation, repeatability, portability but inconsistencies in

interpretation abound and have restricted some from embracing this test. A move to a national standard is under discussion. Despite carotid stenosis being one of the first vascular beds to be investigated by duplex techniques, the techniques are ready for change. Velocity measurement that take into account the various vectors of flow, flow measurements, or new gray scale measurements (perhaps with contrast agents or new gray scale modes which encode moving blood) may change the way we diagnose ICA stenosis in the future.

*Please see the Call for Papers on page 10 to submit your abstract for consideration for either the industrial or medical sessions. Abstracts are due by 31 October.*

## UIA 44: Workshops - Tuesday 21 April 2015

Tuesday morning, 21 April, will feature two workshops. One is **Sonic and Ultrasonic Measurements in Oil and Gas Well Logging** presented by **Eric Molz, Meggitt Sensing Systems**.

Acoustics is vital in many phases of the oil and gas well industry, from seismic field exploration to hydrocarbon well production and recovery. One area of this industry, oil and gas well logging, has many unique acoustic, and specifically ultrasonic, measurements.

Our second workshop will be presented by Eberhard Hennig from PI Ceramic, Germany, on **Designing with Piezoceramics Workshop**.



Eberhard Hennig

This workshop will present an overview of PI's rule-of-thumb design guidelines for piezoceramics with specific application examples tailored to power ultrasonic transducers

and sensors. It will also include an update on PI's latest lead-free piezoceramic materials with detailed comparisons versus leaded materials on their performance and application differences. The workshop will include step-by-step examples on applying the technology along with applications information such as material selection, preload, heat-treatments, electrodes, surface finish/flatness, power handling, autoclave cycling and vibrational life.

The Sonic and Ultrasonic Measurements in Oil and Gas Well Logging workshop will present the methods of sound generation, reception, and interpretation standard to oil and gas well logging.

## Invited Paper: Loss Mechanism and High Power Characterization

With accelerating the commercialization of piezoelectric actuators and transducers, the main research focus seems to be gradually shifting from the "real parameters" such as larger polarization and displacement, to the "imaginary parameters" such as polarization/displacement hysteresis, heat generation, and mechanical quality factor which is originated from three loss factors (dielectric, elastic and piezoelectric losses). Reducing hysteresis and heat generation, and increasing the mechanical quality factor to amplify the resonance displacement are the primary target. Our group has been working on the loss characterization of piezoelectrics for 30 years. In 1980s, we primarily worked on the hysteresis measurement by using a pseudo-DC technique. Loss could be measured under high

voltage and stress level, but the experimental set-up was bulky and expensive. In 90s, we proposed a simple method with a pulse drive. Though the set-up was inexpensive and could be used for high voltage level, elastic loss could only be measured with low accuracy. In recent several years we are focusing on a new resonance AC drive method. This technique is basically a precise admittance measurement around both the resonance and antiresonance peaks, from which we obtain the mechanical quality factors for the resonance ( $Q_A$ ) and the antiresonance ( $Q_B$ ). From the values of  $Q_A$ ,  $Q_B$ , and the electromechanical coupling factor  $k$ , we can obtain all three dielectric, elastic and piezoelectric loss factors precisely. The measurement simplicity and accuracy of this methodology are very attrac-

tive, and our proposal will be widely accepted as a standard method in the piezoelectric actuator community. In this paper, a novel method for determining the piezoelectric losses is proposed; (1) method how to realizing symmetrical admittance/impedance curves for obtaining the mechanical quality factors  $Q_A$  and  $Q_B$  around the resonance and antiresonance frequencies, and (2) process how to calculate the piezoelectric three losses from the values of  $Q_A$  and  $Q_B$ . Our discussion in this paper is limited for samples of  $k_{31}$ ,  $k_{33}$ , and  $k_{15}$  modes.

We will also discuss the differences between the fundamental phenomenology of piezoelectric and magnetostrictive materials, including the loss mechanisms, and also discusses the composite effect between these two materials. From a



Kenji Uchino  
ONR Global-Asia, Office of Naval Research, Tokyo, Japan; & Int'l Center for Actuators & Transducers, The Penn State University, USA

long experience in teaching smart materials, the author discovered that many of the junior professors in materials, electrical engineers and mechanical engineers misunderstand the basic concepts/definitions of professional terminologies in smart materials. This presentation is not focused on providing up-to-date developments, but on re-learning the basics correctly.

## UIA 43: 2014 Symposium Recap



**Enrique Riera, Symposium Chair**



**Andrea Cardoni**



**Patricia Ordóñez**

Madrid was our venue for the 43rd Ultrasonic Industry Symposium, and it provided an excellent opportunity for delegates to network with international colleagues, and to hear some of the latest developments in medical and industrial ultrasound applications.

Seventy-four attendees enjoyed three days of presentations, posters, tutorial workshops and a laboratory tour, all within the environs of CSIC, Madrid. Our local host, and joint Symposium Chairs, Enrique Riera (CSIC) and Margaret Lucas (Glasgow University) assembled a diverse, international programme, spanning ultrasound-assisted drying of foods, to breast cancer diagnosis.



**Margaret Lucas**

### Day 1

Our first day was devoted to a very full programme of developments in industrial ultrasound. UIA President Mark Hodnett opened proceedings, describing work carried out at NPL, UK, to compare objectively the outputs of several commercially-available cavitation detection systems, using a cylindrical reference vessel at 21 kHz, and showing that the acoustic pressure alone is not sufficient to describe the details of cavitation activity. Luis Gaete-

Garretón from the University of Santiago, Chile, then described the background to ultrasonic atomisation applications, before Alexey Peshkovsky from Industrial Sonomechanics showed us the possibilities of scaling up nanoemulsion production towards industrial viability, using 3 kW barbell horns.

Pusonics' Andrea Cardoni then described nonlinear effects manifested in Langevin and airborne plate transducers, together with strategies to counter them. Following our first refreshment break, Eberhard Hennig from PI Ceramic, Germany, gave a valuable account of piezoelectric materials and their properties, going into very useful detail on DC and AC behaviours, and reminding us all of the significant benefits of reviewing older scientific literature!

Joint Symposium Chair Enrique Riera then described in detail recent development work in plate transducers for airborne processes, including using a laser vibrometer to determine vibration modes, and went on to show details of a production scale facility for ultrasonic extraction of almond oil. Patricia Ordóñez from the Universidad Politécnica de Valencia was next up, and described her work in applying theoretical and practical approaches for utilising parametric sources for shallow-water marine applications.



Taking us up to lunch, **Eduardo Moreno** from Tecnalía, Spain described his group's research on applying guided wave approaches for phase velocity determinations within composite plates.

Before resuming the Industrial Session, UIA Vice President Dan Cotter presented outgoing President, Mark Hodnett, with an award to recognise his four years' service, which was warmly received by all delegates. Our scheduled guest speaker from Universitat Politècnica de Valencia, Antonio Mulet, was unfortunately unable to attend at short notice for medical reasons. His colleague, Jose Garcia-Perez spoke instead, with two presentations during the session about airborne ultrasound in drying processes. The technique, using stepped-plate and cylindrical processors has been applied extensively within the food industry, for preserving and storing citrus fruits and vegetables, with enhancements of up to 20% in mass transfer rates. Ultrasonic drying appears to produce larger intercellular spaces than conventional methods, hence providing improvements.

## UIA 43: 2014 Symposium Recap *continued*



**Professor Lorena Pardo** (CSIC) gave an interesting presentation on lead free piezoceramics, examining the complexities of phase transitions and their impact on poling. In the last of the mini session on ultrasound-assisted air drying, Henry Sabarez (CSIRO, Australia) then showed his work on lab-based facilities and predictions, including developing a computational model for convective drying of prunes.



UIA Board Member **Dominick DeAngelis** described Kulicke and Soffa's latest progress in

enhancing their wire-bonding technologies, examining potential improvements that single crystal piezos might offer, over PZT8. Glasgow's Andy Mathieson then outlined approaches for minimising parasitic mode excitation within medical devices such as bone cutters through design improvements, by optimising the position of the piezo stack. Alfredo Carazo from Micromechatronics Inc, our guest speaker from UIA42 in Orlando, FL, discussed developments in piezo transformers for use in high magnetic and electric field medical environments. Rounding off a detailed and varied industrial session, Dave Grewell (Iowa State) presented an update to his groups work on ultrasonic cutting of polylactic acid films, investigating tool lifetimes.

Our evening reception was sponsored generously by Meggitt Sensing Systems, with delegates enjoying wine, beer and tapas, renewing friendships and making new contacts.



### Day two

The first of our workshop speakers was **Mitt Thompson**, CTO of

Measurement Specialties Inc.

MSI provides piezo elements, integrated systems and components to a vast range of diverse industries worldwide. Mitch spoke about commercial applications for ultrasonic piezoelectric sensors, focusing in particular on the design and execution challenges presented by transesophageal echocardiography transducers, ultrasonic air bubble detectors and ultrasonic gap sensors for harsh environments. He closed with a discussion of PVDF based flexible in-road axle counting sensors, so commonplace on our highways worldwide.

Our second workshop was given by Professor **Sandy Cochran** and Muhammad Sadiq from IMSAT, University of Dundee, UK, on the evolution, formulation, manufacture characterisation and application of single crystal piezos. Reminding us along the way of the crystal structures within ferroelectrics, their domains and polarisation, we heard also about crystal growth methods, and finally, case studies of different applications, ranging from ultrasonic actuators to high intensity therapeutic sources.

The next session comprised a brief run through of each of the posters that were then presented by their authors in the afternoon. Each poster was given a 2 minute slot, in which the main objectives, findings and outcomes of the research,



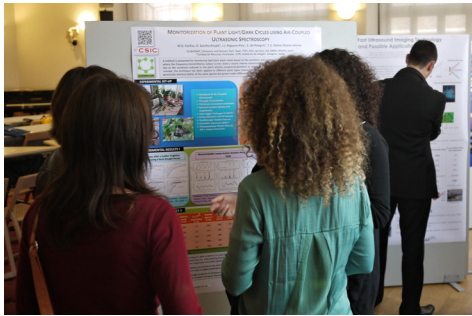
**Andy Mathieson**



## 43: 2014 Symposium Recap *continued*

with a great range of topics, spanning medical ultrasound elastography imaging to metal oxide synthesis.

Following lunch, the afternoon sessions were split between browsing the posters discussed in the morning, and a detailed tour of the laboratory facilities at CSIC, hosted and led by our Symposium co-Chair, Enrique



Poster Session

Riera. Journeying through the laboratories on three floors allowed delegates to see the breadth of lab-scale and industrial-scale experiments and facilities, used to carry out all aspects of airborne and waterborne sound research. Particular highlights included development of a ring transducer array and scanning modality for breast imaging (also presented during the poster session), airborne ultrasound detection of circadian rhythm effects in plant leaves, and an ultrasonic textile washer. Thursday evening saw delegates enjoying a traditional Spanish three course meal and an excellent after-dinner Flamenco show at the Corral de la Moreria.

### Day 3

The final Symposium day featured the latest developments in medical-related applications of low and high power ultrasound. Kicking us off, Pablo Iglesias from Universitat Politècnica de Valencia described

computational modelling studies, to investigate beam deviations when using transcranial ultrasound for assisting blood-brain-barrier applications. Raquel Valdez (CINESTAV-IPN, Mexico) then took us through her finite element modelling work on tissue heating arising from HIFU transducer application, demonstrating the need to incorporate nonlinearities to improve simulations.

Sandy Cochran (IMSAT, Dundee, UK) was next up, describing his colleague, Zhen Qiu's work on developing a distinctive focused ultrasound transducer, utilising 96 piezo crystal elements arranged in a geodesic array, controlled using a 32-channel Diagnostic Sonar modular instrumentation system. Following a refreshment break, Chris Fury (NPL, UK) described his PhD work in developing a miniature transducer, operating at MHz frequencies for exciting microbubbles within a microfluidics chip, part of a project to investigate their potential for use as local



environmental sensors. Following this, **Fernando Arce Vega** (CINESTAV-IPN, Mexico) presented his work on 3D ultrasound image reconstruction from 2D slices, with specific application to

detailed tumour diagnosis in breast cancer, achieving almost 92% reconstruction accuracy.



UIA Board Member **Wanda Wolny** then described recent progress in developing high frequency imaging transducers at Meggitt, based on a laser patterned gold electroded annular array design, achieving on-axis pressures of almost 10 MPa at frequencies of 25 MHz, with bandwidths of 12 MHz. Our last presentation



before lunch was our invited speaker, **Wagner Pereira** (Federal University of Rio de Janeiro, Brazil), who discussed in detail the identification, characterisation and combination of wide range of textural and morphological parameters for quantifying breast lesions using ultrasound,

### 43: 2014 Symposium Recap *continued*

including aspects such as fractality and circularity. Morphological parameters provided better discrimination in imaging application.

Prior to the final Symposium session commencing, outgoing UIA President Mark Hodnett introduced, and formally



introduced **Dan Cotter**, who was voted in as the new UIA President at the Board Meeting preceding the Symposium (see page 8). The afternoon presentations commenced with



**Muhammad Sadiq** (IMSAT, Dundee, UK), describing research into ultrasonic activation of a standard gauge 20 needle, with the aim of reducing needle misplacement during biopsies, and showed encouraging results of preliminary trials in excised

tissue and on cadavers. New UIA President Dan Cotter then discussed Integra's work in tissue selectivity, investigated via realtime power monitoring, high speed camera imaging, and by studying the response of tissue and blood vessels in fresh porcine liver. Moving our discussions to dentistry, **Emilia Pecheva** from the



University of Birmingham, UK, presented her research on biofilm removal using commercial dentistry tips, characterising devices using laser vibrometry, and examining the role of cavitation.



**Noé Jiménez** (Universitat Politècnica de Valencia) then presented detailed modelling work, simulating nonlinear propagation of ultrasound in tissue media, including those

with complex frequency-dependent attenuation, with a long-term goal of improving understanding of elastography imaging. Our penultimate presentation was given by UIA Board Member **George Bromfield**, who discussed some of his work with Moog Medical on longitudinal/torsional mode transducers for surgical applications, using a full-wave transducer, and showing the results of sensitivity



analyses using finite element methods.

Our final speaker was **Fernando Bejarano** (University of Glasgow), who updated us on his research into cymbal transducers for



**The Scottish Trio: Mohammed, Sandy and Margaret**

application within bone-cutting devices.

Drawing the Symposium to a close, UIA President Dan Cotter thanked the speakers, chairs and co-chairs, and invited all delegates to meet again in Washington DC, April 20-22 2015, for UIA44.

## The Last Word...

### ...From an outgoing President

It has been a very great honour, and a privilege, to have led the Ultrasonic Industry Association since 2010, and I have taken tremendous pride in holding such a prestigious position. Since taking over from Robert Muratore at our 39th Symposium in Boston, I have been thrilled by the ever-increasing diversity of applications, geographical origins and exciting new people coming through in the fascinating field of medical and industrial ultrasound, and furthermore, showcasing them for you, the UIA members, during our Symposia. We have explored some fascinating new cultures and destinations, and will continue to do so in the coming years.



**Mark Hodnett,**  
UIA Immediate  
Past President

I'm delighted that I am able to remain as a UIA Board Member to help do just that.

I wholeheartedly commend to you your new President, Dan Cotter.

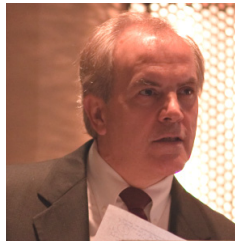
I've known Dan since he first attended a UIA Symposium (at NPL in London, 2007), and since then, his wealth of technical experience has been showcased regularly, through

his insightful presentations on technology developments at Integra. Since joining the UIA Board in 2010, we have also benefitted greatly from his organisational skills and network of contacts, which has helped enable us to bring you such a rich selection of topics at our Symposia. He is a great leader, and I know that his accession to President will take UIA to a new level.

Thank you all for your feedback, support and enthusiasm during my four years in office. I know you'll offer the same, and more, to Dan.

## President's Message

At our Symposium in Madrid we had the opportunity to formally thank Mark Hodnett for his 4 years of service as President of the Ultrasonic Industry Association, and it was a pleasure and simple task as I have seen the evolution of UIA over about 10 years, and the strength of the conferences and organization are at a high-point. Mark's leadership and organization has strengthened the Industrial, Workshop, and Medical programs, to the point that for the first time we are considering the need for parallel sessions. The conferences in Boston, Glasgow, San Francisco and other venues grew, and we had more than 50 abstracts for Madrid. Strength of the technical programs, participation of world-class Keynote speakers, and



**Dan Cotter,**  
Integra NeuroSciences

general levels of presentation have grown. Coincidentally, I was referencing Mark Hodnett's research in cavitation thresholds in ultrasound test vessels in our technical presentation for Madrid. Clearly, Mark's contributions to the UIA and field of ultrasound have been many, and we look forward to his continued participation.

The energy level of presenters in Madrid and the excellent programs bode well for expanded contributions from around the world, as I believe we found a common thread with many new participants with interests from breast cancer pathology, detection, and therapy to 3 kW transducers and novel horns for water treatment or food processing. An interesting anecdote from evening dinner meetings with professors and post docs from UK and Spain I will share follows: essentially, I believe we have greatly

benefitted from the mix of academics, research, and industry. From a fellow in the medical device industry's perspective, I have enjoyed the more fundamental studies and research presented, but have come to learn that the participants from the universities appreciate seeing implementation of devices that are commercialized and being used every day in brain tumor or other surgeries, and in industrial applications. One of the contributing professors, commented on enjoying the presentations on commercialized devices, and I had not considered the interest previously. This may be a unique mutual appreciation, that is perhaps one element of success in the growing UIA.

We have seen great evidence of a strong meeting to come in Washington DC planned for the Spring of 2015, with Keynote speakers



## President's Message, continued

selected for Medical and Industrial sessions well in advance of the normal timing, and format of technical sessions already being discussed in detail. The session and conference chairs are experienced. We just announced the decision to hold UIA Symposium 45, in 2016, in Seattle, Washington. Seattle area has substantial density in ultrasound research and development, with both large and new smaller companies and universities in the area. Dr. Tom Matula, Director of CIMU (Center for Industrial and Medical Ultrasound) at the University of Washington was consulted, as he was a former keynote speaker and participant with UIA, and he graciously indicated their organization will participate at the meeting. We will work to involve Tom and his group, as they have recent experience organizing an ASA meeting in Seattle that attracted almost 2000 participants. We are beginning to discuss UIA Symposium 2017 with suggestions of sites in northern Europe, Germany, or the option of Melbourne, Australia.

With the Madrid symposium, we were able to form a relationship for publication with Physics Procedia of Elsevier, and conference organizers and board members are working to get 30-50 manuscripts reviewed and finalized. This task includes providing the opportunity for past conference manuscripts that were submitted, and awaited publication. The ability to provide a working volume of Industrial and Medical Ultrasonics development is attractive, and it also supports future conference proceedings: a draw for participation of authors in the conferences. We will highlight this in the coming call for papers and Vibrations newsletters.

We have begun to organize a 3-year planning committee, with a call for participation at Madrid, and the response has been great. We will begin meeting shortly, following the wrap-up of Madrid and initiation of our efforts for the symposium in Washington DC. Along with continued strength of the annual symposium, other forums for meeting and connection of members through the year are being discussed including a WebEx or hybrid WebEx and site meeting in the Fall, or about half way through the year. If you missed the meeting

in Madrid and would like to join the committee, please reply. I am grateful to have an excellent group of officers to work with including the recent election of Tony Crandall to VP, and we will keep the board and membership informed of progress on new initiatives.

## UIA Board of Directors 2014 - 2015

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Daniel Cotter  
Integra  
Burlington, MA, USA

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Wanda Wolny  
Meggitt  
Denmark, Copenhagen



Georgetown University Conference Center  
Washington, DC, USA  
20 - 22 April 2015

## 2015 UIA Symposium Call for Papers

The Ultrasonic Industry Association invites you to submit a 200 word abstract for consideration of presentation or poster on 20 - 22 April at its 44<sup>th</sup> Annual Symposium in **Washington DC, USA** at the Georgetown University Conference Center. Plan now to join UIA for this international conference featuring the best of ultrasound from around the world. For more information, please go to <http://www.ultrasonics.org> Please note the appropriate category and preferred format of your proposed presentation:

- Industrial Applications:** NDE, Measurements, Cleaning, Atomization, Materials Processing, Effluent Processing, Food Processing, Joining and Fastening, Welding and Cutting, Sonochemistry, Underwater Applications, Remote Sensing, Transducer Design/ Materials.
- Medical:** Surgical, Therapeutic, HIFU/LIFU, Bioeffects, Tissue Characterization, Bio-Acoustic Microscopy, Transducer Design/Materials

Preferred Presentation Method:  Paper Presentation  Poster Session

**Deadline: 31 October 2014**

**Important Information:** Presentations will be no longer than 25 minutes; final abstracts must be submitted via e-mail. The session chair will contact you directly to discuss your proposed presentation. Bio-sketches and presentation suitable for distribution to participants on a USB memory device at the symposium must be submitted to the UIA office no later than **30 March 2015**. Final papers will be due shortly after symposium, at a date to be announced. **Accepted presenters receive a discounted registration fee.**

**Please type or print your information below**

Presentation Title \_\_\_\_\_

Authors \_\_\_\_\_

Presenters \_\_\_\_\_

Main Contact \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State/Prov \_\_\_\_\_ Country \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

### Symposium Chairs:

Ronald Manna, Misonix ▶ [rmanna@misonix.com](mailto:rmanna@misonix.com)

Alan Winder, Acoustical-Sciences ▶ [a.winder@acoustic-sciences.com](mailto:a.winder@acoustic-sciences.com)

Medical Session Chair: Robert Muratore, Quantum Now LLC ▶ [wave@quantumnow.com](mailto:wave@quantumnow.com)

Industrial Session Chair: Dominick DeAngelis, Kulicke & Soffa ▶ [ddeangelis@kns.com](mailto:ddeangelis@kns.com)

**Please submit this form to [uia@ultrasonics.org](mailto:uia@ultrasonics.org)**

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## UIA 44: Washington, DC USA

The Georgetown University Hotel and Conference Center, the location for UIA 44, is nestled among the historic streets of Georgetown. The serene location, away from the clamor of downtown, coupled with its comfort and elegance will allow our participants the opportunity to indulge in the history and culture of this charming corner of Washington, DC.

As the preferred hotel for Georgetown University, our location offers 146 guest rooms with outstanding amenities and services expected by today's traveler.

Easily accessible from the area airports, Union Station and major highways, our hotel offers proximity to fine restaurants and upscale boutiques. Plan to arrive early or to stay after UIA 44 to visit Washington's many museums and historical locations. You can travel using the Georgetown University Transportation



Shuttle to go to the Rosslyn and Dupont Circle Metro stations.

### Traveling to Washington

When planning your flight to DC, here are estimated taxi fares:

- Regan National (DCA) \$20/one way
- Dulles International (IAD) \$51/one way

- Baltimore Washington (BWI) \$65/one way - or take the MARTA train to Union Station (\$6/one way) where the fare is just \$15/one way.

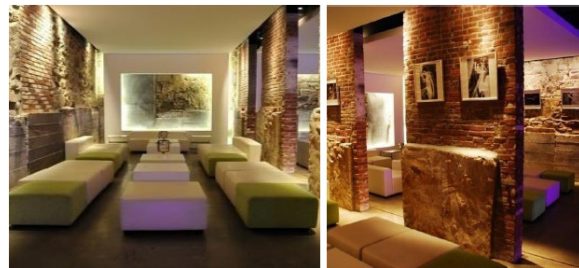
The Georgetown University Hotel and Conference Center is located at the heart of the Georgetown University campus inside the Thomas and Dorothy Leavey Center.

## Tuesday Evening: L2 Lounge & Tour

One favorite feature on the UIA Symposium is our Tuesday evening event which provides a relaxed atmosphere for networking in a unique location.

This year we will visit the L2 Lounge, an elegant venue in the heart of Georgetown. Designed by Lehman, Smith, McLeish, the lounge inserts an

elegant modern aesthetic into a 100 year old commercial space. The result is a loft-like gallery effect where attendees will be able to enjoy conversations, dinner and the unique ambiance that is not open to the public. After dinner, we will view Washington monuments by moonlight. This evening is included in full registration.



Additional tickets may be purchased for guests at the time of registration.

# Exhibit and Sponsor Information

## 2015 UIA Symposium

20-22 April 2015, Washington, DC, USA

Georgetown University Hotel & Conference Center

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.

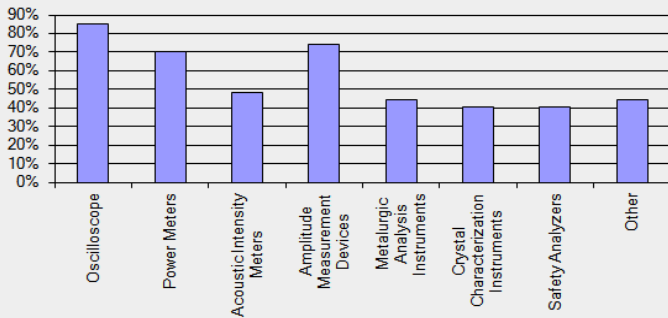
*All fees are if paid prior to 19 December, see contract...*

P O Box 2307  
Dayton, OH 45301-2307 USA  
Phone: +1.937.586.3725  
Fax: +1.937.586.3699  
uia@ultrasonics.org  
www.ultrasonics.org

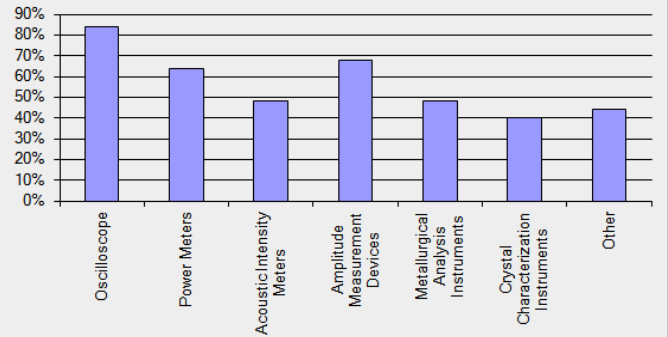


# Products and Services used by UIA members

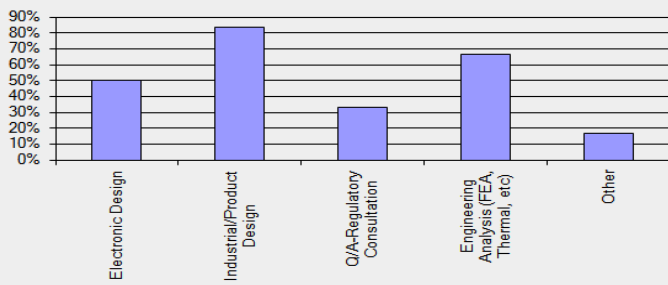
## Instruments used in R&D and Production



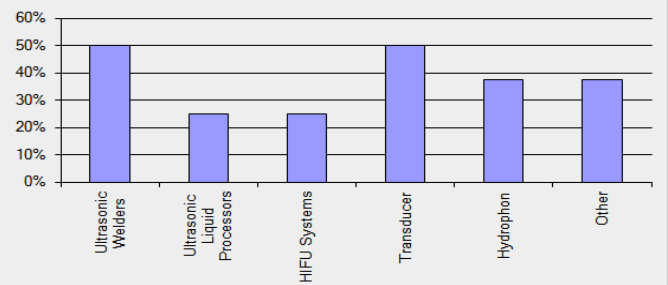
## Instruments used for products and services



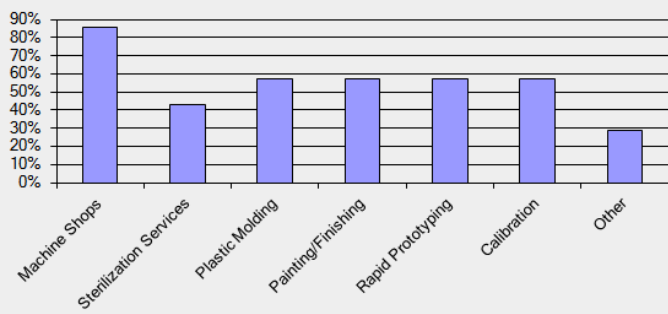
## Types of Design Service Companies used by UIA members



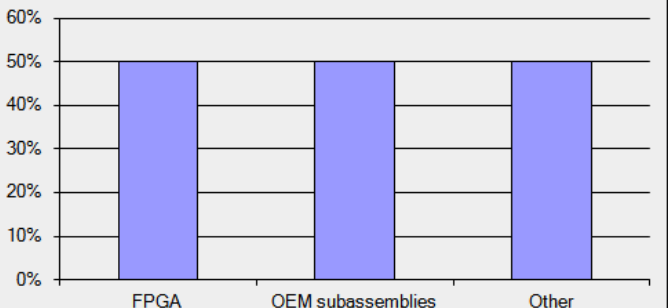
## Types of Ultrasound Companies used by UIA members



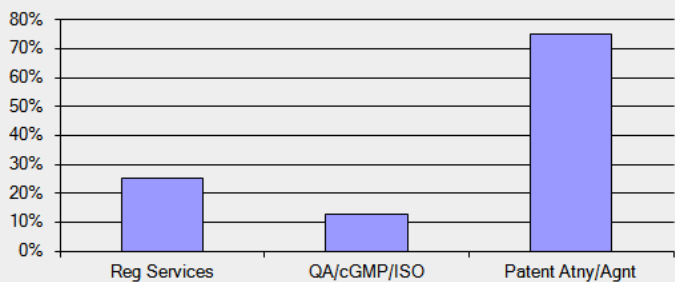
## Types of assemblies or contract services used by UIA members



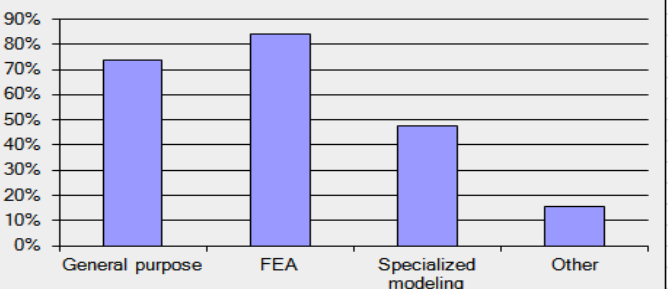
## Types of hardware companies used by UIA members



## Types of legal/consultant companies used by UIA members



## Types of software companies used by UIA members





# 44<sup>th</sup> Annual UIA Symposium 20 – 22 April 2015

**Georgetown  
University Hotel &  
Conference Center  
Washington, DC  
USA**

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

<b>Company Name:</b> _____		
<b>Contact Person:</b> _____		
<b>Title:</b> _____		
<b>Address:</b> _____		
_____		
<b>City:</b> _____	<b>State:</b> _____	<b>Zip:</b> _____
<b>Phone:</b> _____	<b>Fax:</b> _____	
<b>E-mail:</b> _____		
<b>Second Registrant:</b> _____		

### EXHIBIT SCHEDULE

#### Monday, 20 April 2015

8:00 Exhibit Set-up  
9:00 – 4:00 Exhibit Tables

#### Tuesday, 21 April

8:00 – 12:00 Exhibit Tables

#### Wednesday, 22 April

8:00 – 3:30 Exhibit Tables

### PAYMENT INFORMATION

<b>Sponsor</b> <i>please indicate the sponsorship level</i> PLEASE SPECIFY THE EVENT YOU WISH TO SPONSOR		\$ _____
<b>Exhibit I – includes one registration</b>		
<b>BEFORE 19 December</b> <input type="checkbox"/> <b>Member - \$1,795</b>	<input type="checkbox"/> <b>Non-Member - \$1,995</b>	
<b>I January and after</b> <input type="checkbox"/> <b>Member - \$1,975</b>	<input type="checkbox"/> <b>Non-Member - \$2,195</b>	\$ _____
<b>Exhibit II – includes two registrations</b>		
<b>BEFORE 19 December</b> <input type="checkbox"/> <b>Member - \$2,470</b>	<input type="checkbox"/> <b>Non-Member - \$2,790</b>	
<b>I January and after</b> <input type="checkbox"/> <b>Member - \$2,670</b>	<input type="checkbox"/> <b>Non-Member - \$3,070</b>	
<b>TOTAL</b>		\$ _____

**Table Top Exhibit includes exhibit table, company identification sign, 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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We agree to comply with all the Rules and Regulations as provided and to the conditions under which displays in Georgetown University Hotel & CC 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

## Ultrasonic Industry Association

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Dayton, OH USA

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E-mail: [uia@ultrasonics.org](mailto:uia@ultrasonics.org)  
Facebook: UIAWorld  
Twitter: @UIAWorld

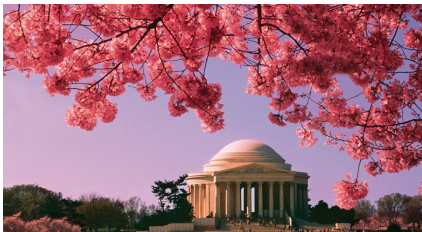


**VISIT US AT  
ULTRASONICS.ORG**

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.



**UIA 44**  
**washington**  
**DC** TM

