



Vibrations

Powering Sound Ideas

UIA46: Dresden Germany 24–26 April 2017

The 46th Annual UIA Symposium will offer a global focus on the latest advances in ultrasonics in Europe, US and beyond. Presentations from six countries will feature the latest in ultrasonics in both medical and industrial applications.

The Symposium is chaired by Leo Klinstein, Dukane, USA and Thomas Daue, Smart Material Corporation/Smart Material GmbH, Germany.

The Monday Medical session chairs are Jay Sheehan, Integra Life Sciences, US and Klaus Van Jenderka, Physik, Sensorik und Ultraschalltechnik, Germany.

The Tuesday Workshop chair is Dominick DeAngelis, Kulicke & Soffa Industries, Inc., US. Poster session chairs are Margaret Lucas, University of Glasgow and Sunita Chauhan, University of Monash.

The Wednesday Industrial session chairs are Leo Klinstein, and Rasmus Lou-Moeller, Meggitt, Denmark.

Ultrasound Solutions Center

Visit our exhibitors and sponsors to learn about the newest innovations in ultrasound solutions.

Invited Keynote Speakers

George Schmitz, Professor for Electrical Engineering and Chair, Medical Engineering at Ruhr-University Bochum, Germany will present

Detection and tracking of microbubbles for super-resolution vascular imaging

Thomas Daue, President, Smart Material, USA and German, will present

Piezoelectric Vibration Energy Harvester— State of the Art System Implementations and Economics .

Tuesday Workshops

A variety of topics from three different piezoceramic manufacturers, PI, Ceramtec and Meggitt will be discussed.

Poster Session

The poster session provides the opportunity for graduate students to showcase their results to the academic and industry delegates from both the medical and industrial areas of ultrasonics. Deadline for submission of abstracts is 28 February. Use this [link](#) to submit your abstract.

Tour of Fraunhofer Institute

Always a highlight of our Tuesday afternoon, this year UIA will be visiting the Fraunhofer Institute. After a general presentation about the

Institute, small groups will tour through some of their labs. See page 4 for more information.

Tuesday Evening Event

UIA enjoys the opportunity to have an informal networking opportunity over a good dinner. This year, we are visiting the Sophienkeller Im Taschenbergpalais - see page 4 for more information

Hotel Reservations

UIA46 will be held at the Dresden Hilton Hotel. See page 6 for reservation information.

Symposium Schedule Announced

Three full days of presentations will provide participants with a full range of the latest advances in ultrasonics throughout the world. Please see the complete listing on pages 2 - 3.

IMPORTANT DATES

24 February

Last day to make reservations at the Dresden Hilton Hotel for guaranteed UIA rates.

<http://group.hilton.com/ABR-UIA46Symposium>

14 April

Last day to pre-register for the UIA46 Symposium online. Please use this link:

www.Ultrasonics.org/UIA46Reg

Special Points of Interest

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UIA46 Medical Sessions—Monday 24 April 2017

- 8:30 – 9:00 **Comparison of Needle Actuation Transducers Made of Piezoceramic and Piezocrystal**, *Tingyi Jiang, Sandy Cochran, Zhihong Huang*, School of Science and Engineering, University of Dundee, School of Engineering, University of Glasgow
- 9:00 – 9:30 **Blood Mimicking Fluid for Reproducing Rheological and Acoustical Blood Properties**, *Tina Fuhrmann, Anton Schlesinger, Michael Schultz, Klaus-V. Jenderka*, University of Applied Sciences Merseburg
- 9:30 – 10:00 **Ultrasound Localization of Cannulas**, *Stephen Rumble, Stefanie Dencks, Georg Schmitz*, Ruhr-Universität Bochum
- 10:00 - 10:30 **Refreshment/Exhibit Break**
- 10:30 – 11:00 **Numerical Investigation of Thermal Response in Biological Tissue Phantom (s) Subjected to HIFU: Effect of Nature and Contrast of Embedded Inhomogeneity**, *Pragya Gupta, Atul Srivastava and Sunita Chauhan*, Monash Research Academy; Indian Institute of Technology Bombay, India; Mechanical & Aerospace Engineering, Monash University, Melbourne, Australia
- 11:00 – 11:30 **Epoxy Bonded Planar Piezoceramic Transducers for High Power Applications**, *Daniel Richards, Andrew Mathieson, Margaret Lucas*, University of Glasgow
- 11:30-12:00 **Dispersion Risk associated with Surgical Debridement Devices**, *Dan Voic*, Misonix
- 12:00 - 13:00 **Lunch**
- 13:00 – 14:00 *Invited Speaker: Detection and tracking of Microbubbles for Super-resolution Vascular Imaging*, *Georg Schmitz*, Ruhr University Bochum
- 14:00 – 14:30 **Determination of Acoustic Lung Tissue Properties and Their Impact on Diagnostic-Therapeutic Ultrasound Applications**, *F. Wolfram, Th Lesser*, Lung Cancer Center, Germany
- 14:30 – 15:00 **2D Ultrasound Elastography Using Plane Shear-Wave Compounding**, *Heiko Tzschätzsch, Manh Nguyen Trong, Michael Schultz, Jürgen Braun, Ingolf Sack*, Charité-Universitätsmedizin Berlin, GAMPT mbH,
- 15:00 – 15:30 **Refreshment/Exhibit Break**
- 15:30 – 16:00 **Optimisation of an Ultrasonic-Sonic Surgical Needle for Bone Biopsy**, *Li Li, Andrew Mathieson, Margaret Lucas*, School of Engineering, University of Glasgow
- 16:00 – 16:30 **All-Optical Highly Sensitive Akinetic Sensor for Ultrasound Detection and Photoacoustic Imaging**, *Stefan Preißer, Wolfgang Rohringer, Mengyang Liu, Christian Kollmann, Balthasar Fischer, Wolfgang Drexler*, Medical University Vienna

UIA46 Industrial Sessions: Wednesday, 26 April

- 8:30 – 9:00 **Parametric Study of Multiple-Orifice Ultrasonic Resonators**, *Hafiz Osman, Fannon Lim, Margaret Lucas*, University of Glasgow
- 9:00 - 9:30 **Ultrasonic Welders with Servo Actuators – Latest Advancements**, *Leo Klinstein*, Dukane IAS
- 9:30 - 10:00 **Estimation of acoustic agglomeration of aerosols process for source term mitigation in nuclear accidents**, *Manuel Aleixandre, Enrique Riera, Rosario Delgado-Tardáguila, Luis E. Herranz, Juan A. Gallego-Juárez*, Dpto. Sensores y Sistemas Ultrasónicos, ITEFI, CSIC; Unidad de Seguridad Nuclear, División de Fisión Nuclear, CIEMAT
- 10:00 - 10:30 **Refreshment/Exhibit Break**
- 10:30 - 11:00 **High Frequency Ultrasonic Transducers Using Soft Mold Process**, *Sylvia Gebhardt, Paul Günther, Holger Neubert*, Fraunhofer Institute for Ceramic Technologies and Systems IKTS
- 11:00 - 11:30 **The signal emitted by acoustic cavitation**, *Paul Prentice, Kristoffer Johansen, Jae Hee Song*, University of Glasgow
- 11:30 - 12:00 **Unconference**
- 12:00 - 13:00 **Lunch**
- 13:00 - 14:00 *Invited Speaker: Piezoelectric Vibration Energy Harvester*, *Thomas Daue, Dr. Jan Kunzmann*, Smart Material Corp.
- 14:00 - 14:30 **Avoiding Adhesive Delamination in Piezoceramic Stacks of Ultrasonic Transducers**, *Dominick A. DeAngelis, Gary W. Schulze*, Kulicke & Soffa Industries
- 14:30 - 15:00 **Intelligent Diagnostics in Aerospace: Fully Convolutional Neural Network Priors for Improved Ultrasound Image Segmentation**, *Martin Szarski, Sunita Chauhan*, Mechanical and Aerospace Engineering, Monash University, Melbourne, Australia
- 15:00 – 15:30 **Refreshment/Exhibit Break**
- 15:30 - 16:00 **Characterising the effects of microstructural changes to Ti-6Al-4V on ultrasonic wave interaction**, *Mathew Wilkie, Andrew Mathieson, Margaret Lucas*, University of Glasgow
- 16:00 Symposium Concludes

UIA46 Workshops Tuesday, 25 April 2017

8:00 - 9:00	Co-fired Multilayer Piezoceramic Components and their Applications , <i>Patrick Pertsch</i> PI Ceramic GmbH
9:00 - 9:30	New Hard PZT Materials and Choosing a Suitable Material for Specific Applications , <i>Timo Scholehwar, Eberhard Hennig</i> , PI Ceramic GmbH
9:30 - 10:00	Efficient Interaction with Ceramic Suppliers , CeramTec
10:00 - 10:30	Progress on Cost-effective screen printed linear arrays for medical imaging , <i>Borregaard, Lou-Moller, Zawada, Ringgaard, Xu, Guizzetti, Meggitt</i> , BK Ultrasound
10:30 - 12:00	Poster Session and Exhibits
12:00 - 13:00	Lunch
13:00 - 14:00	Travel to Fraunhofer
14:00 - 16:30	Tour of Fraunhofer
19:30 - 22:00	Dinner at Sophienkeller Im Taschenbergpalais

Fraunhofer Institute Tour

On Tuesday afternoon UIA46 will visit the Fraunhofer Institute for Ceramic Technologies, which conducts applied research on high-performance ceramics. As a research and technology service provider, the Fraunhofer IKTS develops modern ceramic high-performance materials, customized industrial manufacturing processes and creates prototype components and systems in complete production lines from laboratory scale to pilot plant scale. Furthermore, the institute has expertise in diagnostics and testing of materials and processes. Test procedures in the fields of acoustics, electromagnetics, optics, microscopy and laser technology contribute substantially to the quality assurance of products and plants.

Fraunhofer IKTS works in eight market-oriented business divisions in which it demonstrates and qualifies ceramic technologies and components as well as non-destructive test methods for new industries, product concepts and markets beyond the conventional areas of application. These disciplines include ceramic materials and processes, mechanical and automotive engineering, electronics and microsystems, energy, environmental and process engineering, bio- and medical engineering, optics as well as materials and process analysis.

Evening Event

The Sophienkeller Restaurant is located in the historical centre of Dresden in the vaulted ceilings of the "Taschenbergpalais" opposite to the chimes pavilion of the "Dresdner Zwinger". Entering these historical vaults of the Taschenbergpalais you step back into the 18th century, and enter the world of August the Strong.

In 1730, August the Strong, Elector of Saxony and King of Poland arranged a legendary festivity for the King of Prussia, Friedrich Wilhelm I, in a camp known as Zeithainer Lager. He proudly presented his newly reformed army. Even today, it is still the epitome of the baroque way of life because of its luxury and splendor. The field-kitchen provided them with countless mouth-watering delicacies. Today these pleasures have returned, and with them the folly mood, the Prussian and Baden galleries and the carousel.

King August the Strong, Countess Cosel, musicians, fortune tellers, magicians and strolling artists will be happy to introduce the visitor to the many facets of Baroque lifestyle.

UIA46 will enjoy a very special evening at the Sophienkeller Restaurant, walking distance from our hotel.

Pre-Symposium Hiking Tour

Plan to arrive in Dresden to join Klaus-Vitold Jenderka for a hiking tour to Saxon Switzerland on Sunday, 23 April.

The group will meet at the Dresden Main Station, Ticket Counter at 8:45 am.

You will depart on the suburban railway Line S1 at 8:59 am for a 45 minute trip to Bad Schandau/Krippen.

Next is a 15 minute walk to the ferry port, where you will take the ferry from Krippen over the river Elbe (a 5 minute ride).

The hiking will begin by hiking to the Schrammstein look-out, elevation 417m (optional via the Schrammsteinbaude" for lunch) and the Falkenstein to the Kirnitzsctal. Duration is approximately 4 hours.

A certain level of fitness is required. Hikers should also be free of giddiness, since you will have to climb steep stairs and ladders along the path.

Depending on weather conditions and/or endurance of the group, the tour can be extended to the Kirnitzsctal vial the Carolafelsen and Wilde Hölle.

You will then ride the Kirnitzsctal tramway (also known as the Kirnitzsctalbahn or

Kirnitzsch Valley Tramway to Bad Schandau, the gate to the Saxon Switzerland National Park. You will walk through the city to the ferry port (15 minutes). This will also provide you with the opportunity to buy some souvenirs and/or dinner.

To return to the railway station you can take the ferry or bus. You will ride back to the Dresden Main Station on the suburban railway, arriving at approximately 6 pm.

You will be responsible for the cost of the transportation (approximately 15€) and any food you purchase.

For more information about these points of interest, please use these links:

https://en.wikipedia.org/wiki/Saxon_Switzerland

https://en.wikipedia.org/wiki/Kirnitzsctal_tramway

You may indicate your interest in participating in this tour on your registration for UIA46.

Path with stairs and ladder



Views from Schrammstein



Everything you need to know about registering for and attending UIA46

Schedule Overview

The symposium formally begins on Monday, 24 April at 8:30 am and concludes on Wednesday, 26 April at 5 pm.

There is a pre-symposium hike that departs at 8:45 from the Dresden Main Railway stations on Sunday, 23 April. For more information, please see page 5.

Monday, 24 April

- Medical Sessions
- Ultrasound Solution Center
- Evening Opening Reception

Tuesday, 25 April

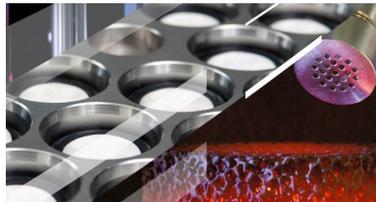
- Workshops
- Poster Sessions
- Ultrasound Solution Center
- Fraunhofer IKTS Tour
- Evening Event (companions welcome)

Wednesday, 26 April

- Industrial Sessions
- Ultrasound Solution Center
- Symposium concludes

Tour of Fraunhofer IKTS

The Fraunhofer Institute for Ceramic Technologies and Systems IKTS conducts applied research on high-performance ceramics. The institute's three sites in Dresden and Hermsdorf (Thuringia), Germany, collectively represent Europe's largest R&D institute dedicated to the study of ceramics.



This guided tour will include a general presentation and tours of five different labs.

Tuesday Evening Event

The highlight of UIA Symposia is an evening at the Sophienkeller Restaurant. See page 4 for more information.

Registration	Fees
Member	\$948
Nonmember	\$1,092

Exhibit and Sponsorships

Please see the complete information on pages 10-11 about opportunities available at UIA46.

Headquarters Hotel

The Dresden Hilton Hotel will be the headquarters for UIA46. Guestrooms are available for 127€ single and 152€ double, which includes breakfast. Reservations need to be made **prior to 24 February 2017**. You may book online here:

<http://group.hilton.com/ABR-UIA46Symposium>

Rooms may be reserved between 21—27 April at this rate. The group name is **ABR UIA 46 Symposium**.



Go to www.Ultrasonics.org/UIA46Reg
to register

From the President...



Tony Crandall, UIA President

Wow! When you read this edition of *Vibrations* you'll see what a great symposium is planned for Dresden this April. I won't repeat all the information you can read in the other articles in this newsletter, but it's clear that the symposium chairs and session chairs have done a wonderful job and I thank them for all the hard work. We have three days of presentations that cover a wide variety of fascinating and useful topics. There is a pre-symposium hike that should be a lot of fun and a post-symposium tour that should be very interesting. Anyone who works in ultrasonics would benefit from attending this meeting.

The medical and industrial sessions have speakers from multiple countries presenting on a variety of interesting topics. Tuesday's workshops, posters and Fraunhofer tour will make for a great day followed by a fun night in a unique pub. The Ultrasound Solutions Center will allow companies to showcase their products and attendees to see what people in the field have to offer.

I encourage everyone who can attend to do so and companies to consider exhibiting and sponsoring at this great event.

The Ultrasound Solutions Center will feature a wide range of ultrasonic equipment throughout UIA46

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UIA46: Call for Posters

Submission of poster abstracts for consideration for UIA46 presentations or posters is now electronic.

Use the link at the right to go to the UIA46 Symposium Poster Submission site.

Please follow the instructions below to complete your submission(s). Should you have any questions, please email uia@ultrasonics.org or call +1.937+586.3725.

The UIA invites abstract submissions for posters for the 46th Annual UIA Symposium, 24 – 26 April 2017, in Dresden, Germany. We particularly encourage poster abstract submissions from graduate students. This is an opportunity to showcase your research results to academic and industry delegates in any area of medical or industrial ultrasonics. We would be delighted to receive poster abstracts from graduate students in Dresden and the surrounding area, to bring a strong 'local research' flavour to the UIA Symposium. You can submit your abstract here. We look forward to seeing you in Dresden.

Margaret Lucas, University of Glasgow, Poster Chair

Go to <http://tinyurl.com/UIA46Paper> to submit your abstract

Step 1



UIA46: 2017 Annual Symposium
 24-26 April 2017 | Dresden, Germany
 ULTRASONIC INDUSTRY ASSOCIATION

Deadline for Poster Abstracts is 28 February 2017

Login

UIA46 Symposium Presentation Submission

Email: Password:

[Login help](#) [New user? Register now!](#)

You must create a new profile, even if you submitted an abstract last year.

The Ultrasonic Industry Association invites you to submit a 200 word abstract for consideration of presentation or poster on 24-26 April at its 46th Annual Symposium in Dresden, Germany at the Dresden Hilton Hotel. Plan now to join UIA for this international conference featuring the best of ultrasound from around the world.

Step 2

First Name *

Last Name *

E-mail address *

cc email

Password *

Confirm Password *

Phone *

Country *

Step 3

Submitter:

You have no Submissions in this status

Important Information: Presentations will be no longer than 25 minutes; 1

Step 4

Submission Group *

Applicant type *

Type of application presentation * Industrial Medical Workshop

Preferred Presentation Method * Paper (no longer than 25 minutes) Poster (displayed during symposium with opportunity to discuss) Workshop (at least 60 minutes on technical aspect of ultrasound)

I intend to submit a written paper for the proceedings * Yes No Uncertain at this time

Presenter Name *

Presentation Title *

Authors of Paper *

Institution(s) of Author(s) *

Abstract

You may upload your abstract here

Once you have completed your submission, you may cancel, save to continue later or submit. Once you have created your profile, just go to Step 3 to add another submission.

Measurement of Acoustic Properties from Lung Tissue

Measurement of acoustic properties from lung tissue and their impact on diagnostic - therapeutic ultrasound applications.

Medical Session by Frank Wolfram, Th Lesser; SRH Waldklinikum Gera- Lung Cancer Centre, Germany

Acoustic penetration in lung is limited by intrapulmonary gas content, therefore properties of cancerous and lung tissues haven't been investigated so far. It has been shown that using One Lung Flooding (OLF) with saline an acoustic access to central lung tumours can be generated. Therefore this work was motivated to investigate in acoustic properties comprising speed of sound, impedance and attenuation of lung tumours and flooded lung parenchyma. Resected lung lobes containing NSCLC were flooded ex-vivo. Cancer tissue was sampled out of the flooded lobes as well. For measurement a broadband pulsed immersion technique is used. All measurements were performed within 45 min after resection. The acoustic impedance of lung cancer tissue (1.6–1.9 MRays) was higher than that of water. The attenuation coefficient of NSCLC tissue varied between 0.31–0.44 dB/cm/MHz while flooded lung showed the lowest value of 0.12 dB/cm/MHz. The determined properties can be used to explain several effects have been reported on diagnostic and effects on diagnostic and therapeutic ultrasound applications in lung using OLF.



Frank Wolfram

High Frequency Ultrasonic Transducers Using Soft Mold Process

Industrial Session by Sylvia Gebhardt, Paul Günther, Holger Neubert; Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Dresden, Germany



Sylvia Gebhardt

High resolution imaging requires high frequency ultrasonic transducers. For fabrication, fine scale 1-3 piezocomposites are necessary. Due to the brittleness of the ceramic, the limited blade width and the increasing effort, conventional dice-and-fill technique becomes increasingly insufficient as pillar size and kerf become smaller.

The soft mold process offers the fabrication of fine scale piezoceramic arrays with free design of ceramic pillars. The basis of this approach are master molds, which are structured by microsystems technologies. That allows a high variety of rod size, shape, spacing, and arrangement. From the master molds soft plastic templates are taken, which are reusable. A piezoceramic slurry is filled into the soft molds under vacuum and therein dried. After demolding, array structures are debindered, sintered and filled with an epoxy polymer. Ceramic body and excessive epoxy are removed by grinding and the resulting 1-3 piezocomposite lapped to the desired thickness, electroded and poled.

We here report on the development of a 20 MHz ultrasonic transducer based on round piezoceramic pillars with 34 μm diameter and 160 μm height in hexagonal arrangement with 10 μm spacing. 1-3 piezocomposites made of these structures show coupling coefficients $k_t = 0.6$.

These are just two of the session abstracts from our exciting and stimulating program. See pages 2 and 3 for the full listing of medical and industrial session presentations.

Here's how YOUR company can reach key ultrasonics users



UIA offers companies access to key influencers in the international ultrasonic community through four key avenues: new website, *Vibrations* newsletter, Sound Solutions one-day meeting and UIA46 International Symposium.

UIA46 Annual Symposium

The three day annual symposium will be held in Dresden, Germany 24—26 April 2017. Sponsorships include tabletop exhibits.

Website Banners

There are two positions available that will appear on every page of the site that will click through to the URL of your choice. See page two for more information about sizes, location, and costs.

Vibrations Newsletter

Display ads are available in this newsletter that is distributed electronically every quarter. Ads include a link to the URL of your choice.

Sound Solutions

This one-day midyear meeting is held each fall with an emphasis on practical answers to ultrasound problems that companies have. Sponsorships and tabletop exhibits are available for this meeting.

Sponsorship Packages

Each package is for 12 months from date of payment. Go to page %%to see details and pricing.

Titanium Includes two ad positions on website, full page ad in *Vibrations* newsletter and sponsor recognition/tabletop exhibit at Sound Solutions midyear meeting and Annual Symposium and more.

Gold Includes masthead banner ad position on ultrasonics.org, half page ad in *Vibrations* newsletter and sponsor recognition/exhibit at Sound Solutions and Symposium.

Silver Includes vertical ad position on ultrasonics.org, 1/3 page ad in quarterly *Vibrations* newsletter and tabletop exhibit at Sound Solutions and Annual Symposium.

Bronze Includes 1/2 column page ad in quarterly *Vibrations* newsletter and tabletop exhibit at Symposium.

Select the level of exposure best for your company. Go to www.Ultrasonics.org/UIA46Reg



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2017 SPONSORSHIP PACKAGES

	Titanium	Gold	Silver	Bronze
	\$5,000	\$4,000	\$3,000	\$1,500

Website

Masthead banner with URL link	X	X		
Vertical banner with URL link	X		X	
Career Center Ad	unlimited	4 per year	3 per year	1 per year

Vibrations

Ad in 4 quarterly issues with URL Link	Full	1/2 page	1/3 page	1/2 column
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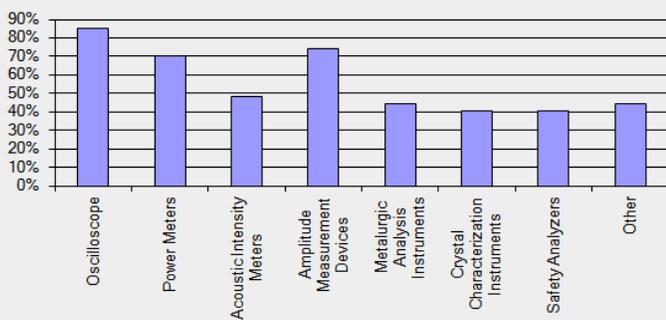
Sound Solutions

Sponsor Recognition	X	X		
Tabletop exhibit	X	X	X	X
Complimentary Registration	2	2	1	1

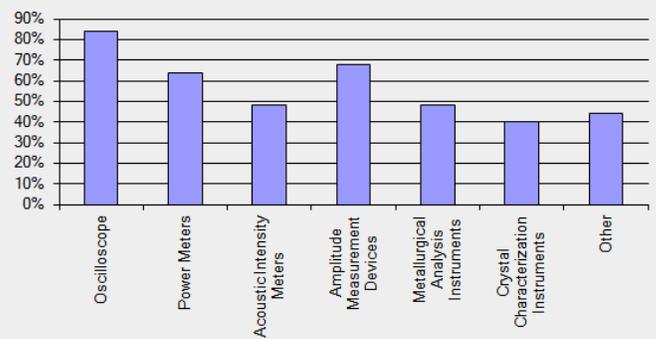
UIA46 Symposium

Sponsor Recognition	X	X		
Tabletop exhibit	X	X	X	X
Complimentary Registration	3	2	1	
Proceedings Sponsorship	X	X		
Sponsor Badge Ribbon Recognition	X			
Onsite Program Recognition	X	X	X	X
Exhibitor Badge Ribbon Recognition	X	X	X	X

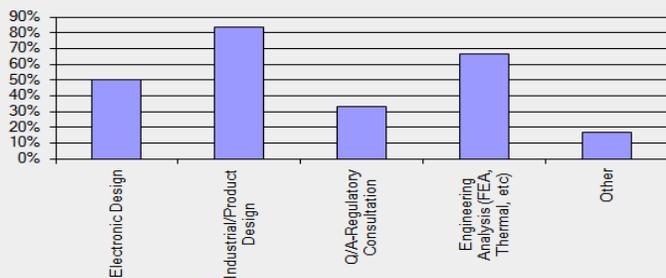
Instruments used in R&D and Production



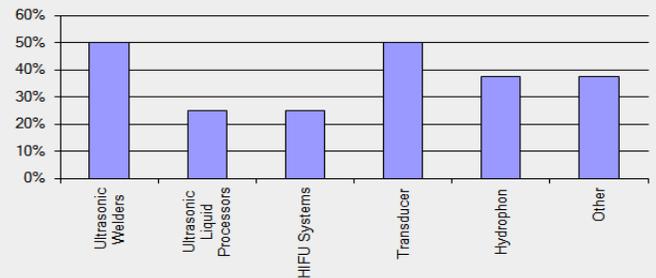
Instruments used for products and services



Types of Design Service Companies used by UIA members



Types of Ultrasound Companies used by UIA members



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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 online Referral Network, learn about ultrasonics with our online primer, or meet industry leaders at our next symposium.

Important Dates

24 February 2017: Deadline for reservations at the Dresden Hilton

28 February 2017: Deadline for Poster abstracts

14 April 2017: Last day to register online for UIA46

14 April 2017: Abstract deadline for 44th Annual Review of Progress in Quantitative Nondestructive Evaluation Conference (QNDE**)**

24-26 April 2017: UIA46 in Dresden, Germany

16-21 July 2017: 44th Annual Review of Progress in Quantitative Nondestructive Evaluation Conference (QNDE**)**

A promotional image for the UIA46 conference. The top half of the image has a dark blue background with the text 'UIA46 Dresden, Germany 24 - 26 April 2017' in white. The bottom half of the image shows a night view of a large, ornate building, likely the Dresden Hilton, with its lights on. At the bottom of the image, there is a yellow arrow pointing to the right with the text 'Click here for more details' in black.