

Powering Sound Ideas

Practical Sound Solutions 21 October Columbus OH

UIA is offering a one-day workshop to focus on the challenges end users commonly face when using ultrasonics.

This workshop will target specific challenges that are repeatedly brought to equipment manufacturers, research organizations or consultants and deployment challenges.

The program will begin on Tuesday evening, 20 October with a reception followed by an optional workshop by Karl Graff on the **Fundamentals of Power Ultrasonics**. Karl

Graff, the author of *Power Ultrasonics*, is well known for his contributions to ultrasound.

The program continues on Wednesday with workshops on :

- Power Ultrasound Overview
- Metal Welding
- Polymer Welding
- Automotive Light Welding Trends
- Soldering
- Equipment Tooling
- Manufacturing Trends

A block of rooms has been reserved at the Hampton Inn & Suites on Olentangy River Road, which is where the opening reception will be held. **Reservations** should be made by **2 October**. The workshop on Wednesday will be held at the EWI Headquarters in Columbus. You can **register** for this workshop today! The cost for UIA members is just \$175; non-members \$195.

See page 2 for the detailed schedule and presenters.

Special points of interest:

- Sound Solutions Schedule Page 2
- Elisa Konoafagou Page 3
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- UIA45 Call for Papers goes electronic Page 11

UIA45: 4-6 April 2016 Seattle WA, USA

The 45th Annual UIA Symposium planning is well underway. The **Symposium** Co-Chairs are Dominick DeAngelis and Tom Matula. **Industrial Session** Chairs are James Sheehan and Rasmus Lou-Moeller. **Medical Session** Chairs are

Daniel Cotter and Andrew Mathieson. **Workshop Session** Chairs are Prakash Manandhar and Muhammad Sadiq. **Poster Session** Chairs are Tony Crandall and Alexey Peshkovsky. **Exhibit Chair** is James Hossack.

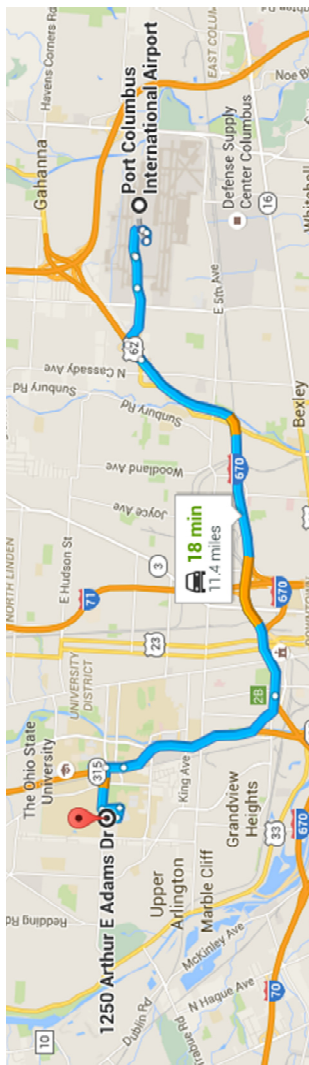
The invited speakers are George Keilman and Elisa E. Konoafagou. *Please see pages 3 - 4 for their presentation abstracts.*

See page 11 for instructions on submitting your abstract for this meeting.

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**Columbus, Ohio
airport is just
20 minutes
from EWI
Headquarters**



Sound Solutions

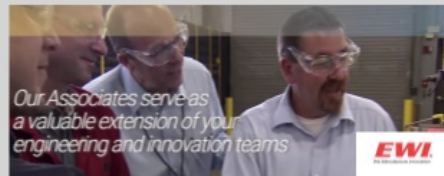
When: October 21, 2015



What & Why

The Ultrasonic Industry Association is offering this workshop to focus on the challenges end users commonly face when using ultrasonics.

The Sound Solutions Workshop will target specific challenges that are repeatedly brought to equipment manufacturers, research organizations, or consultants as deployment challenges.



Who?

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."

EWI's mission is to shape the future of manufacturing through innovative technology solutions

Where?

Columbus, Ohio

Capital of the Buckeye State

Home of The Ohio State University

Tuesday Evening

Hampton Inn & Suites
3160 Olentangy River Rd.
Columbus, OH 43202

4:30 pm: Registration begins

5:30 pm: Reception

6:30 pm: Optional evening workshop, Fundamentals of Power Ultrasonics presented by Karl Graff, author of Power Ultrasonics

Wednesday

EWI Headquarters
1250 Arthur E. Adams Dr.
Columbus, Ohio 43221

8:00 am - 4:00 pm: Workshops

Topics include: PU overview, metal welding, polymer welding, automotive light weighting trends, soldering, equipment, tooling, manufacturing trends and more!

Topic	Speaker(s)
Power Ultrasonics Overview	Karl Graff
Metal Welding	Mitch Matheny
Polymer Welding	Miranda Marcus
Automotive light weighting trends	ALMII
Soldering	Kirk Cooper
Equipment, Tooling	Jay Sheehan
Manufacturing trends	Karl Graff
US 3D Printing	Mark Norfolk
Wire & Cable	Tim Frech

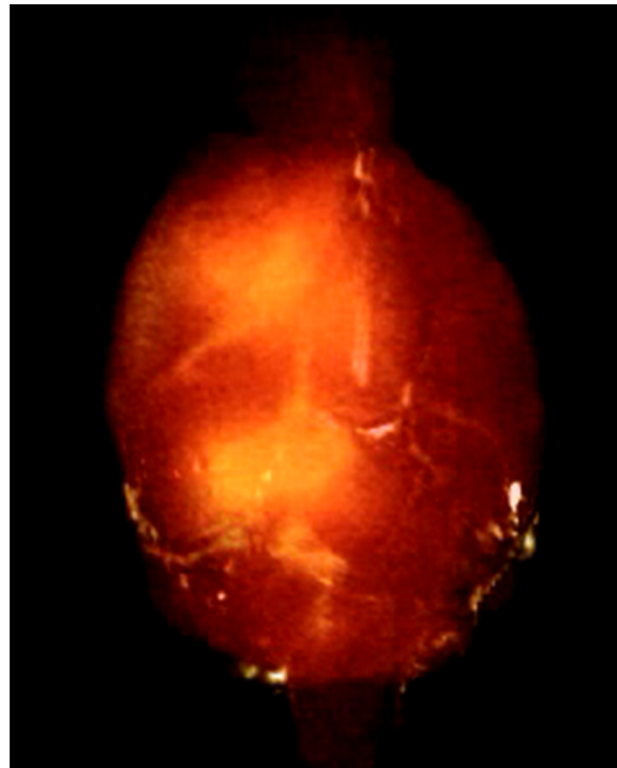
Elisa Konofagou: UIA 45 Invited Speaker

Safe and Localized Blood-Brain Barrier Opening using Focused Ultrasound

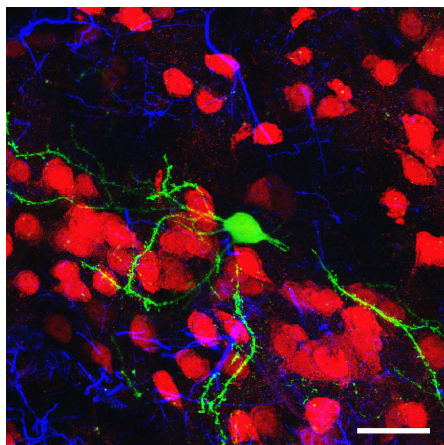
Current treatments of neurological and neurodegenerative diseases are limited due to the lack of a truly non-invasive, transient, and regionally selective brain drug delivery method. The brain is particularly difficult to deliver drugs to because of the blood-brain barrier (BBB). The impermeability of the BBB is due to the tight junctions connecting adjacent endothelial cells and highly regulatory transport systems of the endothelial cell membranes. The main function of the BBB is ion and volume regulation to ensure conditions necessary for proper synaptic and axonal signaling. However, the same permeability properties that keep the brain healthy also constitute the cause of the tremendous obstacles posed in its pharmacological treatment. The BBB prevents most neurologically active drugs from entering the brain and, as a result, has been isolated as the rate-limiting factor in brain drug delivery. Until a solution to the trans-BBB delivery problem is found, treatments of neurological diseases will remain impeded. Over the past decade, methods that combine Focused Ultrasound (FUS) and microbubbles have been shown to offer the unique capability of noninvasively, locally and transiently open the BBB so as to treat central nervous system (CNS) diseases.

Four of the main challenges that have been taken on by our group and discussed in this paper are: 1) assess its safety profile, 2) unveil the mechanism by which the BBB opens and closes, 3) control and predict the opened BBB properties and duration of the opening and 4) assess its potential in neurotherapeutics. All these challenges will be discussed, findings in both small (mice) and large (non-human primates) animals will be shown as well as its clinical potential.

Keywords - blood-brain barrier, drug delivery, focused ultrasound, mechanism, microbubble.



Blood-brain barrier opening in the caudate and substantia nigra of a mouse



Neuronal GFP expression using gene delivery through the blood-brain barrier

*Elisa Konofagou is with the
Department of Biomedical
Engineering, and Department
of Radiology, Columbia
University, New York, NY*

*George Keilman
is Co-Founder
& CTO of
Sonic
Concepts, Inc.
Bothell, WA*

George Keilman: UIA45 Invited Speaker

Ultrasonic technology has been applied in a wide range of industrial areas. This presentation will focus on the novel operating principles behind some new and less common industrial applications. Possible future application areas based upon these operating principles will be discussed.

A brief historical overview of ultrasonics in the Pacific Northwest will be given, including academic research groups, government labs, and industrial companies.

Several applications will be discussed that have their origins in the pulp and paper industry. In the first application, acoustic standing waves are used to fractionate wood fibers by length into different grades, in order produce higher-quality paper products. In Figure 1, a standing wave is established between two boundaries. Fibers (dark bands) are subjected to acoustic radiation force and also to acoustic radiation torque. Radiation force brings the fibers to a central agglomeration plane, while radiation torque rotates the fibers to that they are aligned vertically in the diagram. It will be shown that, in a more complex implementation, several bands of agglomeration can be generated, each containing a different fraction of fiber size. Related concepts will be presented.

In a second application also from the pulp and paper industry, acoustic pyrometry is used to measure the temperature profiles in real time in high-temperature exhaust flues. By using sensors along multiple acoustic paths, the 2D thermal profile is tomographically reconstructed. This method provided continuous 24/7 measurements with high reliability, with no practical upper limit on the temperatures that can be measured.

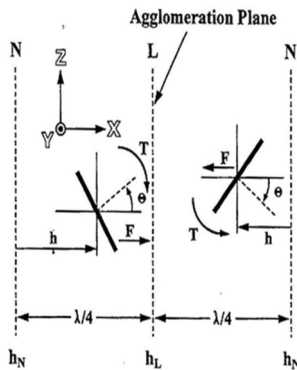


Figure 1. Acoustic radiation force and torque acting on rigid cylinders in a standing-wave field.

In Figure 2, typical sensor placement is shown, along with a reconstructed 2D thermal profile.

In an application from the hydroelectric industry, acoustic scintillation is used to accurately measure the volumetric water flow at a large turbine intake. Accurate water flow measurements are needed under a wide range of operating conditions so that the facility operator can adjust turbine settings to optimize electric power production vs. water flow rate and hydrostatic head. Acoustic scintillation, i.e., the minor fluctuations in ultrasonic signal amplitude as pulses transit the flow channel, arise due to turbulent eddies in the flowing water. By spacing pairs of transducers a known distance apart, the scintillation that occurs on the two paths can be correlated to produce a time delay measurement for water flowing in the channel, as shown in Figure 3. By using multiple sets of transducers spanning the intake, the velocity profile of the flowing water can be measured and integrated to compute total volume flow.

Further applications from other industries will also be presented. Topics include an acoustic pump, an underwater communication link, and the use of Lamb waves to measure mechanical properties of fiber composite sheet materials. The intent is to stimulate discussions about the operating principles, and their possible applications in other fields.

Figure 3. Acoustic scintillation flow-meter principle. Figure courtesy of AQ Flow, Inc.

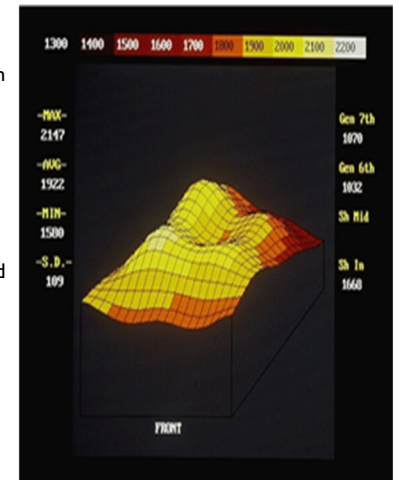
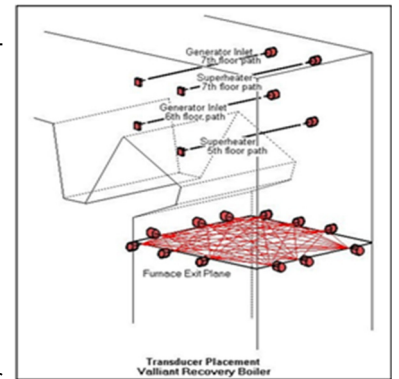
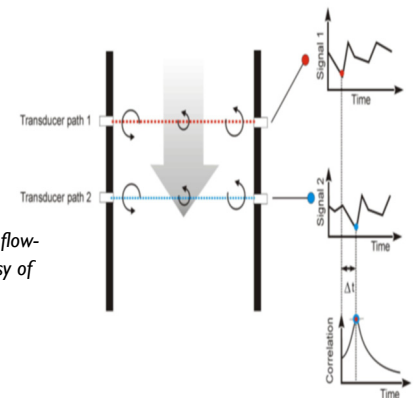


Figure 2. Acoustic pyrometry. Note sensor placement (above), and temperature profile reconstruction (below). Figure courtesy of EnerTechnix.



President's Message

We just had the opportunity to review extended abstracts of the keynote speakers of the medical and industrial sessions planned for UIA45 in Seattle Washington. Non-invasive treatment via the blood brain barrier has been often discussed for over 10 years, and the presentation planned by Elisa Konfougou is specific to detailing the challenges and updating status of clinical potential based on recent findings. The depth of the medical keynote presentation is perhaps complemented by the breadth of the industrial presenter, George Keilman, where he discusses unusual applications of ultrasound in acoustic fractionating of wood fibers with standing waves, acoustic pyrometry of exhaust fumes, acoustic scintillation to measure water flow, and other briefs in applications like acoustic pumps. Tom Matula and Dominick DeAngelis, co-chairs of this exciting meeting, have a tremendous early start on selection of keynotes and organization of the sessions. Session co-chairs were determined with a mix of local and international contributors pairing very experienced chairs with folks newer to UIA; technical quality and energy across the spectrum are assured. There is work on an entrepreneurial session, workshops, and greater emphasis on poster contri-

butions. Please consider being part of the spring symposium in the northwest region where ultrasonic applications and companies are proliferating, and send in your abstracts early.



Dan Cotter,
UIA President

On Tuesday evening October 21st and Wednesday October 22nd we will be in Columbus Ohio for the first **Sound Solutions**, a forum of the Ultrasonic Industry Association for problem solving. This fall's event is coupling UIA and EWI in addressing challenges commonly faced by end users in implementation of power ultrasonics. Sound Solutions is different by design than the symposium in providing a more topical meeting with greater space and time for depth of discussion and focused interactions. The program is in this issue, and the interactions include exposure to many potential new mem-

bers and member companies. I was surprised by the low-airfares from the East to Columbus, and realized I could visit some local companies and research centers, as Cincinnati and Cleveland are within a couple hours. Please take a look at joining us in Columbus, and support EWI, a long term supporter of UIA.

The UIA and its finance committee have developed an understanding of budget and management of symposium and membership income versus expenses, so we are confident in entering a new method of grouping sponsorships. Please review the sponsor, exhibitor, and member company options, and feel free to contact me directly, or any of the board members if you have questions. There are options for sponsor and exhibitors spanning registration and exhibition in Sound Solutions, Symposium, and the UIA Web site. The sponsorships are needed to fund the Web Site Upgrade and continued publication of UIA presentations in Physics Procedia.

Please review the sponsor, exhibitor, and member company options on page 6, and feel free to contact me directly, or any of the board members if you have questions.

How to Reach Your Ultrasonic Customers



UIA has sponsorship opportunities that offer a sustained impact for your company's products and services.

Here's what you get for just one fee:



Ad space on the new website helps increase company exposure



Exhibit at UIA events for a higher company profile



Ads in Vibrations, our quarterly newsletter can be linked to your site

...and there's more!

Make your sponsorship decision today!

Call us:



937-586-3725

Email us:



uia@ultrasonics.org

See next page:



Sponsor Information packet

Sponsor Information Ultrasonic Industry Association

Website, *Vibrations*, Sound Solutions, UIA45 Symposium

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 UIA45 International Symposium.

Website Banners

UIA is launching its new website in 4Q 2015. 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 new one-day midyear meeting will be held at EWI in Columbus Ohio with an emphasis on practical answers to ultrasound problems that companies have. Sponsorships and tabletop exhibits are available for this meeting on 22 October 2015.

UIA45 Annual Symposium

The three day annual symposium will be held in Seattle WA 4 - 6 April 2016. Sponsorships and table top exhibits are available.

Sponsorship Packages

Each package is for 12 months from date of payment. Go to page 4 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.

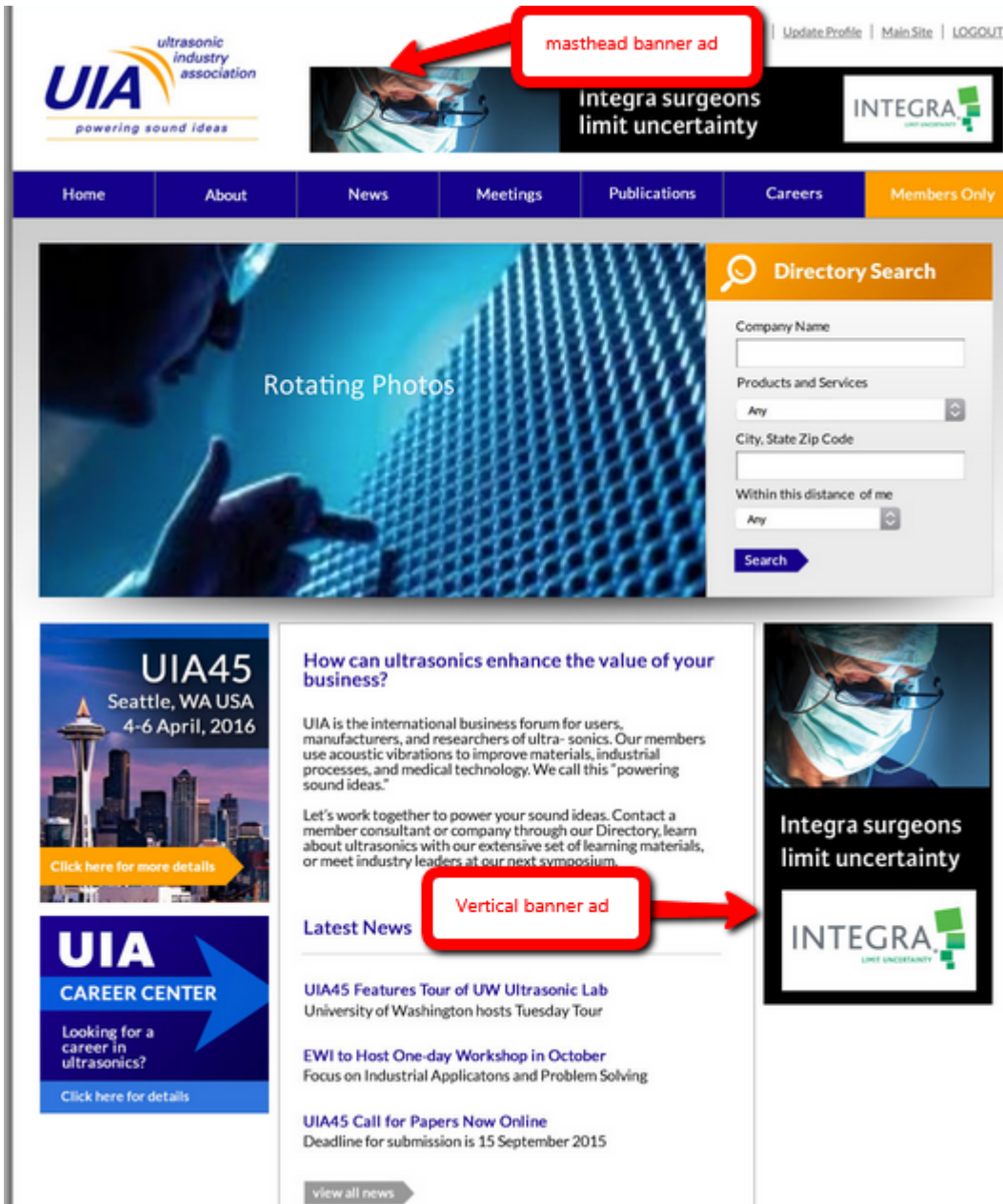
Bronze Includes 1/2 column page ad in quarterly *Vibrations* newsletter and tabletop exhibit at Symposium.

Select the level of exposure best for your company. See the details on page 3.



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UIA Website Ad Placement and Sizes



Masthead Banner Ad

- ◆ Size: 90 pixels high x 728 pixels wide
- ◆ Will rotate with up to 10 other ads
- ◆ May include up to three rotating images
- ◆ Will appear on all pages in this location

Vertical Banner Ad

- ◆ Size: 400 pixels high x 240 pixels wide
- ◆ Will rotate with up to 10 other ads
- ◆ May include up to three rotating images
- ◆ Will appear on all pages in this location

Sponsorship Levels

	Titanium	Gold	Silver	Bronze
	\$5,000/year	\$4,000/year	\$3,000/year	\$1,500/year
Masthead banner with URL Link	X	X		
Vertical banner with URL Link	X		X	
Career Center Ad	Unlimited	4/year	3/year	1/year

UIA Sponsorship Package Descriptions

2015-2016 SPONSORSHIP PACKAGES

	Titanium \$5,000	Gold \$4,000	Silver \$3,000	Bronze \$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
Sound Solutions				
Sponsor Recognition	X	X		
Tabletop exhibit	X	X	X	
Complementary Registration	2	2	1	
UIA45 Symposium				
Sponsor Recognition	X	X		
Tabletop exhibit	X	X	X	X
Complementary 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

Website www.ultrasonics.org UIA is launching its new website design 4Q 2015. Both ad positions - masthead and vertical banners—can have up to three images each and will be linked to the landing page of your choice. Our new Career Center will feature either word or image ads and will be displayed for 30 days.

Vibrations Newsletter is distributed electronically on a quarterly basis. Each ad can be linked to a landing page of your choice.

Sound Solutions Mid Year Meeting is held in October. This one-day meeting provides both sponsorship and tabletop exhibits. Titanium and Gold sponsors will have the opportunity for a 5 minute introduction to their company's products and services.

UIA45 Annual Symposium is a three day meeting held in the spring. Titanium and Gold sponsors will have the opportunity for a 5 minute introduction to their company's products and services. Tabletop exhibits are in the same area as continental breakfasts and breaks.

Call for Papers Now Electronic

This year, the submission of abstracts for consideration for UIA45 presentation or posters is now electronic. Use the link to the right to go to the UIA45 Symposium Presentation Submission site. Please follow the instructions on this page to complete your submission(s). Should you have any questions, please email uia@ultrasonics.org or call +1.937.586.3725.

Go to :

<http://tiny.cc/UIA45Paper>

to submit your abstract

Step 1



UIA45: 2015 Annual Symposium
4-6 April 2016 | Seattle, WA | USA
ULTRASONIC INDUSTRY ASSOCIATION

Login

UIA45 Symposium Presentation Submission

Email: Password:

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

The Ultrasonic Industry Association invites you to submit a 200 word abstract for consideration of presentation or poster on 4-6 April at its 45th Annual Symposium in Seattle, WA, USA at the Motif Hotel. Plan now to join UIA for this international conference featuring the best of ultrasound from around the world.

Step 2

Login

First name *
 Last name *
 E-mail address *
 CC Email
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 Country *

Step 3

Home Edit profile

Logout

Submitter: Dashboard Submissions

Pending Accepted Declined

You have no Submissions in this status

Important Information: Presentations will be no longer than 25 minutes; final abstracts must be submitted via this website.

The session chair may 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 14 March 2016. Final papers will be due shortly after symposium, at a date to be announced, for publishing in electronic proceedings.

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

eSelect - Submission

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)
 Presenter Name *
 Presentation Title *
 Authors of Paper *
 Institution(s) of Author(s) *

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.

Ultrasonic Industry Association

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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.

Important Dates

- 2 October:** Deadline to make your reservation at the Hampton Inn & Suites, Columbus (see page 1)
- 15 October:** Deadline to register for Sound Solutions Meeting
- 20 October:** Sound Solutions Reception and Fundamentals of Power Ultrasonics, Columbus Ohio
- 21 October:** Sound Solutions 8:00 am—4:00 pm, EWI, Columbus, OH
- 31 October:** Deadline to submit abstract for UIA45
- 18 December:** Early registration discount ends for UIA45, Seattle, WA
- 28 March:** Last day to register online for UIA45
- 4 - 6 April:** UIA45 at Motif Hotel in Seattle, WA

The proceedings of UIA43 symposium are now available online on

ScienceDirect: <http://www.sciencedirect.com/science/journal/18753892/63>