

## Powering Sound Ideas

# UIA 48: Toronto, Canada 15 - 17 April 2019

Jay Sheehan, Integra Life Sciences, our Symposium Chair is hard at work with Jahan Tavakkoli, PhD., Undergraduate Program Director, Associate Professor, Ryerson University on UIA19.



### Paper and Poster Submissions NOW ACCEPTED

Have a presentation idea? Abstracts for sessions can now be submitted using the form included in this newsletter on page 7.

Plans for this symposium include:

- Tour of the Ryerson University Ultrasonic Laboratory on Tuesday
- Industrial sessions - chaired by Andrew Feeney, University of

Warwick and Andrew Mathieson, Thales UK, Maritime Mission Systems.

- Medical sessions - chaired by Justin Byers, Bonutti Research and Myra Flitcroft, Moog Components Group.

*Continued on next page*

### Special Points of Interest

- UIA48 Hotel Reservation Information - Page 2
- New ultrasonic products that will impact our daily lives - Page 4
- UIA48 Registration is open! Details on Page 6
- Paper & Poster Submission Information - Page 7

## Planning Your Trip to Toronto

When you check out the list of MUST SEE places in Toronto, the first two are the CN Tower and the Distillery District. UIA48 is carefully planned to provide participants easy access to both these locations.

### CN Tower

Still the tallest free-standing structure in the Western Hemisphere, the CN Tower is located just

steps away from our headquarters hotel. You can be one of the more than 2 million people who visit the CN Tower each year.

The floor of the observation tower is made of glass for a bird's-eye view of 113 stories below to the ground. Not to worry... the floor can withstand the weight of 35 moose. Let's hope they aren't visiting when you are!

### Book an EdgeWalk!

Take a walk on the edge of the tower! This should be open at the time of UIA48. See page 2 For booking information.



### PLAN AHEAD!

### Passports Needed

Entry to Canada requires a passport. Make sure that yours won't expire before October 2019. Most countries don't require a visa - let UIA know if you need a letter of invitation and it will be sent to you promptly. See page 6 .

## UIA48 Preview, continued

- Workshops and Poster Session on Tuesday
- New this year! Interactive presentations throughout the symposium.

**Tuesday Event at Mill Street Brewery** - Located in the historic Brewery District, Mill Street are beer innovators in the Canadian brewing scene with their in-house nano-brewery, which allows them to create unique, small-batch brews.

### Make Your Hotel Reservations Today!

UIA48 will be held at the InterContinental Hotel Toronto Centre. To make your reservations you can call: 1-800-235-4670 or you can book [online](#). Please note that you are attending the **UIA 2019 Annual Symposium** when booking through the 1-800 number.

Hotel rooms are just \$245C/night. [Make your reservations](#) by 15 March 2019.



## Planning Your Trip to Toronto! *continued*

### Distillery District

Our Tuesday evening event will be held at the Mill Street Brewery, in the heart of the Brewery District. This is located just one mile from our hotel. Plan to stroll around the district before dinner to enjoy this historic pedestrian-only neighborhood – flanked by industrial-style Victorian buildings and paved with cobblestone once trodden on by horse-drawn carriages. It overflows



with art galleries, performance spaces, cafes, restaurants and yes, a brewery. This is the place to go for a glimpse into Toronto's past.

Want to ride a Segway? Take a 30 minute tour and learn about the history of the District and enjoy this new method of transportation while you are at it.

Other places to visit include:

**St. Lawrence Market** is often regarded as one of the best food markets in the world by foodie experts, and travelers couldn't agree more. Not only were recent visitors impressed by the overwhelming amount of delicious food under this market's one roof, but they also loved how reasonably priced items were. According to some visitors, the food is only half the fun. Many strongly recommended holding out

on a visit for Saturday, when the market truly comes alive with vivacious vendors hawking their fare to both hungry tourists and locals.

**Casa Loma**, built by Sir Henry Pellatt, in the early 1900's is the only full-size castle in North America. It is located just 3 miles north of the InterContinental Hotel.

Toronto has two **Hop-on Hop Off Bus Tours** to take you to all these locations and more. Plan to come the weekend before UIA48 and use a two day ticket to easily visit all that Toronto has to offer.

Find more information here: [www.seetorontonow.com/](http://www.seetorontonow.com/)

To book your Edgewalk Tour beginning in January 2019, [click here](#)

## Application of pulsed HIFU toward studying traumatic brain injury



Jahán Tavakkoli, Dept. of Physics, Ryerson University, Toronto, Canada will make this presentation during UIA48.

The pathophysiology of traumatic brain injury (TBI) is classified into primary injury, defined as the initial physical impact to the head; and secondary injury, which involves a cascade of biological events that further neuronal damage. To study the pathways involved in secondary brain injury and to evaluate potential therapeutic candidates efficiently, models of TBI was developed in adult zebrafish *in vivo* and in cell cultures *in vitro*. These models use pulsed high intensity focused ultrasound (pHIFU) beams to induce controlled mechanical injuries to fish brain or to cells.

High intensity focused ultrasound (HIFU) is a portable and affordable modality for non-invasively focusing ultrasonic

energy into localized internal tissues and organs. In our lab, we developed a specialized pHIFU system for a study toward understanding of the mechanisms behind TBI and developing novel therapeutic strategies. The image-guided pHIFU applicator makes use of a high-power piezocomposite transducer technology which makes it capable of generating acoustic pressures of up to 20 MPa in a highly localized focal region of ellipsoid shape with dimensions of 2 mm (short axis) by 10 mm (long axis). The output acoustic pressure and intensity of the pHIFU applicator were fully characterized by a series of acoustic power and hydrophone-based pressure measurements along with 3D simulations. The system has been using in two parallel studies: (1) inducing controlled mechanical injury in zebrafish brain *in vivo* to mimic TBI and to study the outcome of various treatments methods, and (2) to expose BEND3 mouse brain endothelial cell line cultured on a petri dish with an acoustically transparent membrane. pHIFU output exposure parameters used in studies 1 and 2, respectively, were pulses of 50 ms duration and 8 MPa focal pressure, and 50

ms duration and 0.3-0.6 MPa focal pressures.

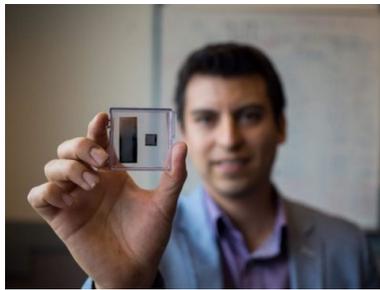
In study 1 a locomotor behavioural study was performed on fish, and in study 2 western blot and immunohistochemistry studies were performed to observe and quantify for cellular and morphological changes on BEND3 cells. In study 1, it is concluded that the injury induced by the pHIFU beam significantly altered locomotor behavior of adult zebrafish. In study 2, it is concluded that the BEND3 nuclei shape deformation is acoustic pressure dependent within the range of pressures used in this study. The overall conclusion is that the pHIFU system provides a highly controllable and repeatable method to induce mechanical injury to neural cells both *in vivo* and *in vitro* toward studying and understanding of TBI.

Research funding for the project was provided by grants from Ontario Research Fund- Research Excellence (ORF-RE) Grant, Natural Sciences and Engineering Research Council (NSERC) of Canada Discovery Grant, and Ryerson Start-Up Research Fund.

## Ultrasound Applications in the News

### Breakthrough opens door to smartphone-powered \$100 ultrasound machine

Engineers at the University of British Columbia have developed a new ultrasound transducer, or probe, that could dramatically lower the cost of ultrasound scanners to as little as \$100. Their patent-pending innovation -- no bigger than a Band-Aid -- is portable, wearable and can be powered by a smartphone.



**UBC researcher Carlos Gerardo shows new ultrasound transducer**  
Credit: Clare Kieman, UBC

Conventional ultrasound scanners use piezoelectric crystals to create images of the inside of the body and send them to a computer to create sonograms. Researchers replaced the piezoelectric crystals with tiny vibrating drums made of polymer resin, called polyCMUTs (polymer capacitive micro-machined ultrasound transducers), which are cheaper to manufacture.

"Transducer drums have typically been made out of rigid silicon materials that require costly, environment-controlled manufacturing processes, and this has hampered their use in ultrasound," said study lead author Carlos Gerardo, a PhD candidate in electrical and computer engineering at UBC. "By using polymer resin, we were able to produce

polyCMUTs in fewer fabrication steps, using a minimum amount of equipment, resulting in significant cost savings."

Sonograms produced by the UBC device were as sharp as or even more detailed than traditional sonograms produced by piezoelectric transducers, said co-author Edmond Cretu, professor of electrical and computer engineering.

"Since our transducer needs just 10 volts to operate, it can be powered by a smartphone, making it suitable for use in remote or low-power locations," he added. "And unlike rigid ultrasound probes, our transducer has the potential to be built into a flexible material that can be wrapped around the body for easier scanning and more detailed views -- without dramatically increasing costs."

Co-author Robert Rohling, also a professor of electrical and computer engineering, said the next step in the research is to develop a wide range of prototypes and eventually test their device in clinical applications.

"You could miniaturize these transducers and use them to look inside your arteries and veins. You could stick them on your chest and do live continuous monitoring of your heart in your daily life. It opens up so many different possibilities," said Rohling.

#### Source:

[www.sciencedaily.com/releases/2018/09/180911110232.htm](http://www.sciencedaily.com/releases/2018/09/180911110232.htm)

### Wearable ultrasound patch monitors blood pressure deep inside body



**Wearable ultrasound patch tracks blood pressure in deep artery or vein.**  
Credit: Chonghe Wang/Nature Biomedical Engineering

A new wearable ultrasound patch that non-invasively monitors blood pressure in arteries deep beneath the skin could help people detect cardiovascular problems earlier on and with greater precision. In tests, the patch performed as well as some clinical methods to measure blood pressure.

"A major advance of this work is it transforms ultrasound technology into a wearable platform. This is important because now we can start to do continuous, non-invasive monitoring of major blood vessels deep underneath the skin, not just in shallow tissues," said Chonghe Wang, a nanoengineering graduate student at UC San Diego.

#### Source:

University of California - San Diego. "Wearable ultrasound patch monitors blood pressure deep inside body." ScienceDaily. ScienceDaily, 12 September 2018. [www.sciencedaily.com/releases/2018/09/180912202421.htm](http://www.sciencedaily.com/releases/2018/09/180912202421.htm)

## From the President

What makes the field of ultrasonics so esoteric is the simultaneous application of the multi-disciplines required for its usage that rarely fall under anyone's course of study in college, even at the PhD level. These disciplines include competencies in fluids, stress and dynamic analyses, as well as precision assemblies, from mechanical engineering, piezoceramics design from the material sciences, and amplifiers and controls design from electrical engineering, just to name a few. And when you also consider these mechanical systems operate above 20kHz (i.e., ultrasonically), mechanical engineers like myself quickly become bewildered at the complexities involved (e.g., how does a threaded joint behave at 120kHz?).

As a result, if you spent your entire lifetime taking classes and working in this field in a vacuum, you may never really achieve the competencies required for great success.

Here is where the UIA comes in: most of our Symposium attendees were seasoned in ultrasonics by "standing on the shoulders of giants" to achieve their success, and our casual format provides many opportunities for you to interact and advance your knowledge with our "giants." The presentations at the Symposia are also very diverse in topics, which means there is always something new for everyone regardless of your experience.

How do I know this? Well, when I attended my first UIA conference over 10 years ago, I often found myself puzzled when things went wrong with the ultrasonics, even though I had a good knowledge of ultrasonic transducer design principles. I now feel that my working knowledge has increased 10 fold, albeit I am still puzzled at times, and I owe most of this to the UIA Symposia. I remember when I first started in ultrasonics and was told by my supervisor that you "will never understand this stuff, and the sooner you realize this the less discouraged you will be." This was as true then, as it is now.

So if you are looking to increase your general knowledge in ultrasonics, our conference chair Jay Sheehan has an outstanding symposium planned for UIA48 in Toronto in 2019. We welcome your involvement in the forms of poster presenter, paper presenter or becoming a sponsor. I hope to see you there!



**Dominick DeAngelis**  
UIA President

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## UIA48: Registration, Sponsorship, & Visas

# Register Now

### UIA48 Registration

*Register early for UIA48 and save!*

You know you are coming to the only event that focuses on the latest advances in ultrasound. So why not use your 2018 budget dollars and save at least \$120USD (for UIA members)?

Register by the end of day on Friday, 20 December and pay just \$790USD for the full symposium, which includes 3 days of programming, a tour of Ryerson University ultrasonic laboratories, the Tuesday evening event at the Mill Street Brewery and more.

The non-member fee is \$910USD

### UIA Sponsorship

Sign up for the sponsorship level of your choice (see page 7 - 8 for all the details) by clicking on the button above and selecting the **Sponsorship Package Registration Form**.

### Planning for your exhibit in Toronto

UIA48 is registered with Canada Customs to make it easier for you to bring your exhibit material into Canada.

We are working with Consult Expo as our customs broker, and have the documentation you will need to complete for your shipment of material to Toronto. **Please plan ahead!** You will need to complete a forms package and ship your material to Canada **no later than 1 April no foolin'!**

You can include your marketing materials and a pop-up banner stand in your baggage without a problem.

### Need a Visa?

Most of our UIA48 participants will not require a visa to enter Canada. All you will need to bring is your passport.

However, if you are coming from a country that does require a visa, please email us at [uia@ultrasonics.org](mailto:uia@ultrasonics.org) and we will send you the formal letter of invitation you will need to secure your visa.



# UIA48 Call for Papers/Posters

Here's your opportunity to share your latest research and applications with the ultrasonic community. We welcome traditional presentations (25 minutes in length) and posters. On Tuesday, we feature workshops on ultrasonic principles. Here are the instructions for our online [Paper Submission Process](#).

On the Abstract Submission Home Page, you first need to set up your profile (1) before submitting your abstract (2)

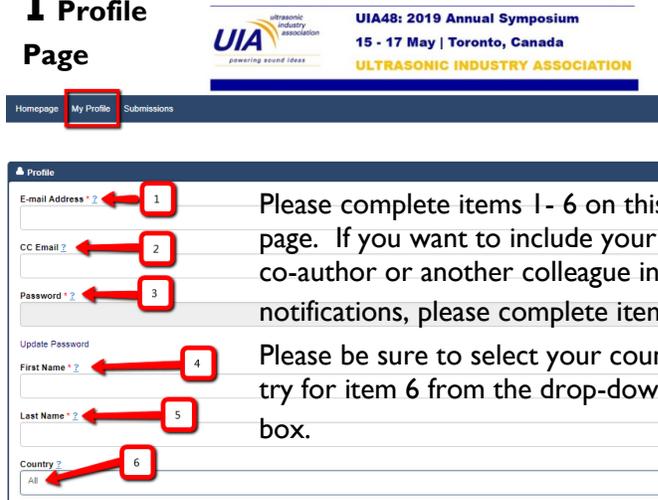


The UIA invites abstract submissions for posters for the 48th Annual UIA Symposium, 15 - 17 April 2019, in Toronto, Ontario, Canada. This is an opportunity to showcase your research results to academic and industry delegates in any area of medical or industrial ultrasonics. We would be delighted to receive poster abstracts from graduate students to bring a strong 'local research' flavor to the UIA Symposium. You can submit your abstract here. We look forward to seeing you in Toronto. We welcome your submission for UIA48. You may submit for one or more of the following:

- Industrial Session
- Medical Session
- Workshop Session
- Poster

If you are selected to present a paper, you will have no longer than 25 minutes to do so. We allocate up to 60 minutes for a workshop session. Posters will be displayed on Tuesday with an opportunity to discuss with interested individuals

## 1 Profile Page



Please complete items 1 - 6 on this page. If you want to include your co-author or another colleague in notifications, please complete item 2.

Please be sure to select your country for item 6 from the drop-down box.

## 2 Submission Page Instructions

After completing your profile, you are ready to upload your submission.

2: Select if your presentation is industrial, medical, workshop, or poster.

Items 3, 4 and 5 will be used for publicity purposes - please ensure their accuracy.,

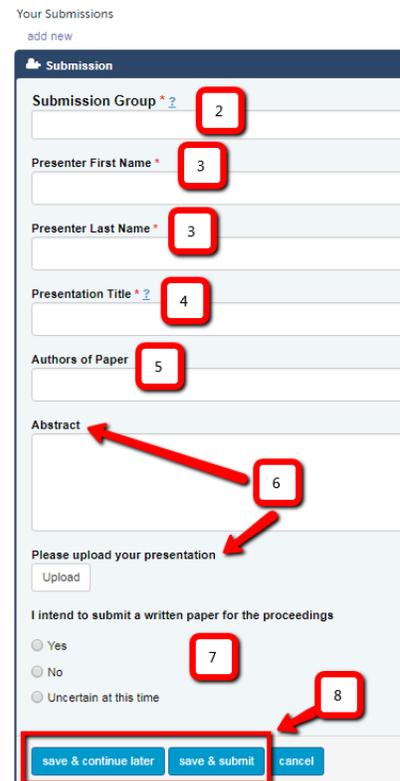
Item 6 - you can either cut and paste your abstract OR upload it.

Item 7 - your interest in publishing your paper will not affect the decision to accept your presentation.

After completing items 1 - 7, you MUST select **save & submit**.

Please note you can save what you have and return to submit later.

## 2 Submission Page



# 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 UIA48 International Symposium in Toronto, Canada 15 - 17 April 2019

## UIA48 Annual Symposium

The three day annual symposium will be held in Toronto, Canada, USA 15 - 17 April 2019. Sponsorships include table top 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.

## Sponsorship Packages

Each package is for 12 months from date of payment. Go to page 2 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/Symposium](http://www.Ultrasonics.org/Symposium)



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# 2019 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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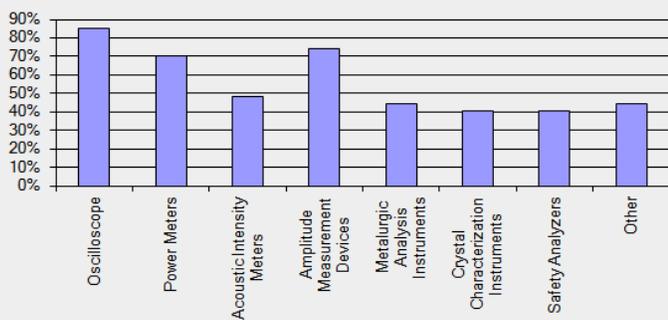
## Sound Solutions

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

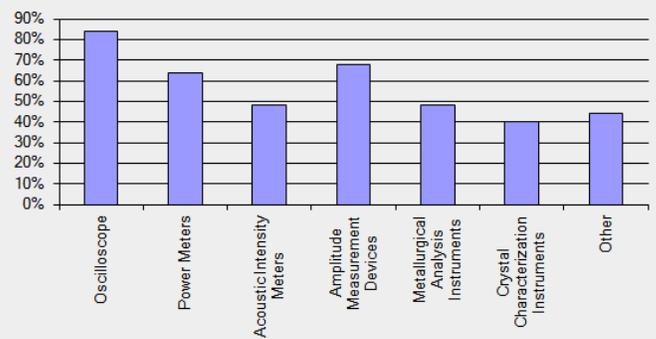
## UIA46 Symposium

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

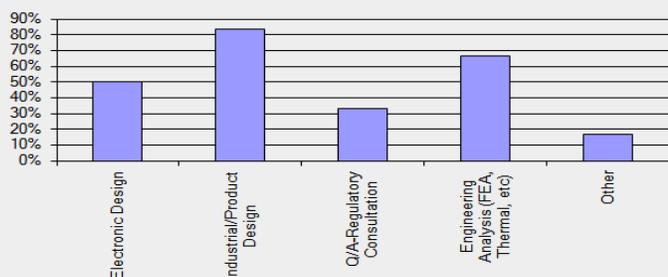
### Instruments used in R&D and Production



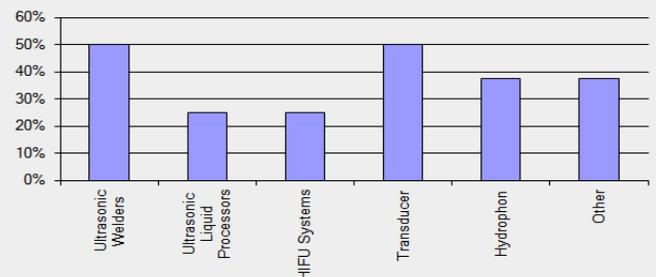
### Instruments used for products and services



### Types of Design Service Companies used by UIA members



### Types of Ultrasound Companies used by UIA members



Ultrasonic Industry Association  
11 W Monument Ave, Ste 510  
Dayton OH USA

Phone: +1.937.586.3725  
uia@ultrasonics.org



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

**30 November 2018: Presentation Abstract Submission Deadline**

**20 December 2018: Earlybird registration closes. Go to <https://tinyurl.com/UIA48Reg>**

**15 March 2019: Last day to make your reservations at the InterContinental Hotel Toronto Centre [UIA48 Hotel Reservations](#)**

**15 - 17 April 2019: UIA48 in Toronto, ON, Canada**