42nd Annual Symposium

ultrasonic industry association
UIA
powering sound ideas

22-24 April 2013

Ultrasonic Industry Association

Schedule on Pages 2 - 3

UIA will find the Magic in Orlando

Plans are well in hand for the 42nd Annual symposium. The format will be similar to past successful symposia, including one day each devoted to Medical sessions, to ultrasonic workshops and standardization, and to Industrial sessions. Online registration is now open, or use the registration form on page **10**.

The symposium will be held at the Hilton Orlando Lake Buena Vista hotel in the Walt Disney World Resort. Ideally situated next to the Downtown Disney® Marketplace and Downtown Disney® West Side and Cirque de Soleil, symposium participants will benefit from complimentary transportation to and from Disney theme parks and enjoy Disney's exclusive Extra Magic Hours benefit — providing longer fun and shorter queues.

See inside for information on our **invited speakers**, **in-depth workshops**, and information about the IEC WG7 and WG3 sessions scheduled during this symposium.

EPCOT® courtesy of WDW

Invited Speakers

- Dr. Tony Jun Huang, The Pennsylvania State University
- Dr. Alfredo Vazquez Carazo, Micromechatronics, Inc.
- Dr. Laura Kloepper, Brown University

Inside this issue:

Invited Speakers

This year's symposium features three invited speakers:

Dr. Tony Jun Huang is an Associate Professor in the Department of Engineering Science and Mechanics at The Pennsylvania State University (USA).

Dr. Alfredo Vazquez Carazo is President and CEO of Micromechatronics Inc.

Dr. Laura Kloepper, presently at Brown University in Rhode Island.

Please see pages 4-5 for more detailed information about their presentations.

An overview of other papers is on page 6.

Symposium Presentation Schedule

Schedule subject to change

Industrial Session Monday, 22 April 2013

7:45 *Registration and Continental Breakfast*
8:15 Welcome, *Mark Hodnett, UIA President*
8:30 New test part for ultrasonic welding characterization, *Leo Klinstein*
9:00 Lead Free Pizoceramic Materials for Industrial Applications, *Eberhard Hennig, Antje Kynast*
9:30 Optimizing Piezoelectric Stack Preload Bolts in Ultrasonic Transducers, *Dominick A. DeAngelis, Gary W. Schulze and K.S. Wong*
10:00 *Refreshments in Exhibit Area*
10:45 Relation of the Geometry of the Piezoelectric Element with the Effect of Crosstalk in the Response of an Ultrasonic Transducer, *Israel Sanchez Dominguez, Pedro Acevedo Contla*
11:15 Piezopaint for Piezomems - industrial low temperature technology for design and production of integrated multifunctional devices, *Wanda W. Wolny*
12:00 *Luncheon*
1:00 Welcome to Afternoon Session, *Dominick DeAngelis, Session Chair*
1:15 Invited Speaker: Ultrasonic Piezoelectric Transformers for Power Conversion, *Alfredo Vazquez Carazo*
2:15 Design, Realisation and Characterisation of Industrial-scale Ultrasound Cells for Honey Processing, *Mark Hodnett, Gianluca Memoli, Lian Wang and Pierre Gélat*
2:45 *Refreshments in Exhibit Area*
3:30 Ultrasonic Welding of Plastic Films, *Jessica Reidt*
4:00 First Day Sessions Conclude

Workshop/Tour Day Tuesday April 23, 2013

7:30 *Continental Breakfast*
8:00 Welcome, *Mark Hodnett, UIA President*
8:15 Transducer design and modelling, *Jay Sheehan*
9:00 Standards and Requirements Affecting Ultrasonics, *Alan Broadwin*
9:30 International Standards: IEC TC87 WG7, Ultrasonic Surgical Equipment, *Mark Schafer*
10:00 International Standards: IEC TC87 WG3, High Power Ultrasound, *Bajram Zeqiri*
10:30 *Poster Session (see next page for details)*
11:00 Invited Speaker: Ultrasonic Signals and Whales with Adaptive Focus, *Laura Kloepper*
12:00 Poster Awards Ceremony
12:15 Workshop Sessions Conclude

Symposium Presentation Schedule, cont'd

Tuesday Night Special Event

3:45 Depart for Disney Tour and Dinner *You MUST be registered in advance; included in FULL registration.*

Medical Session Wednesday April 24, 2013

7:45 *Continental Breakfast*
8:15 Welcome, *Jay Sheehan*
8:30 Acoustic Impediography: a new method for fingerprinting and navigation, *Rainer Schmitt*
9:00 Quantitative ultrasound computed tomography using phase-insensitive pyroelectric detectors, *Bajram Zeqiri*
9:30 Unconference
10:00 *Refreshments in Exhibits*
10:45 Invited Speaker: Acoustic tweezers: manipulating particles, cells, and organisms using standing surface acoustic waves (SSAW), *Tony Jun Huang*
12:00 *Luncheon*
1:00 Welcome to Afternoon Session, *Jay Sheehan*
1:15 VHF and UHF Filters for Wireless Communications Based on Piezoelectrically-Transduced Micromechanical Resonators, *Jing Wang*
1:45 Advancements in Laser Doppler Vibrometry for Ultrasonic Applications, *Eric M. Lawrence*
2:15 Characterisation of commercial and prototype power ultrasonic devices used in bone surgery, *Andrew Mathieson*
2:45 Symposium Wrap-up, *Mark Hodnett*
3:00 Symposium Concludes

Posters

High-Q On-Chip Micromechanical Resonator for Sensing Applications, *Ivan Rivera*

Implementation of High-Q Resonators in Electroplated Nickel as a Low Temperature CMOS Compatible Materials, *Mian Wei*

Low Loss VHF and UHF Filters for Wireless Communications Based on Piezoelectrically-Transduced Micromechanical Resonators, *I-Tsang Wu*, *Julio Dewdney, and Jing Wang*

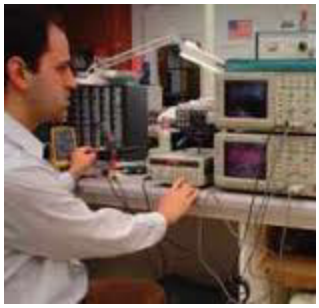
Preliminary Development of MEMS Acoustic Emission Sensor, *Adrian Avila*

Thermochromic materials for the visualisation of the distribution of time-averaged intensity with an ultrasonic field, *Bajram Zeqiri, Ian Butterworth and Mark Hodnett*

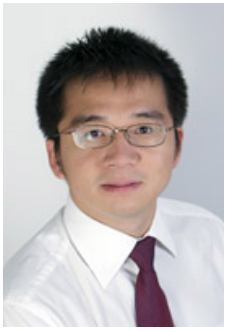
Acoustic method of moving small particles

The ability to manipulate cells and microparticles into desired patterns is critical for numerous biological studies and applications such as microarrays, tissue engineering, and regenerative medicine. Here we summarize our recent progress on a "acoustic tweezers" technique that utilizes standing surface acoustic wave (SSAW) to manipulate particles, cells, and organisms. This technique is capable of manipulating cells and microparticles regardless of shape, size, charge or polarity. Its power intensity, approximately 107 times lower than that of optical tweezers, compares favorably with those of other active patterning methods. Flow cytometry studies have revealed it to be non-invasive. The aforementioned advantages, along with this technique's simple design and ability to be miniaturized, render the "acoustic tweezers" technique a promising tool for various applications in biology, chemistry, engineering, and materials science.

Dr. Alfredo Vazquez Carazo is the CEO and CTO of Micromechatronics, Inc, State College, Pennsylvania, USA. Before joining Micromechatronics Inc., he worked in several world-leading institutions in the fields of smart-material and nano-engineering, including the University of Southampton, England, the Ecole Politecnique Federale de Lausanne, Switzerland, Murata Manufacturing Co. Ltd., Shiga, Japan, and the International Center for Actuators and Transducers (ICAT) of the Penn State University. He has been the Principal Investigator of several Phase I and II SBIR projects for NASA, Darpa, Army and NIH developing multiple innovative piezoelectric-devices for space, military and medical applications. He is the inventor of several commercialized patents.



Dr. Alfredo Vazquez Carazo



Dr. Tony Jun Huang is an Associate Professor in the Department of Engineering Science and Mechanics at The Pennsylvania State University (USA). He received his Ph.D. degree in Mechanical and Aerospace Engineering from the University of California, Los Angeles (UCLA) in 2005, and his B.S. and M.S. degrees in Energy and Power Engineering from Xi'an Jiaotong University, Xi'an, China, in 1996 and 1999, respectively. His research interests are acoustofluidics, optofluidics, and micro/nano systems for biomedical applications. He has authored/co-authored over 100 peer-reviewed journal publications and over 110 peer-review conference papers in these fields. He serves as Vice Chair of the American Society of Mechanical Engineers (ASME) Nanoengineering Council and chair of the ASME Society-Wide Micro/Nano Technology Forum. He also serves as member of Editorial Board for eight different journals. His research findings have been recognized with a 2010 National Institutes of Health (NIH) Director's New Innovator Award, a 2011 Penn State Engineering Alumni Society Outstanding Research Award, a 2011 JALA Top Ten Breakthroughs of the Year Award, and a 2012 Outstanding Young Manufacturing Engineer Award from SME.

Ultrasonic Piezoelectric Transformers for Power Conversion

Ultrasonic applications are widely spread through industrial, medical, military and consumer-end applications. Well known applications include ultrasonic cleaning, welding, drilling, liquid atomization, liquid mixing, underwater sonars, ultrasonic diagnostic imaging, ultrasonic transdermal drug delivery, ultrasonic sonication of chemical systems, etc. Most of these applications are based on the conversion of electrical energy into mechanical energy using the resonant properties of a piezoelectric transducer, such as Langevin type transducers.

The ultrasonic properties of piezoelectric materials can also be used to very efficiently convert electrical energy into electrical energy at different voltage levels. This is the case of piezoelectric transformers. Piezoelectric transformers convert electrical energy into electrical energy by means of the high efficiency conversion that occurs in piezoelectric devices when operated near one of the resonance frequencies. The use of piezoelectric transformers was first suggested in the late 20's by A. Nicolson, but it was not until the mid 50's when Charles Rosen was able to demonstrate the feasibility of this type of device thanks to the use of the recently invented PZT ceramic piezoelectric material composition.

Early in the 90s, piezoelectric transformer (PT) technology gained significant interest and market share

Ultrasonic Piezoelectric Transformers for Power Conversion, cont'd

through the business segment of liquid crystal display (LCD) backlighting inverters. The reliability of the advances, together with the improvements of supporting technologies resulting from the LCD backlighting application (e.g. materials, volume manufacturing processes and driver ICs), have allowed the technology to expand to multiple applications.

Nowadays, the use of PTs is penetrating specific market niches where the intrinsic features of these transformers provide a clear benefit compared to traditional magnetic transformers. Piezoelectric transformers are magnetic-less devices and find unique use in those environments subjected to strong magnetic fields, such as certain medical applications. They also have high step-up capability in a very thin profile and small footprint, thus providing replacement options for very high voltage power supplies for use at home, in automobiles and in the office .

This presentation will provide a general overview of different ultrasonic applications developed by Micromechatronics and then will move into a general overview of piezoelectric transformers and their commercial applications.

Multilayer actuators are ideal for precise control of optics

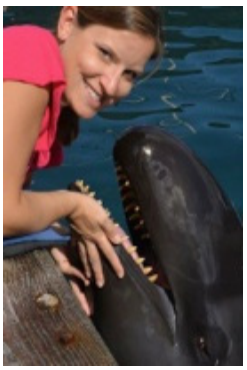
Dynamics of Echolocation in the False Killer Whale

Sound is of utmost importance to odontocetes, and toothed whales and dolphins evolved a hypertrophied auditory system for the production and hearing of ultrasonic signals. As concern increases for the impact of anthropogenic noise on their ecology and behavior, the need for a basic understanding of sound production and hearing becomes paramount. Despite decades of research on the hearing and echolocation of odontocetes, several fundamental gaps in knowledge of their echolocation remain. This research aimed to fill these gaps using a combination of psychophysics, behavior, and acoustics with a false killer whale. This included investigating the impact of high-frequency hearing loss on echolocation discrimination performance and echolocation signal characteristics, characterizing the size and shape of the echolocation beam, and investigating active focusing in the echolocation beam during various echolocation tasks.

The data indicate that false killer whale modified its echolocation clicks to match its range of best hearing, but these changes in echolocation signals corresponded to a drop in echolocation discrimination performance. The size and shape of the echolocation beam was single-lobed, with most of the energy located between 20 and 80 kHz, but this beam size changed during echolocation. Irrespective of frequency, the false killer whale changed its beam size depending on the target distance and difficulty. These data are the first empirical data to directly show beam focusing in an odontocete, and suggest that the odontocete echolocation system is dynamic and capable of short and long term changes. These changes can occur in the echolocation click characteristics or echolocation beam shape and can allow odontocetes to adapt to various acoustic challenges in their environment.

Laura Kloepper obtained her MS and Ph.D. in Zoology from the University of Hawaii at Manoa in April 2012. While at the Hawaii Institute of Marine Biology, Dr. Kloepper worked under Dr. Paul Nachtigall to measure the hearing and echolocation signals of laboratory and stranded whales and dolphins in Hawaii and around the world. Dr. Kloepper was awarded the NSF Postdoctoral Research Fellowship in Biology and is currently working with Dr. James Simmons at Brown University and Dr. John Buck at UMass Dartmouth to investigate bat biosonar performance using the Cramér-Rao Lower Bound and adaptive beamforming. Dr. Kloepper is also an avid triathlete.

Monday's focus is on Industrial and Scientific Ultrasound topics. Tuesday is devoted to ultrasonic workshops and standardization. Wednesday's focus is on Medical Ultrasound presentations.



Laura Kloepper

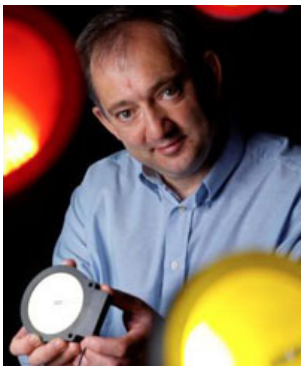
Medical Session Highlights

Rainer Schmitt, Chief Technology Officer, Sonavation

The Symposium Medical Session is shaped by an interesting cross section of presentations in ultrasonic measurement of tissue acoustic properties, temperature measurement of acoustic fields, and an evaluation of novel medical high intensity transducers. A new method for fingerprinting using impediography is also introduced. This array of topics is contributed from the countries of the United Kingdom, Netherlands and the United States.

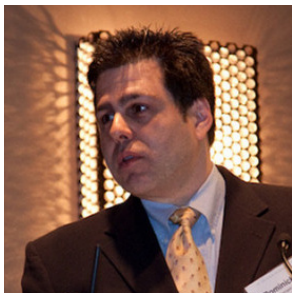
Confirmed presentations include:

- ***Acoustic Impediography: a new method for fingerprinting and navigation,*** *Rainer Schmitt, Sonovation, Netherlands, UK, Belgium and Germany*
- ***Quantitative ultrasound computed tomography using phase-insensitive pyroelectric detectors,*** *Bajram Zeqiri, Christian Baker, Giuseppe Alosa, Peter Wells, and Haidong Liang, National Physical Laboratory (NPL), UK*
- ***High Power Longitudinal/ Torsional Mode Transducers For Cataract Surgery,*** *George Bromfield, Myra Flitcroft PhD, Olga Jovic, Nigel Morlet MD, Moog Medical Devices Group, Utah, USA*
- ***VHF and UHF Filters for Wireless Communications Based on Piezoelectrically-Transduced Micromechanical Resonators,*** *Jing Wang, University of South Florida, USA*
- ***Thermochromic materials for the visualisation of the distribution of time-averaged intensity with an ultrasonic field,*** *Bajram Zeqiri, Ian Butterworth and Mark Hodnett, National Physical Laboratory (NPL), UK*
- ***Advancements in Laser Doppler Vibrometry for Ultrasonic Applications,*** *Eric M. Lawrence, Polytec, Inc., CA, USA*
- ***Characterisation of commercial and prototype power ultrasonic devices used in bone surgery,*** *Andrew Mathieson, University of Glasgow, UK*



Bajram Zeqiri, lead scientist in the Ultrasound Group at NPL

Industrial Session Highlights



Dominick DeAngelis, Kulicke & Soffa Industries

This year's Industrial Session will have broad appeal to most transducer designers and researchers involved in the power, sensor or imaging fields. Some topics include cross talk effects with imaging transducers, new lead-free piezoceramics, ultrasonic food processing, optimizing piezoelectric stack preload bolts, piezoelectric paints and ultrasonic welding of metals, plastics and films. Our diverse group of presenters originates from countries such as Mexico, Germany, United Kingdom, Denmark, and the United States. Confirmed presentations include:

- ***New Test Part for Ultrasonic Welding Characterization,*** *Leo Klinstein,* Dukane Intelligent Assembly Solutions, IL, USA
- ***Lead Free Pizoceramic Materials for Industrial Applications,*** *Eberhard Hennig, Antje Kynast,* Pi Ceramic GmbH, Germany
- ***Optimizing Piezoelectric Stack Preload Bolts in Ultrasonic Transducers,*** *Dominick A. DeAngelis, Gary W. Schulze and K.S. Wong,* Kulicke & Soffa Industries, PA, USA
- ***Relation of the Geometry of the Pizoelecric Element with the Effect of Cross-talk in the Response of an Ultrasonic Transducer,*** *Israel Sanchez Dominguez, Pedro Acevedo Contla,* IIMAS-UNAM, Mexico
- ***Piezopaint for Piezomems - industrial low temperature technology for design and production of integrated multifunctional devices,*** *Wanda Wolny, Rasmus Lou-Moeller, Tomasz Zawada,* Meggitt, Denmark
- ***Design, Realisation and Characterisation of Industrial-scale Ultrasound Cells for Honey Processing,*** *Mark Hodnett, Gianluca Memoli, Lian Wang and Pierre Gélat*
- ***Ultrasonic Welding of Plastic Films,*** *Jessica Reidt, Iowa State University, USA*

Orlando offers ROI: Return on Ideas

42nd UIA Symposium
22-24 April 2013

Birds flock to Greater Orlando's more than 2,000 named lakes, rivers and springs.

Orlando is known for its creative outlets… Walt Disney World, Universal Studios, SeaWorld and much, much more. So, it stands to reason that attending the 42nd UIA Symposium in Orlando will provide you with great ROI: Return on Ideas.

To start planning for your trip, Visit Orlando has a series of apps for both iPhone and the Android:

- Official Guides to Walt Disney World, Universal Orlando and Sea World
- Wait times for Walt Disney World and Universal Orlando
- Live updates for Orlando International Airport and Orlando traffic
- Orlando Dining Guide

You can access all these apps by going to http://www.visitorlando.com/plan-your-trip/orlando-app-store/

For your convenience, we have assembled information to help you plan your WALT DISNEY WORLD® Resort vacation:

Downtown Disney® Area Map

Printable Downtown Disney® Brochure (PDF)

WALT DISNEY WORLD® Resort Information

Downtown Disney

Hilton Orlando Lake Buena Vista hotel is located in the western corner of the Downtown Disney® Area. This area, know as Downtown Disney® West Side, is home to some of the most unique entertainment venues, shops, and restaurants at the Walt Disney World® Resort.

Discover the biggest shopping extravaganza on the planet, Downtown Disney® Marketplace. Sample dozens of unique and imaginative chain and specialty stores loaded with must-have merchandise.

Downtown Disney® Area offers entertainment, shopping, and dining options.

Photos courtesy of Visit Orlando

UIA Rates at the Hilton Orlando Lake Buena Vista Hotel are $189 plus tax, single/double. To make your reservations, call **1.800.782.4414** and reference the code **UAA**.

To make your reservation on line, go to http://tinyurl.com/UIA2013

"La Nouba" is the first Cirque du Soleil show presented in a custom-built freestanding theater. Nearly 5 million spectators have watched "La Nouba's" cast perform daring feats and physical acrobatics. Located at Downtown Disney.

Participants at the UIA Symposium Workshop and Standardization sessions have the unique opportunity to influence and provide input to the Surgical Equipment and High Power Ultrasound standards, without having to be a member of the Working Group .

Tuesday Workshops

Tuesday sees a more relaxed half-day timetable, which will commence with a presentation from UIA Board member Jay Sheehan, describing the new capabilities in transducer modelling provided by ANSYS. Following this, UIA Vice President Mark Schafer will update us on the current position in measurement standards for Surgical Equipment, in his role as Convenor of IEC Technical Committee 87 Working Group 7. This session will then be complemented by a discussion on the progress in Working Group 3, on High Power Ultrasound, to be given by the group convenor, NPL Fellow Bajram Zeqiri. These sessions are unique in the conference calendar, and it is a delight to draw upon world-renowned experts to keep us at the cutting edge of standardisation.

It is a pleasure to be able to welcome Dr. Laura Kloepper, presently at Brown University in Rhode Island, as our invited Speaker for Tuesday. Laura's work is fascinating: her presentation on Ultrasonic Signals and Whales with Adaptive Focus is one which we thoroughly recommend to you.

The formal program for Tuesday will also feature a Poster Session, including a Student Poster competition, with a cash prize and certificate for the top entry, as judged by the UIA Board.

Ultrasonic Transducer Analysis in ANSYS Workbench

ANSYS Finite Element Analysis Software has made many advances in its suite of products. The introduction of ANSYS Workbench has made the analysis of transducers much more seamless as a result. A typical analysis of an ultrasonic power transducer is examined. Use of ANSYS workbench for transducer modal and harmonic analysis is reviewed. A special focus will be made on the use of ANSYS APDL programming language to incorporate the transducer elastic material, piezo electric matrix, and dielectric material properties. Additional ANSYS code will be reviewed that allows transducer impedance analysis through a frequency range. All phases of the transducer analysis will be correlated to classic transducer theory.

Workshop Schedule

7:30 Registration and continental breakfast

8:15 Transducer design and modelling – Jay Sheehan

9:00 Standards and Requirements Affecting Ultrasonics - Alan Broadwin

9:30 International Standards: IEC TC87 WG7, Ultrasonic Surgical Equipment – Mark Schafer

10:00 International Standards: IEC TC87 WG3, High Power Ultrasound – Bajram Zeqiri

10:30 Poster Session

11:00 Ultrasonic Signals and Whales with Adaptive Focus - Dr Laura Kloepper *invited speaker*

12:00 Poster Awards Ceremony


Mark Schafer

Tuesday Tour: Business Behind the Magic

In addition to creating a magical environment for Guests from around the world, Walt and Roy Disney mastered the art of business. In the end, they determined that creativity/innovation, leadership excellence, quality service, brand loyalty, and selection, training and engagement were the five key principles that would forge an invaluable formula for success.

Not only have these time-tested business lessons helped establish Disney as one of the world's leading brands, but thousands of organizations around the world have also successfully adapted these principles in their own pursuit of excellence.

Now you have the unforgettable opportunity to go behind-the-scenes and experience time-tested Disney business philosophies at one of the leading business operations in the world firsthand.

This 3-hour tour features the five core principles taught by Disney Institute and shows how they come to life each day at the Walt Disney World® Resort for Cast Members and Guests. You will explore the following locations:

Textile Services: Visit a state-of-the-art laundry facility, one of the largest in the world, to see how committed, responsible, inspiring leaders are able to motivate a team to achieve amazing results. (Highlights from Disney's Approach to Leadership Excellence and Creativity & Innovation)

Epcot® Cast Services: Experience the "Backstage" area from a Cast Member perspective. See how the Walt Disney World® Resort creates a supportive environment for the Cast Members as they prepare to go on stage. Discover the important role backstage areas play in creating a caring environment. (Highlights from Disney's Approach to Selection, Training & Engagement and Creativity & Innovation)

Main Street, U.S.A.®: Take a stroll through this turn-of-the-century walkway to better understand how we strive to exceed the expectations of our Guests. Discover a tool that helps go beyond standard demographics to meet the needs, wants, stereotypes, and emotions of Guests with innovative products & services. (Highlights from Disney's Approach to Quality Service, Brand Loyalty and Creativity & Innovation)

The "Utilidor" System: Journey beneath the Magic Kingdom® Park to visit support systems designed to improve the experiences of Cast Members and Guests alike. Discover how we use simple tools to engage and empower Cast Members to create lasting customer relationships that drive repeat business and brand loyalty. (Highlights from Disney's Approach to Brand Loyalty and Creativity & Innovation)

After the tour, we'll enjoy dinner in a private area at one of the Disney restaurants. This informal networking event is always a highlight of the UIA Symposium.

This tour will depart from the Orlando Hilton Hotel at Lake Buena Vista at 3:45 on Tuesday afternoon and will return to the hotel following dinner.

This tour is included in full symposium registration - but you must indicate that you intend to participate. If you are registering for only one day, or you have a companion joining you for the tour, please select the Tuesday Evening Event on the registration form.

This Business Behind the Magic Tour is only available through the UIA - this tour is not available to individuals. Don't miss this unique opportunity!

Disney's Approach to Leadership Excellence

Today's successful leaders provide a clear vision, create a structure for executing work, and engage people in the purpose of the organization. Walt Disney himself was a firm believer in this inspirational style of leadership; he used it throughout his long career and taught it to the leaders who succeeded him.

During the Business Behind the Magic Tour, we see this world-class approach to leadership in action. You will see firsthand the principles that are at the core of Disney's organizational strength. We will:

- Learn how to effectively communicate your vision and examine personal methods for inspiring others.
- Explore successful Disney systems and the organizational structures that support them.
- Examine the strategies Disney leaders employ to keep their teams engaged in their work.
- Discover methods for sustaining momentum toward the achievement of goals.
- Explore day-to-day behaviors that will assist you in making a long-lasting impact on the people around you.
- Develop action steps that will help you influence change in your organization and develop your individual leadership behaviors.

42nd Annual UIA Symposium Registration
22 - 24 April 2013
Hilton Orlando, Lake Buena Vista, FL, USA

First Name

Last Name, Designation

Nickname for badge

Position/Title

Employer

Employer City/State

For mailing purposes, I prefer my
- ☐ **Home address as follows:**
- ☐ **Work address as follows:**

Address

City, State, Zip, Country

Phone

E-mail

Please register me in the following manner:

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

❑ Full conference registration

❑ YES, I will attend Tuesday Evening

Select for which category you are registering:

❑ Member ❑ Nonmember ❑ Exhibitor

❑ Speaker ❑ Student ❑ Sponsor

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

Daily Registration

Tuesday does NOT include Tuesday Evening Event

Select which day:

❑ Monday

❑ Tuesday

❑ Wednesday

Select your category:

❑ Member

❑ Nonmember

❑ Speaker

❑ Student (see sidebar)

Sponsorship

❑ Level _____

Special Events

❑ Tuesday Evening Event # of Tickets ____

Fee Schedule	By 3/17	3/18 & after
Full conference (Monday - Wednesday)		
Full conference - Member	$875	$965
Full conference - Nonmember	$995	$1,095
Speaker - Full conference	$750	$825
Student - Full conference	$495	$545
Daily fees (Monday, Tuesday or Wednesday)		
Daily Rate - Member	$295	$325
Daily Rate - Nonmember	$400	$440
Speaker - Daily	$295	$325
Student - Daily	$195	$195
Student - Poster Presenter	$75	$75
Exhibit Levels - Members		
I - 1 table, 1 full registration	$1,795	$1,975
II - 1 table, 2 full registrations	$2,470	$2,670
Exhibit Levels - Non members		
I - 1 table, 1 full registration	$1,995	$2,195
II - 1 table, 2 full registrations	$2,790	$3,070
Sponsorship Levels		
I - Refreshment Sponsor	$1,500	$1,500
II - Breakfast Sponsor	$1,995	$1,995
III - Lunch Sponsor	$2,750	$2,750
IV - Proceedings Sponsor	$2,000	$2,000
Special Event		
Tuesday Evening Event	$180	$190

NOTE: Tuesday evening is included in the FULL conference registration fee. Additional tickets may be purchased for companions.

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

Registration/Sponsorship/Exhibit $_____

Tuesday Evening Event $_____

TOTAL DUE $_____

Method of Payment

❑ Payment enclosed. Make check payable to UIA.

❑ Charge: ❑ MasterCard ❑ Visa ❑ Amex

Exp ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Date ___ / ____ Code: _____

Person's name on card: _____

❑ My billing address is the address used for my registration

Signature

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

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

FAX registration form to +1.937.586.3699