

Ultrasonic Industry Association

2009 Symposium in Vancouver, British Columbia, Canada



Courtesy Tourism Vancouver

The next UIA Symposium will be held on 23 - 25 March 2009 at the Renaissance Vancouver Hotel Harbourside in Vancouver, British Columbia, Canada.

Robert Muratore, UIA President, commented on this location, *Some of the best work in ultrasonics is happening in the Pacific Northwest. We anticipate our largest symposium yet in this beautiful, photogenic environment.*

Ronald Manna, 38th Annual Symposium Chair noted, *Our Pacific Rim location will be more convenient for our Asian colleagues' participation. We are confident that we will have a high caliber of presentations for this year's symposium. Our roster of presentations should provide an excellent overview of the latest research and advancements in both industrial and medical ultrasonic applications.*

The Symposium is divided into three separate days -- and registration will be available daily or for the full symposium.

Monday's focus is on industrial and scientific applications of ultrasound.

Tuesday will feature a selection of workshops with in-depth information on ultrasound design considerations.

Wednesday's focus is on medical applications. Featured speaker is Lawrence A. Crum, PhD, Principal Physicist, Research Professor, University of Washington.

See inside for more information about this Symposium.

Symposium Highlights

- Industrial and Scientific Sessions Monday, 23 March, 2009
- Medical Sessions Wednesday, 25 March, 2009
- Workshops on Tuesday, 24 March 2009
- Special evening event on Tuesday evening, 24 March, 2009

Sun Will Never Set on UIA Board

Enclosed with this issue is the ballot for the 2008 / 2009 UIA Board of Directors. **Please submit your vote!** We are pleased that Dr. Sunita Chauhan has agreed to serve as a Director, pending a positive membership vote. Dr. Chauhan is Associate Professor, Division of Mechatronics and Design, School of Mechanical &

Aerospace Engineering, Nanyang Technological University, Singapore. Her addition to the Board will underscore the global scope of ultrasonics. With Board members from North America, Europe, and Asia, the sun will never set on the UIA Board.

The following directors are proposed for election for a two

year term: George Bromfield, Leo Klinstein, Ron Manna, Adam Morris, Mike Phillips, Jay Sheehan and Jack Sliwa.

The officers are selected by the Board of Directors. For 2008 - 2009, the officers are President, Robert Muratore; Vice President, Mark Schafer; Secretary, Janet Devine; and Treasurer, Ron Staut.

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2008 Symposium Highlights



Professor Kenneth Suslick

“UIA is [a] nice meeting where networking is easy and the relaxed pace makes it a pleasure to attend.”

2008 Symposium Participant

The Sheraton Suites, Alexandria, VA was the venue chosen for the 37th Annual Ultrasonics Industry Symposium, held between 7th and 9th April 2008. Over three days, almost 100 delegates attended paper, poster and workshop sessions describing the latest developments and technologies in medical and industrial ultrasonics, and also had the privilege of touring the White Oak campus laboratories of FDA.

Monday 7th April saw the Industrial Ultrasound paper session, with the keynote presentation given by long-term UIA associate Professor Kenneth Suslick from the University of Illinois, describing latest developments in sonochemistry, sonoluminescence and materials processing.

Several presenters covered new applications of high power ultrasonics in industry, such as Professor Linda Weavers from Ohio State University, who described using ultrasound to clean filtration membranes. In accepting the 2008 Student Paper Award (kindly sponsored by Ethicon Endo-Surgery, a Johnson and Johnson company), Melissa Montalbo from Iowa State University described some excellent work in using power ultrasound to enhance glucose release from corn in the production of biofuels.

A significant highlight of the Industrial session was the presentation to Dr Karl Graff (Edison Welding Institute) of Honorary Membership of the UIA. Karl is recognized world-

wide as an authority and historian on high power ultrasonics, and in accepting his honorary position, presented a paper on the life and works of Lord Rayleigh – a founder of high power ultrasonics. Two of Karl's colleagues at EWI, Matt Short and Tim Frech, also described their recent work in further presentations.



Dr Karl Graff receiving his Honorary UIA Membership from Foster Stulen (UIA President)

The industrial session was completed by presentations from Guanping Zhou (Shenzen Polytechnic, China) and Orland Guedes (Decoup+, France), who both described their work in developing new transducers and applicators.

In a new venture for UIA, three highly successful Workshop sessions were held. The first of these was delivered by George Bromfield (Piezoinnovations) and Tony Crandall (Zevex International, Inc), on Langevin Sandwich Transducer Characterization, and gave participants the opportunity to use a Polytec laser vibrometer, seeing for themselves how modelling and experimental approaches are complementary in device design.

Day one concluded with a

Wine and Cheese Reception, sponsored by Sonobond Ultrasonics.

Tuesday 8th April continued the Workshop sessions, opening with Mark Hodnett (National Physical Laboratory, UK), who described devices and techniques for acoustic output measurements. Almost 70 delegates were present, despite the 7:30am start time, and were able to gain valuable hands-on experience of radiation force balance and hydrophone measurements, the latter with the generous support of Jim Gessert (Sonora Medical). The final workshop was by Adam Morris (Better UltraSonic Technologies), who gave a detailed overview of the design and characterization of HIFU transducers.

Attention then turned to the Poster Sessions, and 20 posters were presented by authors from across the globe, on a broad range of topics, including a cost-effective radiation force balance for HIFU devices (Faezeh Razjouyan, George Washington University), the development of a PZT cavitation sensor (Shinichi Takeuchi, University of Yokohama), a study of cavitation in water and phantom material at 200 kHz (Shmuel Ben-Ezra, Ultrashape, Israel), and a novel pyroelectric method for measuring ultrasound power (Bajram Zeqiri, NPL, UK). The poster sessions were also very well-attended, indicating the continued popularity of the format.

Following the HIFU Industry Council Meeting and a boxed lunch, 60 Symposium delegates took up the invitation from FDA to visit the ultrasound

2008 Symposium Highlights, continued

research laboratories at the White Oak campus, hosted by Dr Jerry Harris. Jerry and colleagues presented their research on developing methods for characterising HIFU transducer fields, including radiation force techniques, the evaluation of thermal and cavitation effects, streaming methods and mathematical modelling.

On Tuesday evening, the Symposium Dinner was held at the prestigious and exclusive Cosmos Club, in downtown Washington DC. Delegates enjoyed salmon and filet mignon entrées, and networked extensively before embarking upon a moonlit bus tour of the city. The tour took in the Lincoln and FDR Memorials, and offered a great night-time perspective of the nation's capital.



Dr. Flemming Forsberg

Wednesday 9th April was Medical Sessions day. The first invited speaker was Professor Flemming Forsberg (Thomas Jefferson University), who gave a vibrant and entertaining overview of the role of contrast agents in therapeutic and diagnostic ultrasound.

Past president Mark Schafer then described some collaborative research with ImaRX



Lincoln Memorial - taken during the UIA Moonlight Tour.

All photographs pages 2/3 courtesy of Mark Hodnett.

Therapeutics, again focusing on diagnostic and therapeutic applications of contrast agents. In a strong programme, the therapeutics theme continued with a joint presentation from Vesna Zderic and Robin Shah from nearby George Washington University, who spoke on ultrasound-assisted drug delivery applications via cornea and sclera, and also from Hidemi Furusawa from the wonderfully-named Breastopia Hospital, Japan, who described the use of focused ultrasound surgery in the treatment of early breast cancer. Alan Winder (J&W Medical, LLC) gave a memorial tribute to the work of Professor Luiz Duarte (University of Sao Paulo) - a Brazilian scientist who pioneered the use of low intensity therapeutic ultrasound (LITU) in aiding bone fracture healing, receiving the first U.S. patent for LITU technology.

The second invited speaker was Professor Levon Nazarian, also from Thomas Jefferson University, who spoke in detail on the impact of ultrasound imaging on defining treatment programs, particularly with regard to conditions such as

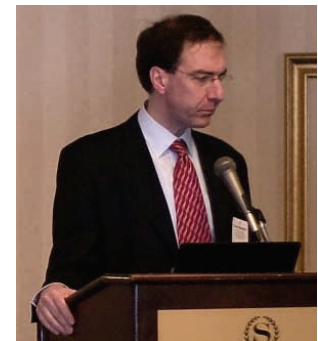
hemotomae and tendonitis. This was of particular interest to Session Chair Robert Muratore, who had suffered a soft tissue arm injury on the eve of the Symposium, and who spoke next on the potential use of high frequency HIFU for tendon ablation.

The medical sessions were concluded by a presentation from Klaus-Witold Jenderka (PTB, Germany), who gave a systematic and detailed account of some collaborative work with a university and hospital, in which normal and edematous brain tissue samples were compared by way of ultrasonic backscatter and attenuation measurements, as a form of quantitative sonography. The final paper of the symposium was delivered by Peter Cope (InfiniTech LLC), who gave an interesting overview of valuing and exploiting IP.

The feedback from delegates, 40% of whom were attending their first UIA Symposium, has been very positive, including constructive comments and suggestions for future events. We look forward to seeing old and new faces in Vancouver in 2009.

“UIA is [a] very useful, valuable symposium because we can make discussion directly and frankly with famous investigators.”

2008 Symposium Participant



Professor Levon Nazarian

Graduate Research Paper Award Recipient

Melissa Montalbo, Iowa State University received the 2008 Graduate Research Paper Award from Foster Stulen (outgoing UIA President) for her paper on *The Potential of Ultrasonic Pretreatment of Corn Slurry for Enhanced Saccharification in Ethanol Production*. In addition to the plaque, a cash award of \$1,200 was included in this award, sponsored by



Featured 2009 Symposium Speaker Lawrence Crum



Lawrence A. Crum, PhD

Dr. Crum has a broad range of interests in acoustics, including acoustic cavitation, medical ultrasound, and ocean ambient noise. His current studies include sonoluminescence, sonochemistry, cavitation inception, diagnostic and therapeutic ultrasound, extracorporeal shock wave lithotripsy, and acoustic hemostasis. He has published over 250 articles in scientific journals, presented over 300 pa-

pers at professional meetings, and served on the editorial board of several journals. He is a Fellow of the Acoustical Society of America and the American Institute of Ultrasound in Medicine, has served as President of the Acoustical Society of America, the Board of the International Commission on Acoustics, and the World Council on Ultrasonics. Dr. Crum was awarded a Doctor Honoris Causa from the

Universite Libre de Bruxelles in 1997 and was elected an Honorary Foreign Member of the National Academy of Sciences of the Bashkortostan Republic in 1998. He is an Honorary Visiting Professor of Moscow State University and Chongqing Medical University. In 2001, he was awarded the Helmholtz-Rayleigh Silver Medal of the Acoustical Society of America. Dr. Crum joined Applied Physics Laboratory in 1992.

Please see the Call for Papers on Page 7. Please send your form to UIA by Tuesday, 2 September.

2009 Symposium Chairs

Ron Manna, 2009 Symposium Chair, announces the many individuals who have responsibility for this symposium:

Industrial Session Co-Chairs [Leo Klinstein](#) and [Jay Sheehan](#)

Medical Session Co-Chairs [Jack Sliwa](#), [Jahan Tavakkoli](#) and [Alan Winder](#)

Exhibitor and Sponsor Chair [Adam Morris](#)

European & Internet Advertising; Poster Chair [Mark Hodnett](#)

Workshop Chair [Tony Crandall](#)

Advertising Chair [Foster Stulen](#)

You may contact any one of the co-chairs noted above by clicking on their name or you may send your inquiry directly to UIA at uia@ultrasonics.org

Exhibit and Sponsor Information for 2009 Symposium

UIA offers companies access to key influencers in the international ultrasound community at their annual symposium.

This year, we offer both exhibit and sponsorship opportunities:

Sponsorship Levels

Level One - Refreshment sponsorship - \$1,000 – includes recognition in conference literature, logo on refreshment table, and one conference registration;

Level Two - Breakfast sponsorship - \$1,500 - includes recognition in conference literature, logo on buffet table, and one conference registration;

Level Three - Lunch sponsorship- \$2500 - includes recognition in conference literature, signage at lunch, and one conference registration;

Exhibit Opportunities

Level One Exhibitor – UIA Corporate or Sustaining Member \$1,295 - includes recognition in symposium literature, 6' x 3' table and one full symposium registration;

Level One Exhibitor – Non Member \$1,645 - includes recognition in symposium literature, 6' x 3' table and one full symposium registration;

Level Two Exhibitor – UIA Corporate or Sustaining Member \$1,995 - includes recognition in symposium literature, 6' x 3' table and two full symposium registrations.

Level Two Exhibitor – Non Member \$2,345 - includes recognition in symposium literature, 6' x 3' table and two full symposium registrations.

Please complete the sponsorship /exhibit form on [page 6](#) to sign up for any of these marketing opportunities.



Attention UIA Members

Please send us your news. We plan to feature member success stories in future issues of *Vibrations*. Send to uia@ultrasonics.org subject: Member News

2008 - 2009 UIA Board of Directors

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Jay Sheehan
OmniSonics Medical
Technologies
Wilmington, MA, USA

Alan Winder
J&W Medical LLC
Westport, CT, USA



38TH Annual UIA Symposium 23 – 25 March 2009 Exhibit / Sponsor Form

**Renaissance Hotel
Vancouver – Harbourside
Vancouver, British
Columbia, Canada**

SEE PAGE 5 FOR COMPLETE LISTING OF BENEFITS FOR EACH LEVEL.

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

Company Name: _____

Contact Person: _____

Title: _____

Address: _____

City: _____ **State:** _____ **Zip:** _____ **Country:** _____

Phone: _____ **Fax:** _____

E-mail: _____

EXHIBIT SCHEDULE

Monday, 23 March 2009

7:00 am Exhibit Set-up
8:00 am – 5:30 pm Exhibits Open

Tuesday, 24 March 2009

8:00 am – 4:30 pm
Exhibits Open

Wednesday, 25 March 2009

8:00 am – 4:30 pm
4:30 pm Exhibit tear-down

PAYMENT INFORMATION

Sponsor (check one) \$1,000 Refreshment \$1,500 Breakfast \$2,500 Lunch \$ _____

Each sponsorship level includes 1 full registration

Exhibit – Corporate or Sustaining Member* \$1,295 includes 1 full registration
(check one) \$1,995 includes 2 full registrations \$ _____

Exhibit – Non member* \$1,645 includes 1 full registration
(check one) \$2,345 includes 2 full registrations \$ _____

TOTAL \$ _____

+ Table Top Exhibit includes 6 'x 3' table and company identification sign

* Additional fees will apply for electric, internet connections and telephone lines

WITH YOUR CONFIRMATION, YOU WILL RECEIVE A SYMPOSIUM REGISTRATION FORM TO COMPLETE FOR THE FULL REGISTRATION(S) FOR WHICH YOU HAVE PAID.

METHOD OF PAYMENT: Check Enclosed (Make checks payable to UIA)
 Purchase Order number or attach copy _____
 Please charge my credit card: MasterCard VISA

Person's Name
on card: _____

Card #

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 Exp

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We agree to comply with all the Rules and Regulations as provided and to the conditions under which displays in Renaissance Hotel Vancouver may be held. We understand that space is available on a first-come, paid-in-full basis.

Authorized Signature _____

Date _____

Return completed contract to: UIA ♦ PO Box 2307 ♦ Dayton, OH ♦ 45401-2307
Phone: 937.586.3725 ♦ Fax: 937.586.3699

2009 Call for Papers/Posters

The Ultrasonic Industry Association invites you to submit a 200 word abstract for consideration of presentation or poster on 23 – 25 March at its 38th Annual Symposium in **Vancouver, BC, CANADA** at the Renaissance Vancouver Hotel Harbourside. Plan now to join UIA for this international conference featuring the best of ultrasound from around the world. For more information, please go to <http://www.ultrasonics.org>

Please check the appropriate category and preferred format of your proposed presentation:

Industrial Applications: NDE, Measurements, Cleaning, Atomization, Pulp/Paper, Metal and Plastic Joining and Fastening, Welding and Cutting Films, Fabrics, Metals and Plastics, Sonochemistry, Underwater, Remote Sensing

Medical: Surgical, Therapeutic, HIFU/LIFU, Biological Nonlinear Effects, Low Frequency Tissue Characterization, Bio-Acoustic Microscopy, Transducer Design/Materials

Paper Presentation **Poster Session**

Please print clearly

Presentation Title _____

Authors _____

Presenters _____

Main Contact Name _____

Address _____

City _____ State/Province _____ Postal code _____

Phone _____ Fax _____ E-mail _____

Deadline: 2 September 2008

Important Information: Papers will be no longer than 25 minutes; final abstracts must be submitted via e-mail or disc and bio-sketches and **full papers** must be submitted to the UIA office no later than **15 February 2009**. The session chair will contact you directly to discuss your proposed presentation. **Accepted presenters receive a discounted registration fee.**

Symposium Chairs

Symposium: Ron Manna ▲ phone +1.631.694-9555 ▲ Fax: +1.631.694.1322 ▲ rmanna@misonix.com

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Poster Chair: Mark Hodnett ▲ +44 208 943 6365 ▲ Fax: +44 208 943 6161 ▲ Mark.Hodnett@npl.co.uk

Please submit this form (preferably electronically) or via fax to:

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Fax: +1.937.586.3699
Email: uia@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."

President's Letter: UIA Members Engender a New Field of Medicine

Heisenberg teaches us that any probe of a system, including an ultrasonic probe, will change the state of the system. We can envision low energy probes scattered elastically by a system with little macroscopic consequence. Although the system components will change their state slightly, the post-probe ensemble state will be statistically similar to the pre-probe state. Thus it is possible to have non-destructive testing (NDT).

However, it is also possible to exploit the state changes. The field of deliberately using ultrasonic probes to irreversibly alter systems is called ultrasonics (Foster Stulen, *Vibrations* 17(2):4, 2007). UIA represents those who use ultrasonic energy to alter biological and industrial systems.

In 1930, E. N. Harvey (*Biol Bull* 59:306-325) identified three mechanisms by which ultrasound could change the state of biological tissue: cavitation, heat, and radiation force. Cavitation and heat play a major role in the well-established field of tissue cutting and surgical aspiration, such as provided by many of our members, notably Sustaining Member Misonix, Inc. (Ron Manna, delegate and UIA Board Member), and the fast-growing field of high intensity therapeutic ultrasound (HITU), exemplified by Board Member Jack Sliwa's Epicor atrial fibrillation therapy system. What about the acoustic radiation force?

At the recent Acoustics'08 Conference in Paris (acoustics08-paris.org), Professor L. R. Gavrilov of the N. N. Andreyev Acoustics Institute in Moscow reviewed work that he had done in the last decade of the Soviet Union. He demonstrated an intriguing influence on peripheral nerves by ultrasound, claiming acoustic radiation force as the mechanism for stimulation of various sensory responses. In the 1990's, Dr. Shin-ichiro Umemura of Japan investigated hearing through direct stimulation of the auditory nerve by auditory-frequency modulated acoustic radiation force.

For the past year, in collaboration with Columbia University, summer interns and I have begun to explore the means by which radiation force influences tissue at the cellular level. We have demonstrated cell deformations on the order of a few microns in response to radiation force. Currently, we are investigating cellular functional responses accompanying the deformations.

Radiation force stresses cells mechanically. It appears that in some instances, shear stress is the trigger to the cellular response. Apparently, the means of inducing the shear stress are less impor-

tant than the stress itself. That is, acoustic radiation force, maximal in the acoustic beam focal region, is capable of being applied centimeters distant from the ultrasonic transducer. It is also possible to shake the skin directly with a transducer, and induce shear stress through mode conversion at tissue boundaries.

UIA members have already made important contributions in this field of sub-ablation bioeffective ultrasonics. UIA Board Member Alan Winder was technical consultant on the Exogen device (exogen.com) which is marketed worldwide, and has been shown to reduce healing time substantially for bone fractures. Alan's contributions included product design and development reliable, cost-effective, commercial production, and broadening the underlying intellectual property for world-wide patentability. Fluorescence marker studies showed that shear waves stimulate the integrin receptors embedded in the osteoblast membrane, triggering protein expression and healing.

I can imagine many exciting new products based on shear waves, whether applied locally through direct tissue coupling, or applied distally via acoustic radiation force. It is feasible to stimulate, at arbitrary locations, integrins and cytoskeletal receptors. Modulated ultrasound can be used, non-invasively, to induce a plastic tissue response. I predict that within a decade, sub-ablation bioeffective ultrasonics will develop into a major area of therapeutic medicine.

Robert Muratore, Ph.D., UIA President, is affiliated with the Frederic L. Lizzi Center for Biomedical Engineering Riverside Research Institute in New York, NY, USA.