

Ultrasonic Industry Association

## 2008 Symposium in Washington DC



**The 37th Annual UIA Symposium will be held 7 - 9 April 2008 at the Sheraton Suites Alexandria, outside of Washington DC**

UIA is pleased to announce that the 37th Annual Symposium will be held in Alexandria, VA, just outside of Washington DC.

**Three days of sessions** will be continued for the 2008 meeting. Monday's sessions will focus on Industrial presentations. Wednesday's sessions will focus on Medical presentations.

**Invited speakers** include Kenneth S. Suslick, Professor of Chemistry, University of Illinois at Urbana-Champaign; Flemming

Forsberg, PhD, and Lev Nazarian, M.D, Professors of Radiology at Thomas Jefferson University. You can read about their recent research in this issue.

**New this year** will be workshops which will focus on High Power Ultrasonic Transducer Modeling and Characterization, Acoustic output measurements and HIFU Transducer Design Considerations. For more details on these workshops, please go to page 9.

We will again feature **Poster sessions** during our symposium. There will be a session where each presenter is given five minutes to provide an overview of their poster, followed by the opportunity for individuals to further explore the information provided on the posters. This session was a highlight of the 2007 symposium.

**A tour of the FDA** new R&D labs is planned for Tuesday afternoon. More details will be available about this portion of the program.

**Tuesday evening, UIA will dine at the Cosmos Club.** A private social club, incorporated in Washington, D.C. in 1878 by men distinguished in science, literature and the arts, will provide a historical venue for an enjoyable dinner. You can read more about the Cosmos Club on page 7.

After dinner, we will take a moonlight tour of the District to enjoy the sites lit to show their beauty and majesty.

**Exhibit and sponsor information** will be available shortly on the UIA website for companies wishing to reach the symposium participants.

Abstract submission deadline has been extended to 30 September. Please see the Call for Papers on page 5.

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## 36th Annual Symposium an Outstanding Success

UIA traveled to Teddington, Middlesex, England for the 2007 Annual Symposium. Held at the National Physical Laboratory, more than 70 individuals in the world-wide ultrasonic community gathered to hear the latest advances from China, England, France, Hungary, Iran, Israel, Scotland, and the United States.

Monday's session focused on industrial presentations. Tuesday was devoted to poster sessions, including overviews from each poster presenter. The HIFU Industry Council was also held on Tuesday, followed by a tour of the ultrasonic capabilities at National Physical Laboratory.

Wednesday's session featured Medical presentations, which included speakers from China, United Kingdom and the US.

Read more about this year's symposium on page 2. Electronic proceedings are available with the papers and posters - more information on page 2.

## 2007 Symposium Recap

The new product award was presented to Israeli company Ultrashape, for their pioneering developments into precisely-guided, focused ultrasound systems that can non-invasively disrupt fat cells – Medical Session Chair and UIA Board Member Robert Muratore is shown presenting the award to Yorem Eshel.



Proceedings from the 2007 Symposium are available in electronic format from UIA for \$90 each. Email your request to [uia@ultrasonics.org](mailto:uia@ultrasonics.org)

*This article was prepared by Mark Hodnett, National Physical Laboratory, the host for the 2007 UIA Symposium.*



March 19<sup>th</sup>-21<sup>st</sup> saw the Ultrasonics Industry Association (UIA) hold their annual symposium outside the USA for the first time, with NPL acting as hosts. The 3-day meeting consisted of dedicated sessions on developments in Industrial and Medical and Ultrasound, a half-day poster session, and a tour of NPL worldleading acoustical measurement facilities.

The two invited speakers were from the UK: Professor Tim Mason (Coventry University), who spoke on industrial applications of ultrasound, and Professor Gail ter Haar (Institute of Cancer Research, Sutton), who gave a comprehensive overview of High Intensity Focused Ultrasound.

The symposium had a truly international flavor: the 70 delegates were from the USA, Hungary, Iran, Israel, Germany, China, Spain, UK and Portugal also represented. Invited speakers came from France and Singapore. The majority of presented papers were from European authors, emphasizing Europe's strong position in ultrasound research, measurement and application development, and showing the global appeal and reach of the UIA. The breadth of topics covered in the proffered papers was substantial, ranging from research into cavitation measurement techniques carried out at NPL and also at PTB (Germany), through patent portfolio strategies, to the development of endoscopic nasal HIFU systems for treatment of brain tumors, to the use of image-guided robotic systems for HIFU surgical procedures (breast,

urological, neurosurgical).

The Graduate Research Paper Award, which was generously sponsored by Precision Acoustics, UK, was presented to Euan McCulloch from the Department of Mechanical Engineering, University of Glasgow, for his work on simulating ultrasonic cutting using finite element models.

The poster session, a new venture for the UIA Symposium, was highly successful. With a central theme of Transducer Design and Acoustic Characterization, participants from locations as diverse as Denmark, Israel and Hungary presented their work via a 5 minute 'showcase' in the main auditorium, and then in network discussion with interested observers around their prepared artwork.

Delegates also enjoyed a detailed tour of NPL's laboratories, which covered the current state of the art in measurements of airborne and waterborne sound. Tour highlights included the highly-specified reverberation and free-field airborne sound rooms, and the open tank underwater acoustics facility, which utilizes a 5.5 m deep, 5 m diameter wooden vat that was previously used in the production of Scotch whisky.

The conference dinner was held at the Royal Society, a highly prestigious venue which inspired one delegate to enthuse, "One cannot fail to be inspired by the knowledge and experience surrounding us here". Other feedback included, "Best conference of UIA I've attended. NPL tour was good"!

## 2008 Symposium Schedule

### Monday, 7 April, 2008

#### Industrial Sessions

7:45 - 8:30 am	Continental Breakfast and Registration
8:30 am – 9:30 pm	<b>Invited Speaker</b> Kenneth S. Suslick, Professor of Chemistry, University of Illinois at Urbana-Champaign
9:30 – 12:15 pm	<b>Industrial Papers</b>
12:15 – 1:15 pm	Lunch
1:15 - 1:30 pm	<b>New Product Award Presentation</b>
1:30 - 3:00 pm	<b>Industrial Papers</b>
3:00 - 3:30 pm	Break
3:30 - 5:00 pm	<b>Workshop I: Langevin Sandwich Transducer Characterization/Measurement</b> George Bromfield, Piezo Innovations and Tony Crandall, ZEVEX International Inc
5:30 - 6:30 pm	Wine and Cheese Reception

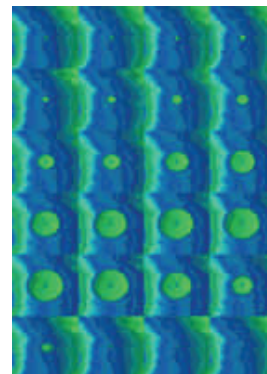


Photo by D. Flannigan and K. S. Suslick

A cinematographic sequence of photos of the growth and implosive collapse of a single bubble (shown in blue) in sulfuric acid irradiated with high intensity ultrasound. The images are shown in false color.

### Tuesday, 8 April 2008

#### Workshops and FDA Tour

7:00 – 8:00 am	Continental Breakfast
7:30 – 9:00 am	<b>Workshop II: Acoustic output measurements</b> , Mark Hodnett, National Physical Laboratory
9:15 – 10:45 am	<b>Workshop III: HIFU Transducer Design/Characterization</b> , Adam Morris, Better UltraSonic Technologies
11:00 – 12:30 pm	Poster Presentations and Poster Sessions
11:45 - 12:30 pm	<b>HIFU Industry Council</b> meeting
12:15 - 1:15 pm	Lunch
1:30 – 5:15 pm	<b>Tour of FDA</b>
6:30 -- 10:00 pm	Depart for Evening at Cosmos Club

### Wednesday, 9 April 2008

#### Medical Sessions

7:45 - 8:30 am	Continental Breakfast and Registration
8:30 - 9:30 am	<b>Invited Speaker:</b> Flemming Forsberg, PhD, Professor of Radiology, Thomas Jefferson University, Jefferson Medical College
9:30 - 12:15 pm	<b>Medical Papers</b>
12:15 - 1:15 pm	Lunch
1:15 - 1:30 pm	<b>Student Award Paper Presentation</b>
1:30 - 2:30 pm	<b>Invited Speaker:</b> Lev Nazarian, M.D., Professor of Radiology, Thomas Jefferson University, Jefferson Medical College
2:30 - 5:00 pm	<b>Medical Papers</b>
5:00 pm	Symposium Concludes



Flemming Forsberg, PhD, Professor of Radiology, Thomas Jefferson University, Jefferson Medical College

How does this apply to the UIA? Our mission is to use ultrasonic energy to perform useful work.

## Insure, Ensure, Assure, Ultrasonics, Ultrasound and the UIA

### Foster Stulen, UIA President

I am a bit of a stickler for grammar and proper word usage. I don't know how many times I've read an article that involved a contractual agreement with an insurance company. I attended a workshop last month given by a professor of a top-tier university and business consultant. I was amused by a slide that said this approach could *insure* business alignment. First, an *approach* is not an insurance company, and second, every CEO would probably like to get one of those policies.

Recently, the board was admonished by one of its members about the use of ultrasound and ultrasonics. After all, we are the Ultrasonic Industry Association. So what is the difference? Ultrasonics is the field of changing material properties with direct application of ultrasonic drivers, transducers and other device. Ultrasound is the propagation of high frequency mechanical vibrations through a gas, liquid or solid medium to interrogate the medium or structure, or communicate through the medium.

In the past the distinction was quite

clear. Welders and cleaners were clearly applications of ultrasonics. Ultrasound was used in nondestructive evaluation testing in engineering and for diagnostic imaging in medicine. But was it really that distinct back then?

An ultrasonic cleaner uses cavitation and acoustic pressure to breakup surface scale and free trapped debris. Extracorporeal shock wave lithotripsy, ESWL, uses focused ultrasound transmitted through water and soft tissue to treat kidney stones. The ultrasound produces cavitation to erode the stone and stress waves to fracture the stone. Both cleaners and ESWL are treating a material object to improve the current state. ESWL uses focused ultrasound to treat a stone, and cleaners use a "diffuse" acoustic field in water. That is, the water or cleaning solution is an acoustic medium that intervenes between the driver and the object to be cleaned. Is the difference that distinct?

I have fallen into the ultrasonics and ultrasound trap myself. My company produces the Harmonic

*ultrasonic* surgery system. But I have described the action of the blade on tissue as *contact* ultrasound to differentiate it from HIFU therapies. It is simply ultrasonics versus ultrasound. Maybe HIFU should denote High Intensity Focused *Ultrasonics*, because it is clearly changing the state of tissue in its focus region.

My opinion is that the differentiation between ultrasonics and ultrasound can no longer be based on treatment versus imaging. To me the distinction is whether the application uses focused ultrasound to treat or image a material several wavelengths away from the ultrasonic driver/transducer or the object is in direct contact with the driver or a couple wavelengths away in a diffuse field.

How does this apply to the UIA? Our mission is to use ultrasonic energy to perform useful work. So as long as ultrasonic energy is being used to treat a material or object from a current state to an improved state, the UIA applies.

## Headquarter Hotel: Sheraton Suites Alexandria

Room rates for the UIA Symposium are \$209 single/double. Call +1.703.836.4700 to make your reservations

801 North Saint Asaph St  
Alexandria, Virginia  
22314 USA

Surrounded by the charm and history of Old Town, Sheraton Suites Old Town Alexandria offer easy access to Ronald Reagan Washington National Airport and Washington D.C.

Complementary shuttle service is offered to National Airport, where the Metro will take you throughout the District of Columbia to enjoy the nation's history as you visit the nearby Jefferson Memorial, Washington Monument, Lincoln Memorial and other museums and monuments during your free time.



For your evening enjoyment, you are just a short stroll from the Potomac River Waterfront, where one can enjoy the celebrated art galleries, boutiques, restaurants, and shopping. You will stay in one of the spacious 247 two-room suites where a great night's sleep awaits you between the crisp sheets, plush mattress, and cozy duvet of the Sheraton Sweet Sleeper (SM) Bed.





## 37th Annual UIA Symposium

7 - 9 April 2008

### Call for Papers / Posters

The Ultrasonic Industry Association invites you to submit a 200 word abstract for consideration of presentation or poster session on 7 - 9 April at its 37<sup>th</sup> Annual Symposium in **Washington, DC** at the Sheraton Suites Old Town Alexandria. 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 indicate your preference for a  Presentation  Poster in the following category:

**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

#### Please print clearly

Presentation Title \_\_\_\_\_

Authors \_\_\_\_\_

Presenter(s) \_\_\_\_\_

Main Contact Name \_\_\_\_\_

Address \_\_\_\_\_

City/St or Prov/Postal \_\_\_\_\_

Phone/Fax/Email \_\_\_\_\_

## Deadline: 30 September 2007

**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 March 2008**. The session chair will contact you directly to discuss your proposed presentation. Final decision to be made by UIA. **Accepted presenters receive a discounted registration fee.**

#### Chairpersons

**Symposium:** Ron Manna ☎ phone +1 631.694.9555 ☎ Fax: +1 631.694.9412 ☎ [rmanna@misonix.com](mailto:rmanna@misonix.com)

**Symposium Co-Chair:** Mark Hodnett ☎ +44 208.943.6365 ☎ Fax:+44 208.943.6161 ☎ [Mark.Hodnett@npl.co.uk](mailto:Mark.Hodnett@npl.co.uk)

**Medical Co-Chairs:** Alan Winder ☎ +1 203.226.0810 ☎ Fax: +1 203.226.4123 ☎ [a.winder@jwmed.com](mailto:a.winder@jwmed.com)

Robert Muratore ☎ +1 212.502.1701 ☎ Fax: +1 212.502.1729 ☎ [muratore@rrinyc.org](mailto:muratore@rrinyc.org)

**Industrial Chair:** Leo Klinstein ☎ +1 630.797.4950 ☎ [lklinstein@dukcorp.com](mailto:lklinstein@dukcorp.com)

**Ultrasonic Industry Association P O Box 2307 Dayton OH 45401-2307 USA**

**Voice: +1 937.586.3725 Fax +1 937.586.3699 [uia@ultrasonics.org](mailto:uia@ultrasonics.org) [www.ultrasonics.org](http://www.ultrasonics.org)**

Kenneth S. Suslick, Marvin T. Schmidt Professor of Chemistry at Illinois and researcher at Beckman Institute for Advanced Science and Technology, is an invited speaker for the Industrial Sessions on Monday, April 7, 2008 during the UIA Symposium.

## Temperature inside collapsing bubble four times that of sun

CHAMPAIGN, Ill. — Using a technique employed by astronomers to determine stellar surface temperatures, chemists at the University of Illinois at Urbana-Champaign have measured the temperature inside a single, acoustically driven collapsing bubble.

Their results seem out of this world.

"When bubbles in a liquid get compressed, the insides get hot — very hot," said **Kenneth Suslick**, the Marvin T. Schmidt Professor of [Chemistry](#) at Illinois and a researcher at the [Beckman Institute for Advanced Science and Technology](#). "Nobody has been able to measure the temperature inside a single collapsing bubble before. The temperature we measured — about 20,000 degrees Kelvin — is four times hotter than the surface of our sun."

This result, reported in the March 3 issue of the journal *Nature* by Suslick and graduate student David Flannigan, already has raised eyebrows. Their work is funded by The National Science Foundation and the Defense Advanced Research Projects Agency. Sonoluminescence arises from acoustic cavitation — the forma-

tion, growth and implosion of small gas bubbles in a liquid blasted with sound waves above 18,000 cycles per second. The collapse of these bubbles generates intense local heating. By looking at the spectra of light emitted from these hot spots, scientists can determine the temperature in the same manner that astronomers measure the temperatures of stars.

By substituting concentrated sulfuric acid for the water used in previous measurements, Suslick and Flannigan boosted the brilliance of the spectra nearly 3,000 times. The bubble can be seen glowing even in a brightly lit room. This allowed the researchers to measure the otherwise faint emission from a single bubble.

"It is not surprising that the temperature within a single bubble exceeds that found within a bubble trapped in a cloud," Suslick said. "In a cloud, the bubbles interact, so the collapse isn't as efficient as in an isolated bubble."

What is surprising, however, is the extremely high temperature the scientists measured. "At 20,000 degrees Kelvin, this

emission originates from the plasma formed by collisions of atoms and molecules with high-energy particles," Suslick said. "And, just as you can't see inside a star, we're only seeing emission from the surface of the optically opaque plasma." Plasmas are the ionized gases formed only at truly high energies.

The core of the collapsing bubble must be even hotter than the surface. In fact, the extreme conditions present during single-bubble compression have been predicted by others to produce neutrons from inertial confinement fusion.

"We used to talk about the bubble forming a hot spot in an otherwise cold liquid," Suslick said. "What we know now is that inside the bubble there is an even hotter spot, and outside of that core we are seeing emission from a plasma."

This article was recently featured by the University of Illinois at Urbana-Champaign, describing Professor Suslick's work.

Ultrasound helps in treating tennis elbow  
article conclusion

### Continued from page 8

The needle tip breaks up scar tissue and any calcifications.

Depending on the exact problem being treated, the procedure is often completed with an injection of cortisone-like medication into the area. "The procedure encourages blood vessels to enter the area and enables the body to dissolve the scar tissue and lay down new, healthier tissue. After the procedure, stretching and physical therapy encourage this tissue to become more elastic and lengthened, enabling the tendon to function more normally," the Jefferson radiologist said.

This minimally-invasive procedure takes between five and 15 minutes, and patients are awake and comfortable, watching the procedure. After the procedure, patients may be outfitted with a splint or brace.

*Note: This story has been adapted from a news release issued by Thomas Jefferson University.*

## Cosmos Club

The Cosmos Club is a private social club, incorporated in Washington, D.C. in 1878 by men distinguished in science, literature and the arts. Since its founding, the Club has elected as members individuals in virtually every profession that has anything to do with scholarship, creative genius or intellectual distinction. Among its members, over the years, have been three Presidents, two Vice Presidents, a dozen Supreme Court justices, 32 Nobel Prize winners, 56 Pulitzer Prize winners and 45 recipients of the Presidential Medal of Freedom.

The Cosmos Club stands as the closest thing to a social headquarters for Washington's intellectual elite. On its walls hang portraits of Club members who have received Nobel Prizes, Pulitzer Prizes, Presidential Medals of Freedom, and Cosmos Club Awards. Located in the Dolly Madison room is a bust by Frederick Hart, the same artist who created the famous statue of three soldiers on the Vietnam Memorial Mall.

UIA Symposium participants will have the opportunity to enjoy the history of the United States represented in this unique club.

*The UIA Symposium will visit the Cosmos Club on Tuesday evening. As part of this special event, participants will depart from our headquarters hotel in a luxury coach and enjoy the moonlit view of Washington DC's sites after dinner.*

## In Vivo Perfusion Estimation Using Subharmonic Contrast Microbubble Signals

Flemming Forsberg, PhD, Ji-Bin Liu, MD, William T. Shi, PhD, Raymond Ro, BS, Kathryn J. Lipcan, MBA, RDMS, Xuedong Deng, MD and Anne L. Hall, PhD

Department of Radiology, Thomas Jefferson University, Philadelphia, Pennsylvania USA (F.F., J.-B.L., R.R., K.J.L., X.D.); and GE Healthcare, Milwaukee, Wisconsin USA (W.T.S., A.L.H.). Dr Shi is now with Philips Research USA, Briarcliff Manor, New York USA; Dr Deng is now with the Department of Ultrasound, Nanjing Medical University, Suzhou Hospital, Suzhou, China.

**Objective.** The purpose of this study was to quantify perfusion in vivo using contrast-enhanced subharmonic imaging (SHI).

**Methods.** A modified LOGIQ 9 scanner (GE Healthcare, Milwaukee, WI) operating in gray scale SHI mode was used to measure SHI time-intensity curves in vivo. Four dogs received intravenous contrast bolus injections (dose, 0.1 mL/kg), and renal SHI was performed. After 3 contrast agent injections, a microvascular staining technique based on stable (nonradioactive) isotope-labeled microspheres (BioPhysics Assay Laboratory Inc, Worcester, MA) was used to quantify the degree of perfusion in 8 sections of each kidney. Low perfusion states were induced by ligating surgically exposed segmental renal arteries followed by contrast agent injections and microvascular

staining. Digital clips were transferred to a personal computer, and SHI time-intensity curves were acquired in each section using Image-Pro Plus software (Media Cybernetics, Silver Spring, MD). Subharmonic fractional blood volumes were calculated, and the perfusion was estimated from the initial slope of the fractional blood volume uptake averaged over 3 injections. Subharmonic perfusion data were compared with the gold standard (ie, the microspheres) using linear regression analysis. **Results.** In vivo gray scale SHI clearly showed flow and, thus, perfusion in the kidneys with almost complete suppression of tissue signals. In total, 270 SHI time-intensity curves were acquired, which reduced to 94 perfusion estimates after averaging. Subharmonic perfusion estimates correlated significantly with microsphere results ( $r = 0.57$ ;  $P < .0001$ ). The best SHI perfusion estimates occurred for high perfusion states in the anterior of the kidneys ( $r = 0.73$ ;  $P = .0001$ ). The corresponding root mean square error was 2.4%.

**Conclusions.** Subharmonic perfusion estimates have been obtained in vivo. The perfusion estimates were in reasonable to good agreement with a microvascular staining technique.

Flemming Forsberg, Ph.D., Professor of Radiology, Jefferson Medical College of Thomas Jefferson University, Philadelphia, PA, is an invited speaker for the Medical Sessions on Wednesday, April 9, 2008 during the UIA Symposium. This article was recently featured in the Journal of Ultrasound in Medicine, describing some of Dr. Forsberg's work.

## Researchers Find That Ultrasound Helps In Treating Tennis Elbow And Other Tendon Problems

Lev Nazarian, Professor of Radiology, Jefferson Medical College of Thomas Jefferson University, Philadelphia, PA, is an invited speaker for the Medical Sessions on Wednesday, April 9, 2008 during the UIA Symposium. This article was recently featured in *Science Daily*, describing some of Dr. Nazarian's work.

*Science Daily* — Minimally-invasive ultrasound-guided needle therapy may help treat a wide variety of sports injuries, said Jefferson radiologist Researchers at Thomas Jefferson University Hospital have found that they can successfully treat chronic tendon problems such as "tennis elbow," "jumper's knee" and Achilles tendon, with the help of diagnostic ultrasound, as an alternative to surgery.

The ultrasound is used to better visualize abnormal tendons, identify areas of the tendon containing scar tissue and determine if the scar tissue is infiltrated with calcification, explained radiologist **Lev N. Nazarian, M.D.**, professor of Radiology, Jefferson Medical College of Thomas Jefferson University, Philadelphia, one of the investigators. Then needle therapy is applied to treat the problem.

The study is co-authored by John McShane, M.D., clinical assistant professor of Family Medicine, Jefferson, and sports medicine specialist at the Rothman Institute at Jefferson, who performs the procedure with Dr. Nazarian.

Many of the 400 patients who participated in the trial were able to resume athletic and other activities after 12 weeks, Dr. Nazarian said. "These are small abnormalities that a surgeon wouldn't touch, but can still cause considerable symptoms," the Jefferson radiologist said. "It's the kind of problem that falls between the cracks, so to speak, when it come to treatment. This procedure provides effective treatment to patients who may not have been able to get relief before, with minimal disruption to a patient's life."

The study's findings were presented at the 88th Scientific

Assembly and Annual Meeting of the Radiological Society of North America (RSNA) in 2005. The study is also authored by Jefferson Family Medicine/Sports Medicine specialist Marc I. Harwood, M.D., of the Rothman Institute at Jefferson.

Athletes and non-athletes alike are prone to chronic tendon problems that can be caused by a wide variety of activities and can range in severity from mildly annoying to completely debilitating.

"Tendons are sinewy, somewhat elastic connective tissue that attach muscle to bones," Dr. Nazarian said. "They are vulnerable to wear and tear, particularly as we get older. Over time, tendons become weaker than normal and become subject to tiny breaks and tears in their fibers. When the tendon is overused, strained, or injured, some of the tendon tissue is replaced with scar tissue instead of normal elastic tendon tissue.

"Scar tissue is not elastic," he said. "It is thick and dense and it occurs right at the location where the tendon attaches to the bone. So when the muscle contracts, the normal tendon that is remaining pulls on this now dense, non-elastic tissue that then pulls against the bone. And that interface causes pain."

Treatments to date for chronic tendon problems have been imperfect in that they either do not fully remedy the problem--or they entail major orthopaedic surgery and long recovery periods, said Dr. Nazarian. The ultrasound-guided hypodermic needle procedure can be used to treat a variety of problems including:

- \* Easing inflammation by injecting corticosteroid at the site
- \* Smoothing out bone adjacent

to the tendon.

- \* Eliminate calcifications rubbing against the tendon

"Roughing up" tissue around small tears in the tendon to promote healing "Once we see the abnormality on the ultrasound, we can make a diagnosis right away and tell exactly what is wrong. Additionally, we can treat the problem immediately," said Dr. Nazarian said. Traditionally, physicians have used magnetic resonance imaging (MRI) to assess problem areas. But the researchers found that ultrasonography provides a more accurate look. "In fact, in many ways, ultrasonography is preferable to MRI. It's quicker, less expensive, and better tolerated by patients," Dr. Nazarian said. "Furthermore, because the ultrasound examination is performed in so-called 'real-time,' any abnormalities can be directly correlated with the physical examination."

The study found that approximately 65 percent of the participants (151 males, 155 females, ages 13-82) reported improvement. They suffered from various tendon, muscle and ligament injuries, including tennis elbow, golfer's elbow, jumper's knee, hamstring and rotator cuff injuries and Achilles tendon problems. They had not responded to more conservative therapies such as medication, bracing, physical therapy or rest, and had been living with symptoms from three months to 15 years.

To treat the identified problem, local anesthesia is administered. Then, with the guidance of ultrasound, a needle is inserted down to the areas that contain scar tissue.

**Continued on page 6**



## Powering Sound Ideas

P O Box 2307  
Dayton OH 45401-2307

Phone: 937.586.3725  
Fax: 937.586.3699  
Email: [uia@ultrasonics.org](mailto:uia@ultrasonics.org)

### The Business of Ultrasound

UIA is the international forum for users, manufacturers, and researchers of ultrasonics. Our members use high power ultrasound to improve materials, industrial processes, and medical technologies.

## Workshops a new feature for 2008 Symposium

### High Power Ultrasonic Transducer Modeling and Characterization

George Bromfield, Piezo Innovations and Tony Crandall, ZEVEX International Inc

#### Target audience:

Designers or engineers who may be involved in developing high power, Langevin sandwich ultrasonic transducers, and would like an introduction into the design, computer modeling and measurement of output parameters of this type of transducer.

#### Subjects to be covered

Basic theory relating to the design of Langevin sandwich ultrasonic transducers including the application of bias stress and simple half-wave horn design. A worked example of a practical transducer design using simple theory to estimate inputs for the PiezoTran computer model.

Practical demonstration of the assembly of transducer components, the application of bias stress and testing. Testing to include low power impedance analyzer data, and high power measurements using a power meter and optical and laser vibrometer methods. Measured data will be compared with PiezoTran model output.

### Acoustic Output Measurements

Mark Hodnett, National Physical Laboratory

#### Target audience:

Those who may be involved in developing ultrasound systems or transducers, and would like an introduction into the techniques and devices available that can characterize the acoustic field and give information on beam distribution, power output levels etc. both in R&D and Production test.

#### Subjects to be covered:

- Background to measurement requirements
- Relevant standards and the differing demands
- Hydrophones and their use
- Radiation force balances and their use
- Optical technique
- QA methods for ultrasound transducers

### HIFU Transducer Design

Considerations Adam Morris, Better UltraSonic Technologies

#### Target audience:

Those who may be involved in developing HIFU ultrasound systems or transducers, and would like an introduction into the design requirements, materials and modeling methods pertinent to this type of transducer.

#### Proposed subjects to be covered:

Transducer design begins with Defining the Application: organ type, method of treatment, time and volume,

Power or Pressure req'd, durable or disposable; this leads to definition of: Frequency and Sound Field which allows us to begin the design: single or multi-element, shape and focus, active material, matching layers, power densities and limitations, tuning; evaluation of thermal considerations in the design – to cool or not to cool;

Finally, one must test the output characteristics: sound field, power, impedance etc while under full power –

Discussion of some options and equipment, Environmental Stress Screening.

These workshops are held on Monday afternoon and Tuesday morning, April 7 - 8, 2008, during the UIA Symposium. You may register for the full symposium, which will include these workshops or for just one or more of these workshops. Final registration information will be available in fall 2007.