Volume 19, Issue 1 Winter 2009

Vibrations

Ultrasonic Industry Association

2009 Symposium Program Announced: Vancouver, British Columbia, Canada

Courtesy Tourism Vancouver

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

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.

Invited speakers include **David Grewell, PhD**, Iowa State University and **Lawrence Crum, PhD**, Applied Physics Laboratory, University of Washington

Tuesday's workshops will include:

Measurement of Material Properties For High Intensity Ultrasonic Horns by David Wuchinich, Modal Mechanics

Schlieren Measurements of Ultrasound Fields by Claudio Zanelli and Sam Howard, Onda Corporation

Ceramic Properties And The Practical Interpretation Of Suppliers' Catalogue Data by Wanda Wolney and Rasmus Lou Moeller, Ferroperm Piezoceramics

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 and Poster Sessions on Tuesday, 24 March 2009
- Special evening dinner cruise on Tuesday, 24 March, 2009
- Register by February 16 and receive a free book

Register by Feb. 16 and Receive Free Book!

Why register early? This year, UIA will send ***Piezoelectric Ceramics: Principles and Applications*** to each symposium participant who sends their paid registration to UIA. This includes speakers, full registrations, students and one day registrations.

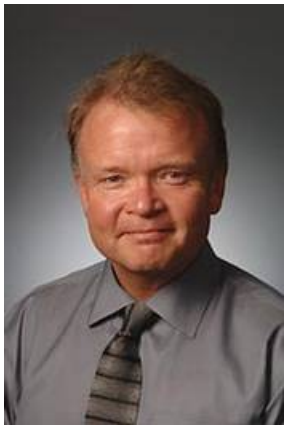
Written by APC International, Ltd., this 110+ page publication includes...

- Piezoelectric Constants
- Behavior of Piezoeletric Cermaic Flow
- Stability
- Typical Applications
- New Approaches
- Generators
- Sensors
- Actuators
- Transducers
- ...and more!

Copies will be sent to all North American participants shortly after February 16. International participants will receive their book at the UIA Symposium in Vancouver.

Inside this issue:

2009 Symposium Industrial Scheduled Presentations



David Grewell, PhD

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

2008 Symposium Participant

8:15-8:30 AM
Welcome to the Industrial Session: Robert Muratore, President; A Few Opening Remarks: Leo Klinstein, Co-Chairman

8:30 -9:00
Karl Graff, EWI;
Continued Developments in High Power Ultrasonic Processes

9:00 - 9:30
Dominick A. DeAngelis, Gary W. Schulze, Kulicke & Soffa Industries;
Optimizing Piezelectric Cystal Preload in Ultrasonic Transducers

9:30-10:00
George Bromfield, Piezo Innovations; Richard J. Meyer, Jr., Penn State University; **A Computer Modeling Method For Optimizing the Performance of Torsional Mode Transducers**

10:45-11:15
William Shigeru Sato, Leo Klinstein, Dukane Corporation;
Ultrasonically Assisted Silicon Wafer Cutting Machine

11:15-11:45
Matt Bloss, EWI;
Ultrasonic Metal Welding of Titanium, Stainless Steel, and Nickel-based Superalloys

1:00 - 1:15 pm
New Product Award Presentation

1:15 - 2:15 pm Keynote Speaker
David Grewell, Ph.D., Iowa State University;
Ultrasonic Enhancement of Sustainable Fuels

2:15-2:45
G. Memoli, P. Gélat, M. Hodnett and B. Zeqiri, National Physical Laboratory; **The Importance of Temperature Control in the Operation of High Power Ultrasound Reactors**

3:30-4:00
Karl Graff, EWI; **The OSU Sonic Power Laboratory – an Ultrasonics Innovation Engine**

4:00-4:30
George Keilman, Sonic Concepts;
Identification and Tracking of Underwater Objects using Ultrasonic Micro-Transmitters

4:30-5:00
Leo Klinstein, Dukane Corporation;
Latest Advances in the iQ Series Ultrasonic Systems

5:00 - 6:30 - Wine and Cheese Reception

Sponsored by:
Ferroperm Piezoceramics
&
Insensor
MEGGiTT
smart engineering for extreme environments

Monday
Continental Breakfast Sponsor

As of January 2009 - schedule subject to change

2008 Symposium Medical Scheduled Presentations

8:15-8:30 AM
Welcome to the Medical Session: Robert Muratore, President; A Few Opening Remarks: Alan Winder, Co-Chairman

8:30 -9:30
Lawrence A. Crum, Ph.D

9:30 - 10:00
Eliaz Babaev, D.Sc., Ph.D, Arobella Medical; **Basics of Ultrasonic Wound Treatment**

10:00 - 10:30
Robert Muratore, Ph.D, Quantum Now; **Bioeffects of Low Dose Ultrasound on Neuronal Cell Function: Current Experiments and Future Applications**

11:00 –11:30
Sunita Chauhan, Robotics Research Center; **Minimally Invasive Robotic HIFU Neurosurgical Applications**

11:30 - 12:00
Amin Jafari Sojahrood; **Classification and Control of the Chaotic Oscillations of Cavitation Bubbles During HIFU**

1:00 - 1:20
Jeff Vaitekunas, Ph.D, Omnisonics Medical Technologies; **Mechanisms of Ultrasonic Thrombolysis**

1:20 - 1:40
Dave Wuchinich, Modal Mechanics; **In-vitro Ultrasonic Vitrectomy: Instrumentation and Efficacy**

1:40 - 2:00
D.J. Cotter, Integra LifeSciences; **Ultrasonic Surgical Horns for Approaches to Brain Tumors and Spine Involving Tenacious and Fibrous Viscoelastic Tissue**

2:00 - 2:20
Aly AlHassan, University of Toronto; **Imaging Within A Lumbar Pedicle Using Ultrasound: Experimental Results**

2:20 - 2:40
Fumio Nogata, Gifo University; **Ultrasound Image-Based Estimation System for Arteriosclerosis of In Vivo Blood Vessel**

3:40 - 4:00
George Keilman, Sonic Concepts; **Hydrophones for Use in High Intensity Focused Ultrasound**

4:00 - 4:20
Mark Hodnett and Bajram Zeqiri, National Physical Laboratory; **Towards A Novel Sensor for Determining Ultrasonic Intensity**

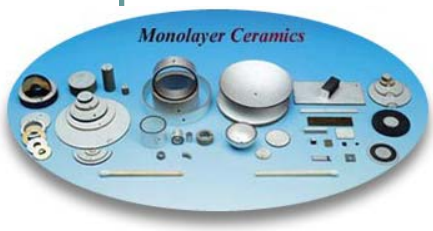
4:20 - 5:00
Wanda W. Wolny, Ferroperm Piezoceramics; **Porous PZT with Tailored Ultrasonic Properties**

As of January 2009 - schedule subject to change

Lawrence A. Crum, PhD

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

2008 Symposium Participant



Tuesday Workshop and Poster Session Schedule

7:45-8:30	Continental Breakfast
8:30-10:00	Workshop I, **Measurement Of Material Properties For High Intensity Ultrasonic Horns**, David Wuchinich, Modal Mechanics
10:30-12:00	Workshop II, **Ceramic Properties And The Practical Interpretation Of Suppliers' Catalogue Data**, Wanda Wolney and Rasmus LouMoeller, Ferroperm Piezoceramics.
12:00-1:00	Lunch
1:00-2:30	Workshop III, **Schlieren Measurements Of Ultrasound Fields**, Claudio Zanelli and Sam Howard, Onda Corporation
3:00-4:30	Poster Sessions: Medical and Industrial
6:00	Depart for Dinner Cruise

Come to Vancouver....


Tourism Vancou ver

Incredible mountains, sparking ocean and a cosmopolitan flair make it perfect for work or play. Exceptional cuisine, first-class hotels and outstanding facilities are just some of things that will make the Vancouver experience unforgettable for UIA delegates.

Where in the World is Vancouver?

Almost exactly halfway between Europe and the Asia Pacific region, Vancouver is located on the western mainland of North America. It's in the southwest corner of British Columbia - the westernmost of Canada's 10 provinces and three territories.

Getting to Vancouver

Vancouver is the hub for a wide array of national and international transport options, ranging from major airline routes to intercity buses and regional ferry and train services. You can even drive yourself - the city is located on main freeway routes from the US and the rest of Canada.

Register early to receive Piezoelectric Ceramics, which documents all aspects of key principles and applications. It's easy to add to your library - just register by February 16!

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

Invited Speaker Improving Plastics Made from Corn and Soy Proteins

David Grewell picked up the little plastic model of a molecule he keeps in his office. He scrunched the model's folding pieces into a ball. That's about the shape of a soy or corn protein, said Grewell, an Iowa State University assistant professor of agricultural and biosystems engineering. Then he unfolded the model into a long, straight loop. That's what happens when researchers add some glycerin – a byproduct of biodiesel production – and some water to the molecule. And that's how biorenewable, biodegradable plastics can be made from the proteins in Iowa crops.

But those aren't the strongest plastics. So Grewell is working with a team of Iowa State researchers to reinforce the plastics with nanoclays, pieces of clay that are just 10 to 20 billionths of a meter thick.

It's not easy to work with those tiny pieces of clay. They tend to stick together in clumps because of electrostatic forces, said Michael Kessler, an Iowa State assistant professor of materials science and engineering who's also working on the project. Those clay platelets need to be separated and mixed evenly throughout the plastic to be much good as a reinforcing agent.

The researchers are turning to high-powered ultrasonics – high-frequency sound waves too high for human hearing – to separate and disperse the platelets. It's a technology Grewell knows a lot about: he worked 12 years in research and development for the Branson Ultrasonics Corp. of Danbury, Conn. He has used ultrasonics to freeze strawberries, process rice and handle many other applications.

The researchers are also using microcellular foaming technologies from Trexel Inc. of Woburn, Mass., to mold and extrude the plastics. The processing technology is expected to enhance the biodegradable plastics while allowing the researchers to use less base material to make the plastics.

Grewell said the potential applications for plastics from crop proteins include disposable wraps for hay bales, pots for plants and packaging for the food industry.

Grewell, Kessler, Howard Van Auken, a professor of management, and Gowrishankar Srinivasan, a graduate student in industrial and agricultural technology, are working on the plastics project with two Iowa companies, the Vermeer Manufacturing Co. of Pella and Vibroacoustics Solutions Inc. of Ames. The project is partially supported by a $68,758 grant from the Grow Iowa Values Fund, a state economic development program.

Jay Van Roekel, the segment manager for Vermeer's ag product group, said the company will test hay wraps made from the plastics developed by the Iowa State researchers. Van Roekel said the company is very interested in helping the research project.

David Grewell displays plastics developed by a team of Iowa State University researchers. The researchers are working to improve biorenewable and biodegradable plastics made from corn and soy proteins. *Credit: Photo by Bob Elbert/Iowa State University*

"It's exciting to be involved in the development of biorenewable technologies and the harvesting of biomass," he said. "We see biorenewables taking hold and expanding every day."

Sam Senti, an application specialist for Vibroacoustics Solutions Inc., said the company would like to use biorenewable and biodegradable plastics in a stick lubricant it has developed. The bio-based lubricant rubs off on metals – it, for example, can be used to help locomotive wheels roll more easily around curves in a track. Senti said biodegradable plastics that add rigidity to the company's product would be very useful in outdoor applications. And so the company wants to help the researchers with some field tests.

The researchers' plastics aren't quite ready to leave the laboratory. Grewell said he's working on production recipes, processing techniques and ultrasonics applications. Kessler will also work to characterize the plastics' strength plus its thermal and mechanical properties.

Working with the two companies should help move all that work ahead, Kessler said.

"Collaborating with these companies will be useful," he said. "And we hope it will help us come up with other ideas."

Source: Iowa State University

Impedance Matching and Other Metaphors

As always, UIA is here to power our sound ideas.

Many UIA members have seen profits recede in recent months, yet remain aware of the central position of contacts in commerce. Maintaining and expanding personal contacts during a low-capital period assures our suppliers and customers that we are active in business, and provides insight into the specific needs of our customers.

Metaphors tend to exhibit the dominant contemporary technology. For example, out of the industrial revolution came talk about the "pressures" of the workplace and the need to "blow off some steam." Today, the metaphors arise largely from the growth of the Internet; the current metaphor used for establishing personal contacts is "networking." As scientists, we know quite a bit about the formality of networks, and can ask how the metaphor can be extended.

Maximum power transfer occurs when there is impedance matching between adjacent elements of a network. If we identify impedance matching as the adjustment of products and services to meet customer needs, then our extended metaphor suggests that commerce will be maximized as a result. This seems reasonable.

UIA has always been a means of networking, and I claim here that it is impedance matched. That is, UIA is a very efficient means of determining the needs of our clients. Furthermore, at the annual symposia, ideas are shared and new techniques learned, so that we will not only be able to find out the needs of our customers, but also how to meet these needs.

Another possible extension of the networking metaphor arises from topology, that is, from the shapes formed by multiple interconnections. Networks can be organized hierarchically, with subnets and supernets. UIA is a network of individuals and companies, and with a name and identity, UIA is also an element in a larger network. Recently, the Board of Directors has begun to explore connections among UIA and other organizations. With help from Mark Schafer, our vice president, and Infinitech LLC, a consulting firm, we have identified the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society as a partner. IEEE/UFFC has agreed to be a Technical Cosponsor of the upcoming Vancouver Symposium. IEEE/UFFC will advertise our event to its members, hopefully resulting in a greater attendance at the meeting. Also, IEEE/UFFC plans to publish our proceedings papers in journal form and in the IEEE Xplore online database. Speakers and poster presenters at our Symposium will be able to submit a short paper which can be referenced in scholarly bibliographies. Thus, the work will be widely disseminated and the proceedings papers can be listed on resumes. IEEE/UFFC will pay UIA a modest sum for the publication rights, and this income will help us to keep our membership fees low.

Future prospects between UIA and IEEE/UFFC include cross-event branding and member discounts, and the designation of the IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control as the official journal of UIA. These inter-organization agreements serve to enhance the value of our UIA membership. UIA remains independent. As always, UIA is here to power our sound ideas.

Robert Muratore, Ph.D.
President, UIA

Experience Vancouver from a Unique Perspective

Tourism Vancouver

Celebrate your Tuesday evening in Vancouver with a sensational dinner on the water.

Welcome to the waters of the Burrard Inlet - spectacular vistas abound as you walk the red carpet to board your private yacht, with the urban cityscape to the south and the Coastal Mountains to the north, there is no shortage of stunning scenery.

You will enjoy this dinner cruise as they make their way around Stanley Park, infamous with it's over 1000 acres of forests neighboring downtown Vancouver and into False Creek. A protected waterway meandering through the heart of the city, bustles with kayaks, mini tug boat ferries, and even a flotilla of floating houses. Enjoy West Coast culinary sensations on board and see through the sunset the fantastic views Vancouver has to offer from a unique perspective.

This cruise is **included** in the full symposium registration. Additional tickets are available for companions. Don't miss this unique view of Vancouver!

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; **Monday reserved**

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 contact UIA 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

38th Annual UIA Symposium Registration
23 - 25 March 2009
Renaissance Vancouver Hotel Harbourside, BC, Canada

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

Daily Registration

Tuesday does NOT include Tuesday Evening Event

Select which day:
- ☐ Monday
- ☐ Tuesday
- ☐ Wednesday

Select your category:
- ☐ Member
- ☐ Nonmember
- ☐ Speaker
- ☐ Student

Special Events

☐ Tuesday Evening Event # of Tickets ____

Fee Schedule

Full conference (Monday - Wednesday)	
Full conference - Member	$715
Full conference - Nonmember	$835
Speaker - Full conference	$550
Student - Full conference	$495
Daily fees (Monday, Tuesday or Wednesday)	
Daily Rate - Member	$325
Daily Rate - Nonmember	$400
Speaker - Daily	$195
Student - Daily	$145
Exhibit Levels - Members	
I - 1 table, 1 full registration	$1,295
II - 1 table, 2 full registrations	$1,995
Exhibit Levels - Non members	
I - 1 table, 1 full registration	$1,645
II - 1 table, 2 full registrations	$2,345
Sponsorship Levels	
I - Refreshment Sponsor	$1,000
II - Breakfast Sponsor	$1,500
III - Lunch Sponsor	$2,500
Special Events	
Tuesday Evening Event	$145

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*

Conference Registration $_____

Tuesday Evening Event $_____

TOTAL DUE $_____

Method of Payment

☐ Payment enclosed. Make check payable to UIA.

☐ Charge Credit Card: ☐ MasterCard ☐ Visa

UIA accepts only these two credit cards!

Exp Date ___ / ____

Person's name on card: _____

◯ Business ◯ Personal

Signature

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

MAIL registration form and payments to UIA, PO Box 2307, Dayton, OH USA 45401-2307

FAX registration form to +1.937.586.3699

Address for express mail only: 11 W Monument Avenue, Ste 510, Dayton, OH USA 45402

Powering Sound Ideas

P O Box 2307
Dayton, OH 45401-2307 USA

Phone: +1.937.586.3725
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."

ACOUSTICS SENIOR RESEARCH SCIENTIST

Focused and competitive technology company seeks a senior level Scientist to join its R&D unit in a Developer capacity. This company engages in the research, development, and commercialization of new technologies that serve the Defense, Automotive, Aerospace and Medical industries. The company has a strong entrepreneurial culture, and an excellent track record of moving new products and processes to successful commercialization. If you are interested in joining a strong and growing team, I invite you to contact me for a confidential conversation.

As Senior Research Scientist, you will take responsibility for leading multiple development programs in the Acoustics division, moving each program from concept through to successful application.

This position reports to the Director. The position is bonus eligible. The company provides relocation assistance.

To be considered for this position, you must meet the following requirements:

- PhD in Mechanical Engineering, Materials Science or Physics is preferred. Related degrees will be considered with appropriate work experience.
- 2 Years minimum related experience in a national lab, or commercial technical or manufacturing setting.
- Knowledge and experience in acoustics, ultrasonic sensors, non-destructive evaluation (NDE) arenas. Knowledge of current research trends and experience in development of sensor or testing equipment is critical.
- Ability to work in a competitive and fast-paced environment, handling complex programs.
- Ability to direct the work of others assigned to the programs.
- Excellent communication skills, both written and verbal.
- Ability to locate external funding sources, and successfully secure funding through writing of grant proposals.
- Ability to make compelling presentations to, and work effectively with customers, including government agency personnel.
- Problem-solving mentality, and a passion for the work.
- Personal integrity.
- Due to the nature of the work, U.S. citizenship is a requirement.

Apply online, or forward a Word resume to flobukenhofer@georgeandrewgroup.com.

ACOUSTICS RESEARCH ENGINEER

Focused and competitive technology company seeks a Master's level Research Engineer to join its R&D unit. This company engages in the research, development, and commercialization of new technologies that serve the Defense, Automotive, Aerospace and Medical industries. The company has a strong entrepreneurial culture, and an excellent track record of moving new products and processes to successful commercialization. If you are interested in joining a strong and growing team, I invite you to contact me for a confidential conversation.

As Research Engineer, you will take an active role in the multiple development programs within the Acoustics division, participating in both the design and development of ultrasonic / acoustic sensors and equipment.
This position reports to the Director. The position is bonus eligible. The company provides relocation assistance.
To be considered for this position, you must meet the following requirements:

- Master's Degree preferred, Bachelor's Degree considered with appropriate experience. Degree areas include Mechanical Engineering, Materials Science, Physics. Other related degrees will be considered with appropriate work experience.
- 2 Years minimum experience in the design, development, testing and/or fabrication of acoustic / ultrasonic sensors, electro-mechanical sensors, instrumentation, transducers, non-destructive evaluation (NDE) equipment, or closely related areas.
- Knowledge and experience with high-performance composite materials or alloys is a plus.
- Due to the nature of the work, U.S. citizenship is a requirement.

Apply online, or forward a Word resume to flobukenhofer@georgeandrewgroup.com.