

How can ultrasonics enhance the value of your business?

UIA is the international business forum for users, manufacturers, and researchers of ultrasonics. Our members use acoustic vibrations to improve materials, industrial processes, and medical technology. We call this "powering sound ideas."

Let's work together to power your sound ideas. Contact a member consultant or company through our Referral Network, learn about ultrasonics with our online primer, or meet industry leaders at our next symposium.



Plan to leave your heart in San Francisco!

2012 Symposium
16 -18 April 2011

Mark Hopkins Hotel
San Francisco, CA, USA

The Transamerica Pyramid in San Francisco is owned by the Golden Gate Bridge, 1948. Level: Overview, San Francisco Commission & Visitors Bureau
ref: Screenshot001/01




P O Box 2307
Dayton OH 45401-2307
USA

Phone: +1.937.586.3725
Fax: +1.937.586.3699
E-mail: uia@ultrasonics.org
www.ultrasonics.org

Latest in Ultrasonic Research and Applications

Powering Sound Ideas...

2011 UIA 40th Annual Symposium

 Ultrasonic Industry Association

Program

23 - 25 May 2011

Wolfson Medical School Building
University of Glasgow, Scotland, UK



Inside:

Medical Sessions	4
Workshops/Posters	5
Industrial Sessions	8
Exhibit/Sponsor	9
UIA Board	11
Contact Info	12



IEEE ULTRASONICS, FERROELECTRICS,
AND FREQUENCY CONTROL SOCIETY

Technical Co-Sponsor

Thanks to our ...

Refreshment Sponsors



Exhibitors

- Electronics & Innovation, Ltd.
- Morgan Electro Ceramics
- National Physical Laboratory
- NTK
- Polytec Limited
- Sonic Systems Limited

Symposium Chairs

Margaret Lucas, University of Glasgow, *Symposium Chair*

Sandy Cochran, University of Dundee, *Medical Session Co-Chair*

Dan Cotter, Integra Life Sciences, *Medical Session Co-Chair*

Sunita Chauhan, Nanyang Technological University, *Poster Chair*

Jay Sheehan, JFS Engineering, *Workshop Chair*

Tony Gachagan, University of Strathclyde, *Industrial Session Co-Chair*

Leo Klinstein, Dukane Corporation, *Industrial Session Co-Chair*

2011 UIA Board of Directors

President

Mark Hodnett
National Physical
Laboratory
Teddington, Middlesex, UK

Vice President

Mark Schafer
Sonic Tech, Inc.
Ambler, PA, USA

Secretary

Janet Devine
Sonobond Ultrasonics
West Chester, PA, USA

Treasurer

Ron Staut
APC International, Ltd.
Mackeyville, PA, USA

Past President

Robert Muratore
Quantum Now LLC
Huntington, NY, USA

Symposium Chair

Margaret Lucas
University of Glasgow,
Scotland, UK

Directors

George Bromfield
Piezo Innovations
Salt Lake City, UT, USA

Sunita Chauhan
Nanyang Technological
University
Singapore

Daniel Cotter
IntegraLife
Burlington, MA, USA

Tony Crandall
ITT
Salt Lake City UT, US

David Grewell
University of Iowa
Des Moines, IA, USA

Leo Klinstein
Dukane Inc.
St Charles IL, USA

Ronald Manna
Misonix, Inc.
Farmingdale, NY, USA

G. Adam Morris
Better UltraSonic
Technologies
North Salem, IN, USA

Jack Sliwa
St. Jude Medical Corp
Sunnyvale CA, USA

Jay Sheehan
BAE Systems
Wilmington, MA, USA

Foster Stulen
Ethicon Endo-Surgery
Cincinnati, OH, USA

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

Fran Rickenbach, CAE, IOM
Executive Director
Dayton, OH, USA

Exhibitor and Sponsor Information



Polytec Limited is the market leader for non-contact, laser based vibration and velocity measurement instrumentation. Our innovative solutions allow our customers to maintain their own technical leadership across many fields. Polytec

manufactures a wide range of laser vibrometers that are the acknowledged gold-standard for non-contact vibration measurement.

PZFlex is the world's leading wave propagation software package specifically designed for piezoelectric and ultrasonic applications. We offer the state-of-the-art modeling software for transducer and ultrasound imaging work. Working closely with the sonar and medical imaging communities, we provide the tools you need to answer your R&D questions quickly and economically. Based on technology developed for simulating large wave-propagation problems for the US government, PZFlex can solve that multimillion-element model that other simulation packages can only dream of. In an era of ever-shorter development times, PZFlex's virtual prototyping approach can help you beat your competitors to market, with a superior product. PZFlex helps you develop prototypes in hours, not weeks.



Sonic Systems Limited

Enabling of ultrasonic technology.

Development and manufacture of ultrasonic systems, for OEM and laboratory applications

Sonobond is a leading manufacturer of ultrasonic welding equipment for welding non-ferrous metals, including spot welding of aluminum sheet metal, joining stranded wire for wire harnesses and cable assemblies, and sealing copper tubes. Sonobond also makes ultrasonic joining equipment for one-pass sealing and cutting of textiles and non-woven materials used in the filter and medical hygiene industries and plastic assemblies. Sonobond is recognized as a world class provider of ultrasonic machinery for the automotive, filtration, medical, electronic, electrical, appliance, HVAC, apparel, ballistics, home furnishings, and aerospace industries. Sonobond can be reached at www.SonobondUltrasonics.com; email: sales@sonobondultrasonics.com; tel: 610-696-4710 or 800 323-1269



Powering Sound Ideas...

Welcome to the 40th Annual UIA Symposium. Over the next three days, we have the opportunity to network with ultrasonic professionals and colleagues from throughout the world. We've built in time for informal networking each day as well as outstanding presentations on the latest in ultrasonics.

Electronic Proceedings

We offer the proceedings for this symposium in an electronic format. At the end of the Symposium, you'll receive a UIA flash drive pen. While it is great to take notes -- you'll really appreciate it when you plug it into your computer and have access to the Acrobat files of the presentations for when you return home.

Also included on the pen are the abstracts for all sessions and posters so that you can search for specific key words.



To access the flash drive, unscrew the center of the pen to reveal the 2 gb flash memory.

We hope...

That you enjoy our symposium. Be sure to visit our exhibitors and to thank our sponsors for their generosity.

Please let us know if there is anything we can do to make this more effective for you.

Margaret Lucas
Symposium Chair

The winning student poster will receive a cash prize, sponsored by:



**Ethicon
Endo-Surgery**

PART OF THE *JOHNSON & JOHNSON* FAMILY OF COMPANIES

Medical Sessions Monday 23 May

- 7.45-8.15 Registration/Coffee/Tea
- 8.20 Welcome by *Mark Hodnett*, President & *Margaret Lucas*, Symposium Chair
- 8.30 Design and realization of a simple, rapid beam plotting system for medical ultrasound fields, *C. Baker, J. Barrie, A. Shaw, M. Hodnett, B. Zeqiri*
- 9.00 Design and construction of an angled ultrasonic transducer applied to blood flow measurement, *P. Acevedo, I. Sanchez*
- 9.30 Modelling and fabrication of high frequency ultrasonic transducer arrays for medical applications, *R. Ssekitoleko, C. Demore, G. Harvey, S. Cochran*
- 10.00 High frequency (20 MHz and above) therapeutic transducers based on piezoelectric film, *W. Wolny, R. Lou-Moellor, A. Nowicki, M. Lethiecq, J. Ketterling, F. Levassort*
- 10.30 *Coffee/Tea in Exhibition*
- 11.00 An in vitro set-up to study low-frequency ultrasound effects on dental cells, *U. Patel, D. Walmsley, B. Scheven*
- 11.30 Surface characterisation using combined ultrasound and low coherence interferometry, *C. Li, S. Li, Z. Huang, R. Wang*
- 12.00 Transducer arrays for ultrasonic particle manipulation, *C. Demore, P. Glynn-Jones, C. Ye, Y. Qiu, S. Cochran, M. Hill*
- 12.30-13.30 *Luncheon sponsored by Integra LifeSciences*
- 13.30 Keynote speaker: Professor *Damien Walmsley*, *University of Birmingham, UK*: Good Vibrations in Dental Ultrasonics
- 14.30 Assessment of the performance of pre-clinical ultrasound scanners using the resolution integral, *C. Moran, B. Ellis, A. Janeczko, S. Pye*
- 15.00 Modeling and monitoring cerebral perfusion in predicting G-LOC, *S. Chauhan, Y. Li, A.C. Ritchie, M. Skote*
- 15.30 *Coffee/Tea in Exhibition*
- 16.00 High resolution ultrasound transducers and arrays for medical imaging applications, *T. Button*
- 16.30 Ultrasonic radiation forces for cell sorting and characterisation, *P. Glynn-Jones, P. Mishra, D. Ankrett, R. Boltryk, M. Hill* Process
- 17:00 Characterisation of an ultrasonic transducer connected to quarter and full wavelength rod horns, *A. Mathieson, A. Cardoni, N. Cerisola*

Exhibitor and Sponsor Information



E&I is the leading supplier of robust and reliable RF amplifiers for ultrasonic applications, worldwide. Contact: tonyharris@eandiltd.com
Web Site: www.eandiltd.com

Integra LifeSciences, a world leader in medical devices, is dedicated to limiting uncertainty for surgeons, so they can concentrate on providing the best patient care. Integra offers innovative solutions in orthopedics, neurosurgery, spine, reconstructive and general surgery. Integra's orthopedic products include devices and implants for spine, foot and ankle, hand and wrist, tendon and peripheral nerve protection and repair, and wound repair. Integra is a leader in neurosurgery, offering a broad portfolio of implants, devices, instruments and systems used in neurosurgery, neuromonitoring, neurotrauma, and related critical care.



A leading supplier of sensing and monitoring systems measuring physical parameters in extreme environments

MTC ElectroCeramics is a business within the Morgan Ceramics Division of The Morgan Crucible Company plc, one of the world's leading advanced materials companies. MTC ElectroCeramics specialize in the design and manufacture of piezoelectric ceramic components, sensors, actuators and transducers.



With over 50 years experience MTC ElectroCeramics use their materials science and design expertise to provide customers with differentiated solutions that ensure optimum performance of their products. For more information please visit: www.morganelectroceramics.com



The National Physical Laboratory (NPL), NPL is showing three examples of its medical ultrasound metrology research work, aimed at providing simple QA tools for clinicians, users and manufacturers. The first of these is the NPL Pyrometer, which is a simple, solid-state device for measuring ultrasound power. The second is a novel method for displaying and analysing ultrasound transducer fields, based on a novel ultrasound absorbing material which has a thermochromic response and the third is a sensor-equipped brain phantom used in the assessment of thermal hazard from neonatal Transcranial Doppler ultrasound.



At NTK Technologies, we do not make the products that you see everyday. However, our innovation helps to advance many of the technologies and products that improve people's lives. We have manufactured ceramics for more than 100 years and ultrasonic transducer and PZT for over 40 years.

Industrial Sessions Wednesday 25 May

8.00 - 8.20 *Coffee/Tea*

- 8.30 Keynote speaker: *Juan Gallego-Juárez, Power Ultrasonics Group, CSIC, Spain: Power Industrial Ultrasonics in Fluid and Multiphase Media: Processes and Technologies*
- 9:30 Advanced Bode plot technique for ultrasonic transducers, *D. DeAngelis, G. Schulze*
- 10.00 Optimisation of an ultrasonic drill horn for planetary subsurface sample retrieval, *P. Harkness, M. Lucas*
- 10.30 *Refreshments and Break*
- 11.00 Ultrasonic-assisted dissolution of biomass using ionic liquid for enzymatic hydrolysis, *M. Montalbo-Lomboy, D. Grewell*
- 11.30 Design and characterisation of a multi-frequency reference vessel for acoustical cavitation, *G. Memoli, L. Wang, M. Hodnett, P. Gelat, B. Zeqiri*
- 12.00 A novel commercial system to break foams using power ultrasound, *A. Cardoni*
- 12.30 Programmable system control of ultrasonic transducers *John Minuth, George Bromfield, Joseph Luis*
- 13.00-13.30 *Luncheon sponsored by Meggitt*
- 13.30 Design, characterisation and evaluation of a multi-frequency high power ultrasonic reactor, *A. Gachagan, T. Mutasa, A. Nordon*
- 14.00 Effect of high-power ultrasonication on extraction and activity of soybean isoflavones, *T. Pananun, M. Montalbo-Lomboy, A. Noomhorm, D. Grewell, B. Lamsal*
- 14.30 A strategy for delivering high torsionality in longitudinal-torsional ultrasonic devices, *H. Al-Budairi, P. Harkness, M. Lucas*
- 15.00 New advanced GUI and other innovations in the iQ family ultrasonic welders, *L. Klinstein*
- 15.30 Energy efficient depolymerisation of post consumer poly-lactic acid with ultrasonics induced implosions, *G. Srinivasan, D. Grewell*
- 16.00 Comparing acoustic emission and erosive measures of cavitation, *I. Butterworth, M. Hodnett, P. Birkin*
- 16.30 *Coffee/Tea - Symposium Ends*

Workshops and Poster Session 24 May

8.00-8.20 *Coffee/Tea*

- 8.30 Fundamentals of transduction, *Jay Sheehan, JFS Engineering, USA*
- 9.15 Fundamentals of ultrasonic wave propagation, *Victor Humphrey, University of Southampton, UK*
- 10.00 *Coffee/Tea in Exhibition*
- 10.30 Measurement of ultrasound (with hands-on measurements and demos) *Precision Acoustics, UK*
- 11.30 A biopic of Lord Rayleigh, *Peter Wells, Cardiff University, UK*

Jay Sheehan, Fundamentals of Transduction

The Fundamentals of Transduction Workshop reviews the basic techniques of power transducer design and analysis. Workshop concepts introduced are spring/mass system and equivalent circuit analysis, parallel and series resonance, and transducer materials. A converter design process is introduced for transducer electrical and mechanical design. Finite element analysis and techniques are presented for a typical half wave resonator. Transducer electrical and mechanical limitations are also discussed.

Precision Acoustics, UK, Measurement of Ultrasound

The Measurement of Ultrasound Workshop offers an interactive demonstration on measurements involving hydrophones and transducers. Hydrophone measurements include an introduction to hydrophone frequency, directional response, and field characterization. Measurements on planar and focused thickness mode transducers are offered as well as ultra short pulsed transducers for high resolution NDT. Differences in acoustic field measurements between pulsed and continuous wave applications are also presented.

18.00-19.30 *Monday, 23 May 2011*

Reception and Whisky Tasting

Ferguson Room, University of Glasgow

Sponsored by:



Tuesday 24 May, continued

12.00 - 14.00 Luncheon sponsored by **PZFlex**

12.00 - 14.00 Poster Session Prize to be awarded at 13.45

Advances in ultrasonic cutting to reduce thermal damage, *Muhammad Sadiq, Zhihong Huang, Sandy Cochran, George Corner, Institute for Medical Science & Technology, University of Dundee, Dundee*

Assessing changes in the performance of clinical ultrasound transducers using the Resolution Integral, *SD Pye, B Ellis, A Janeczko, CM Moran, Medical Physics Department, Royal Infirmary, Edinburgh*

Brain tissue deformation and dislocation tracking using ultrasound for minimally invasive ablation application, *Sudha Shukal et al, Nanyang Technological University*

Characterisation of Langevin transducers, *Andrew Mathieson, Andrea Cardoni, Niccolo Cerisola, University of Glasgow*

Combining linear and non-linear ultrasonic techniques, *C. Wang, A. Gachagan, A. Nordon, A. Robin, D. Littlejohn, University of Strathclyde*

Design and simulation of ultrasonic metal welding, *Ziad Al-Sarraf, University of Glasgow*

Development of an MRI-compatible focused ultrasound device for the treatment of rectal cancer, *Zhen Qiu, Efstratios Kokkalis, Sandy Cochran, University of Dundee*

Development of ultrasound guided body motion tracking, *Xu Xiao, Zhihong Huang, Andreas Melzer, Sandy Cochran, George Corner, Institute for Medical Science & Technology, University of Dundee*

Displacement and resonance characteristics of a novel cymbal transducer for power ultrasonics applications, *Fernando Bejarano, University of Glasgow*

Effect of split-focus on ultrasound propagation through the rib cage for focused ultrasound surgery, *Jing Gao a, Lei Shi, Alexander Volovick, Zhihong Huang, Sandy Cochran, University of Dundee*

Experimental and numerical study of the effects of focus splitting associated with propagation of focused ultrasound through the rib cage, *Jing Gao, Lei Shi, Alexander Volovick, Zhihong Huang, Sandy Cochran, University of Dundee*

Heating by neonatal transcranial ultrasound: a survey of clinical equipment, *G. Memoli, A. Shaw, P. Gélat, N. Sathoo, National Physical Laboratory*

High power longitudinal/torsional mode transducers for surgical and dental applications, *George Bromfield, Piezo Innovations*

Non-invasive characterization of tissue by surface wave generated by ultrasound transducer, *Sinan Li, Yunsheng Qi, Zhihong Huang, Sandy Cochran, University of Dundee*

Tuesday 24 May, continued

Numerical analysis of high performance piezoelectric transducers for ultrasonic cutting, *M. R. Sadiq, Z. Huang and S. Cochran, Institute for Medical Science & Technology, University of Dundee*

Optimal heating strategies for a 2D phased array transducer: a numerical and experimental investigation, *Jing Gao, Alex Volovick, Christine Demore, George Corner, Zhihong Huang, Sandy Cochran, Institute for Medical Science & Technology, University of Dundee*

Piezo-material characterisation for focus ultrasound surgery with temperature-dependent electrical impedance spectrum, *Zhen Qiu, Muhammad Saiqe, Dr. Christine Demore, Dr. Zhihong Huang, Sandy Cochran, University of Dundee*

Standing wave, *Yongqiang Qiu, David A. Hughes, Srikanta Sharma, Christine Demore, Kees Weijer, Sandy Cochran, University of Dundee*

Study of the respiration induced kidney movement and dynamic target localization using imaging ultrasound, *Abhilash, RH and S Chauhan, Nanyang Technological University*

Ultrasonically assisted extraction of oil from porous rocks, *Eimear Neeson, University of Glasgow*

Vibration characterisation of an ultrasonic cutting blade, *Zhongyin, Pan, University of Glasgow*

14.00-14.30 Travel by Underground to Strathclyde University

14.30-17.00 Lab Tour/Demonstrations, Centre for Ultrasonic Engineering, University of Strathclyde

18:30 Buses depart from outside the Wolfson Building, University of Glasgow

19.30 Dinner at Ross Priory, Loch Lomond

23:00 Buses depart Ross Priory



Ross Priory is the University of Strathclyde Glasgow's Recreational and Conference Centre, situated in 200 acres of parkland on the south east shoreline of Loch Lomond. Built in 1812 and designed by the architect James Gillespie (1776-1855), it features his Scottish Gothic style which gives the house its present look. There are extensive grounds and gardens and even a Victorian Walled Garden complete with greenhouses and the estate also contains a 600 year old Yew Walk and a remarkable collection of rhododendrons and azaleas.