

## IUS 2020 Table of Contents

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## IUS 2020 Patrons & Sponsor

### Platinum Patron



Verasonics designs and markets leading-edge Vantage™ ultrasound research systems for academic and commercial investigators. These real-time, software-based, programmable ultrasound systems accelerate research by providing unsurpassed speed and control to simplify the data collection and analysis process. Researchers in 34 countries routinely use the unparalleled flexibility of the Vantage platform to advance the art and science of ultrasound through their own research efforts. In addition, to protect your investment and encompass additional research options, every Vantage System can be upgraded to any configuration. Verasonics' Vantage Systems are the ideal solution for ultrasound driven research and development in biomedical, materials science, earth sciences, and the physics of acoustics.

### Gold Patrons



FUJIFILM VisualSonics, Inc is the undisputed world leader in the development of real-time ultrasound and photoacoustic systems, providing tools specifically designed to support imaging-based research. Our cutting edge technologies support researchers at the world's top pharmaceutical and biotechnology companies, hospitals, and universities in their research efforts across areas including cardiovascular, cancer, neurobiology, developmental biology, and acoustics. These technologies support applications including genetic research, phenotypic studies, drug development, imaging systems development, and many more. VisualSonics' platforms combine a broad range of frequencies, high resolution, real-time data acquisition, and access to quantifiable data, all supported by powerful user-friendly software.



Polytec provides testing services, rentals, and equipment sales & support to researchers and manufacturers. Our innovative solutions in vibration analysis and surface metrology enable our customers to maintain technological leadership in their fields of ultrasonics. Measurements can be performed either in one of our state-of-the-art labs or on-site in your facility: design validation, troubleshooting, calibration and quality control, component and structure level, traveling wave analysis for improving NDT methods, and roughness & shape measurements on the device or wafer. Our instruments measure accurately and reliably with sub-pm resolution at frequencies from DC to 2.5 GHz.



We provide technical expertise and engineering support for emerging applications in advanced ultrasound technologies.

Daxsonics offers services to help companies develop ultrasound products. We work in at all stages of the life cycle providing a range of services including R&D, acoustic stack design, transducer design, electronics, software design, firmware design, and system integration. Our team of industry leading experts consistently come up with creative solutions to help develop market-disrupting products.

#### **Silver Patrons**

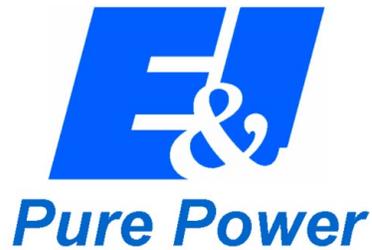
The logo for us4us. It consists of the text "us4us" in a bold, black, sans-serif font. The number "4" is significantly larger than the letters "us" on either side. A registered trademark symbol (®) is located to the upper right of the second "us".

us4us Ltd. delivers advanced ultrasound research systems and OEM components optimized for software-defined ultrasound applications and GPU processing. Our solutions feature raw RF acquisition and high-speed PCIe data streaming, enabling the end user to implement their own real-time CPU/GPU processing algorithms. An open SDK provides flexibility and easy integration with C/C++/Python/Matlab.

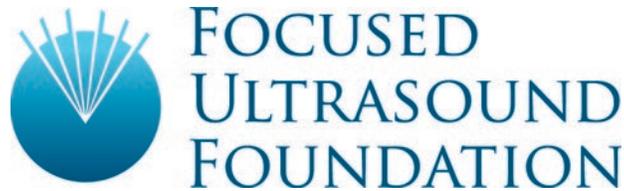
Our current offering:

- us4R-lite – a low-cost, portable ultrasound research system featuring 256TX/64RX channels and an external Thunderbolt 3 interface (40Gb/s). The first truly portable solution to work with your PC/notebook.
- us4R – an advanced 2D/3D-ready ultrasound research system featuring 256TX/256RX channels and an extremely high data transfer rate (up to 30GB/s). The system is intended for real-time implementation of advanced/complex ultrasound processing algorithms on GPUs.
- us4OEM – a credit-card sized ultrasound front-end module with 128TX/32RX channels for integration in the end-user system/solution.

Furthermore, we offer consulting and development services in the area of ultrasound methods, systems, and product development.



Electronics & Innovation, Ltd is a focused and dynamic company fulfilling the market demand for rugged and reliable RF power amplifiers. Founded in 2003, by former ENI engineers and executives, E&I was incorporated on the 16th of March, 2004. We are located in Rochester, NY, where all products are designed, assembled, and tested at our facility. E&I services and supports all major markets; operating globally through distributor outlets worldwide. E&I is committed to providing RF power amplifier solutions of the highest quality, durability, and ruggedness. Our amplifiers have undergone tests by the military and have proven to be even more reliable than the original ENI amplifiers. In addition unlike the old ENI amplifiers, they are CE marked, RoHS Compliant and meet all relevant emissions and safety standards. The Difference to You E&I has the people, the products, and the capabilities to meet your RF needs. Quality is and has been at the cornerstone of our growth – we constantly strive to be better, so that you can achieve more.



The Focused Ultrasound Foundation was created to improve the lives of millions of people worldwide by accelerating the development of this noninvasive technology. The Foundation works to clear the path to global adoption by organizing and funding research, fostering collaboration, and building awareness among patients and professionals. Since its establishment in 2006, the Foundation has become the largest nongovernmental source of funding for focused ultrasound research. For more information, visit <http://www.fusfoundation.org>.

#### Sponsor



## IUS 2020 Short Courses

### Group 1

#### **Essentials of Ultrasound Imaging: An Introduction**

**Sunday, September 6 | 8:00 AM PDT**

Peter Kaczkowski, Verasonics, Inc.

Thomas L. Szabo, Boston University

#### **Artificial Intelligence in Ultrasound Imaging**

**Sunday, September 6 | 4:00 AM PDT**

Yonina Eldar, Weizmann Institute of Science

Ruud JG van Sloun, Eindhoven University of Technology

#### **Ultrafast Ultrasound Imaging: Basic Principles and Applications**

**Sunday, September 6 | 11:00 PM PDT**

Mickael Tanter, French National Institute for Health and Medical Research

#### **Super-resolution ultrasound**

**Monday, September 7 | 4:00 AM PDT**

Olivier Couture, CNRS

Vincent Hingot, Laboratoire d'Imagerie Biomedicale

### Group 2

#### **Machine Learning and Signal Analysis for Ultrasonic Imaging and Communication Applications**

**Monday, September 7 | 7:00 AM PDT**

Jafar Saniie, Illinois Institute of Technology

Erdal Oruklu, Illinois Institute of Technology

#### **Acoustofluidics**

**Sunday, September 6 | 8:00 AM PDT**

James Friend, University of California

### Group 3

#### **Acoustical Imaging: from acoustic field equations to imaging and full waveform inversion**

**Sunday, September 6 | 4:00 AM PDT**

Koen W.A. van Dongen, Delft University of Technology

#### **Finite Element Modelling of Acoustic Resonators**

**Sunday, September 6 | 8:00 AM PDT**

Yook-Kong Yong

Rutgers University

#### **Acoustic Tweezing**

**Monday, September 7 | 2:00 AM PDT**

Charles Courtney, University of Bath

### Group 4

#### **MEMS Technology for Ultrasound Devices**

**Sunday, September 6 | 4:00 PM PDT**

Sunil Bhave, Purdue University

Shuji Tanaka, Tohoku University

#### **Fundamentals and applications of surface acoustic wave sensors**

**Sunday, September 6 | 9:00 PM PDT**

Jun Kondoh, Shizuoka University

### Group 5

**Medical Ultrasound Transducers**

**Monday, September 7 | 7:00 AM PDT**

David M. Mills, GE Global Research

Scott Smith, GE Global Research

**CMUT: Theory, Fabrication, and Applications**

**Monday, September 7 | 12:00 PM PDT**

Butrus (Pierre) T. Khuri-Yakub, Stanford University

Kamyar Firouzi, Stanford University

Quintin Stedman, Orchard Ultrasound Innovation

Ömer Oralkan, North Carolina State University

## IUS 2020 Opening/Closing Events

### Tuesday, September 8, 2020

**6:30 AM – 6:45 AM PDT**  
**Opening Session**

**6:45 AM – 7:45 AM PDT**  
**Plenary Session: David B. Tanner**

**7:45 AM – 8:30 AM**  
**Awards Session**

### Friday, September 11, 2020

**9:45 AM – 10:15 AM PDT**  
**Challenge Session**

**10:15 AM – 10:45 AM PDT**  
**Student Awards**

**10:45 AM – 11:15 AM**  
**Closing Session**

## IUS 2020 Live Social/Workshop Events

### Tuesday, September 8, 2020

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**12:15 PM - 1:00 PM PDT**  
**Student Social**

Students attending IEEE IUS 2020 are invited to participate in the STUDENT SOCIAL! Meet other students in a casual setting and network with future colleagues. This event will be held over Zoom on Tuesday, September 8 at 12:15 PM PDT.

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**1:00 PM - 2:00 PM PDT**  
**Pub Quiz**

We can't meet in person at this year's symposium, but we know delegates will still want to connect with colleagues and meet new faces. Why not sign up for the IUS 2020 Pub Quiz Tournament? This happy-hour social event is open to all registered IUS participants and will take place on Tuesday (Sept 8th) and Wednesday (Sept 9th) at 1 pm PDT.

Teams of 6 to 10 people can compete for the coveted IUS Pub Quiz Cup. Will a team from Verasonics outlast FUJIFILM VisualSonics? Or will a team from academia be crowned champions ... on both nights? Nothing like a little friendly team competition to hoist the IUS Pub Quiz Cup!

Get your team together and sign up here! If you don't have a team, sign up anyway and you'll be placed on a team at random. You can choose to attend either or both events, and you are welcome to sign up at any time before the quiz starts. All those who sign up will be sent instructions closer to the time of the event. Hope to see you there!

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**1:00 PM - 2:00 PM PDT**

**Fujifilm VisualSonics Webinar: Vevo F2 - Empowering Researchers of Ultrasound Technology**  
Presented by Andrew Needles

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**2:00 PM - 3:00 PM PDT**

**Verasonics Webinar: New Turnkey Preclinical Research Platforms for 3D Ultrasound-Guided Focused Ultrasound (USgFUS): HIFUplex™ PLUS 1000 for Small Subjects and HIFUplex™ PLUS 3000 for Large Subjects**  
Presented by Peter Kaczowski, Ph.D., Sr. Scientist, Verasonics, Inc. & Kyle Morrison, President, Sonic Concepts, Inc.

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**2:00 PM - 3:00 PM PDT**

**Overview of Structured Problem-Solving**

Speaker: Mark Sneeringer, SigMax-NH LLC

Biography: Mark Sneeringer is a Continuous Improvement leader with over 37 years of industrial experience and deep expertise in Six Sigma, Lean, Change Management and Program Management. He has led improvement efforts for businesses ranging from consumer lifestyle products, to large household appliances, to complex medical devices. Mark holds a Ph.D. in Geochemistry from MIT and has achieved advanced certifications in Six Sigma, Lean and Reliability. In recent years, he has helped several medical device companies improve cost, time to market, and product quality via training and coaching.

Abstract: Everyone faces problems. Some have known solutions and the right way to deal with those is to simply implement that remedy. Other problems require determining what needs to be done and how to execute the solution. That is where a structured Problem-Solving method is critical to quickly and effectively fixing the issue. This session will describe a multi-step process that is proven to yield good results. It starts with defining the problem unambiguously, runs through root cause analysis and solution selection, and ends with preventive actions that ensure the problem does not recur. The steps and some of the activities/tools used will be described. The approach is applicable in just about any setting: research, manufacturing, sales and marketing, etc. and training can be done in one to two days.

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**Wednesday, September 9, 2020**

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**1:00 PM - 2:00 PM PDT**

**Pub Quiz**

We can't meet in person at this year's symposium, but we know delegates will still want to connect with colleagues and meet new faces. Why not sign up for the IUS 2020 Pub Quiz Tournament? This happy-hour social event is open to all registered IUS participants and will take place on Tuesday (Sept 8th) and Wednesday (Sept 9th) at 1 pm PDT.

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**1:00 PM - 2:00 PM PDT**

**Student Pitch Competition**

Students attending IEEE IUS 2020 are invited to participate in the STUDENT PITCH COMPETITION—present your research in 60 seconds and win a cash prize! This will be held on Wednesday, September 9, at 1 PM PDT. Participation is limited.

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**1:30 PM - 3:30 PM PDT**

**Ally Training Workshop**

Speaker: Valerie Aurora, Frame Shift Consulting

Want to take concrete action to fight injustice, but not sure what to do? The Ally Skills Workshop teaches simple everyday techniques you can use to make your workplace and community more fair and just. In this workshop, you will learn how to recognize when you have the most power and influence—when you can best act as an ally—and how to take effective action to make your workplace and community better.

Facilitator and Ally Skills Workshop lead creator Valerie Aurora brings more than a decade of experience in the tech industry and more than twenty years in the area of diversity and inclusion. Valerie has taught ally skills for more than 8 years, co-founded and led a non-profit supporting women in open technology and culture, and worked as a software engineer for Intel, IBM, and Red Hat.

More about the workshop: The Ally Skills Workshop is a highly interactive discussion-oriented workshop. It starts with a 30 minute introduction on the basics of ally skills and inclusive, respectful, productive discussions. Then participants split up into groups of 4-6 people to discuss specific real-world scenarios in which an ally could take action. After a 5-8 minute group discussion, each group reports out what they discussed and any questions they have, with guidance from the facilitators. We will take a short break every hour.

Note: If you miss the first 30 minutes of the workshop, you cannot participate in the workshop. You are welcome to leave and/or return at any time after the first 30 minutes, and to eat at any point during the workshop. Participation in discussion groups is voluntary. You will receive video conference instructions two days before the workshop.

***\*There is a limited capacity. You will receive an email if you are selected.***

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**2:00 PM - 3:00 PM PDT**

**Verasonics Webinar:**

**Ultrafast Ultrasound Volume Imaging and Integration of Row/Column Arrays into the Vantage Family**

Presented by Miguel Bernal, Ph.D., Ultrasound Scientist, Verasonics, Inc.

**A New Generation of Graphical User Interface Software for the Vantage Platform: SoniVue™ QuickScan and Improved Script-Based UI Controls**

Presented by Daniel Rohrbach, Ph.D., Sr. Scientist and Software Engineer, Verasonics, Inc.

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**3:00 PM - 4:00 PM PDT**

**Women in Engineering**

All attendees active in the technical areas of the IUS are invited to participate in a virtual networking event. We will be discussing strategies for visual and graphical communication of research. Felice Frankel will be giving a talk on scientific illustration and visual communication. Felice Frankel is a science photographer and a research scientist at the Massachusetts Institute of Technology. She has extensively worked on developing new approaches to promote the public understanding of science through visual expression. We will have breakout sessions where we will work on the visual representation of our research. We will work on creating a graphical abstract for our next paper or thesis dissertation.

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**Thursday, September 10**

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**11:30 AM PDT - 12:30 PM PDT**

**Ultrasound Industry Perspectives: Career Development in Industry / Moderator: Jessica Liu Strohmann, Qualcomm**

Speakers: Clyde Oakley; Samir Gupta, Qualcomm; Sophia Shi, Samsung; Holly Lay, Fujifilm VisualSonics; Aqsa Patel, GE Global Research

Do you want to work in industry? Do you have a personalized career development plan? What are your strengths and career aspirations? Would you like to learn more about what it would be like to work in industry at a different stage of your career? You are welcome to join us in this interactive and inspiring panel discussion. We have five distinguished industry leaders to share their experience and offer guidance.

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**12:15 PM - 1:00 PM PDT**

**Student-Professional Networking**

Students attending IEEE IUS 2020 are invited to participate in the STUDENT-PROFESSIONAL NETWORKING event—connect with leaders in ultrasonics from academia and industry! This will be a Zoom event on Thursday, September 10 at 12:15 PM PDT.

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**1:00 PM PDT - 2:00 PM PDT**

**Resume Building Workshop**

Speakers: Abhay Patil, GE Healthcare; Frederic Cegla, Imperial College London; Jason Weigold, MEMSTAFF; Lynn Ewart-Paine, Naval Underseas Warfare Center; Meaghan O'Reilly, Sunnybrook Research Institute - University of Toronto

Attention all job seekers, Young Professionals and students! Submit your resume for feedback from Ultrasonics Professors, Government and Industry Experts!

This live panel discussion, Q&A and feedback session will follow on from our UFFC Soft-Skills Seminar on "How to Create an Effective Resume". Our panel members, from industry, government and academia, will review submitted resumes and give general comments on all submissions. The workshop will then move into breakout rooms for smaller group feedback sessions. Finally, an open Q&A session will conclude the workshop. Learn from job advertisers what you need to include in your resume to get that elusive interview!

Registration is limited to a total of 35 Young Professionals and students on a first-come, first-served basis. YouTube link to UFFC Seminar and registration details to follow.

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**1:30 PM – 2:30 PM PDT**

**Polytec Webinar: Optical metrology solutions for advancing ultrasonic driven technologies**

**Speaker: Jerome Eichenberger**

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**1:30 PM - 3:00 PM PDT**

**Grant Application Workshop**

Speakers & Schedule:

**1:30 – 1:35 pm**

Introduction: Zhen Xu, University of Michigan

**1:35 – 1:55 pm**

Houston Baker, Ph.D., Program Director, Imaging Technology Development Branch, Cancer Imaging Program, National Cancer Institute, National Institute of Health (NIH)

**1:55 – 2:15 pm**

Ruyan Guo, Ph.D., Program Director, EPMD, ENG/ECCS, National Science Foundation (NSF)

**2:15 – 2:35 pm**

Lynne Elmore, Ph.D., Scientific Director, Translational Cancer Research, American Cancer Society

**2:35 – 2:55 pm**

Matt Eames, Ph.D., Director of Extramural Research, Focused Ultrasound Foundation

Abstract: At this workshop, Program directors from the National Institute of Health (NIH), National Science Foundation (NSF), American Cancer Society, and Focused Ultrasound Foundation will give an update of their institutions and currently funded work as well as provide guidance on the funding opportunities and application process. Each speaker will give a 15-minute presentation followed by a 5-minute Q&A session.

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**1:30 PM – 2:00 PM PDT**

**Daxsonics Webinar**

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**2:00 PM - 3:00 PM PDT**

**Verasonics Webinar: Verasonics Vantage: A Platform for Cutting Edge NDT Ultrasound Research**

Presented by Jack Potter, Ph.D., Ultrasound Scientist, Verasonics, Inc.

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**Diversity Survey**

The IEEE UFFC Society is committed to cultivating a diverse professional community. By taking part in this survey, you can help us learn about the makeup of this symposium and ensure that future UFFC-S events are inclusive and representative.

Survey Link: <https://www.surveymonkey.com/r/FTNLJKK>

**Diversity & Inclusion**

IEEE's mission to foster technological innovation and excellence to benefit humanity requires the talents and perspectives of people with different personal, cultural, and disciplinary backgrounds. IEEE is committed to advancing diversity in the technical profession, and to promoting an inclusive and equitable culture in its activities and programs that welcomes, engages and rewards those who contribute to the field without regard to race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression.

**UFFC-S Message on Black Lives Matter**

"If you are neutral in situations of injustice, you have chosen the side of the oppressor."

–Bishop Desmond Tutu

UFFC-S is dedicated to living up to the ideals of these words, continuously revisiting our own actions, and standing with those who are oppressed. # Black Lives Matter

## Expand your Ultrasonic Research Capabilities with the Verasonics Vantage System



### The Vantage systems' unparalleled flexibility continues to expand with new features and options

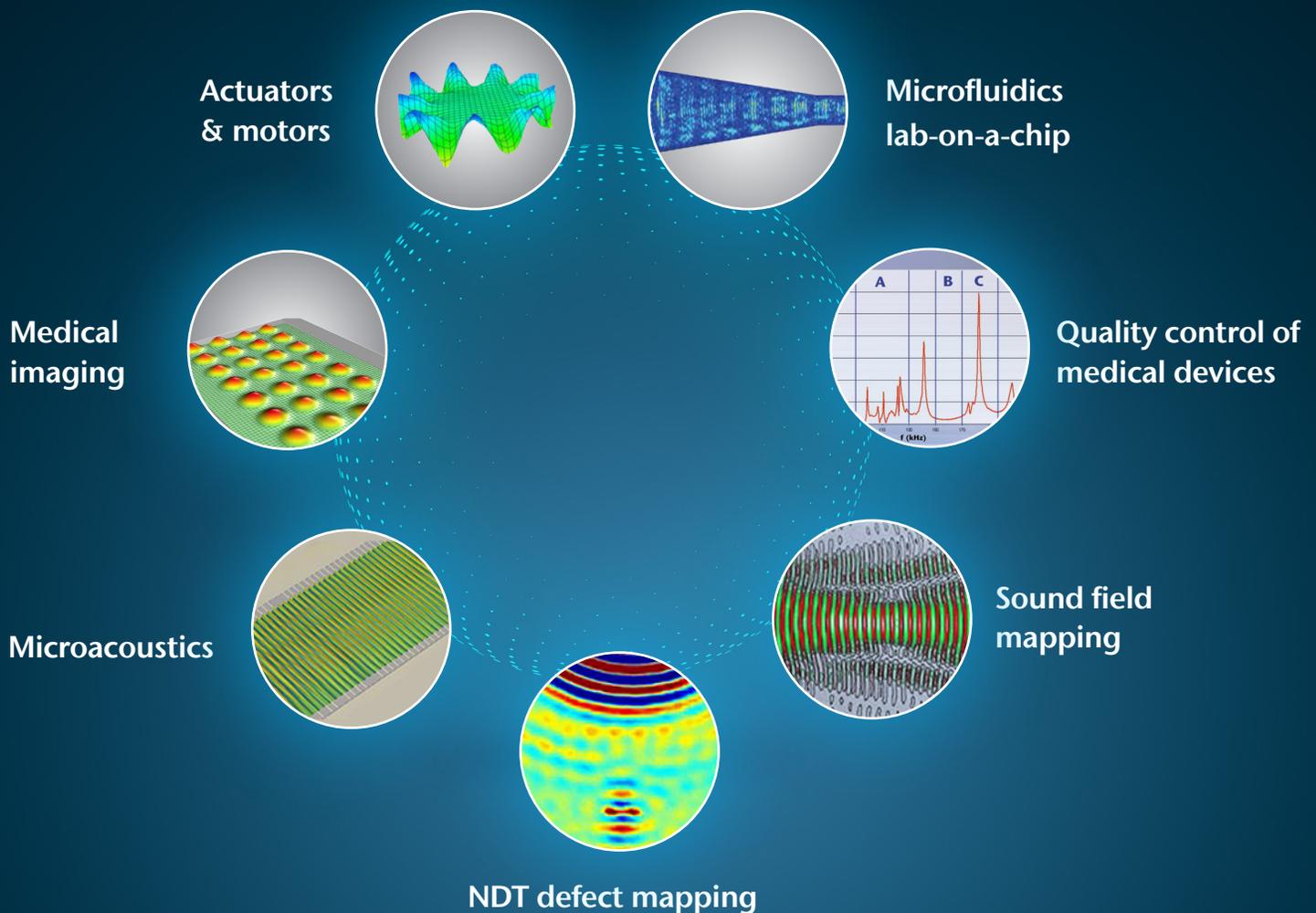
- New techniques & technologies for Volume Imaging
- HIFUplex<sup>™</sup> PLUS Focused Ultrasound research solutions for small and large animals
- New transducer options
- SoniVue<sup>™</sup> QuickScan provides a user-friendly, clinical-style interface for real-time imaging
- New capabilities for NDE applications
- New options for education and product training
- Flexible architecture from 32 to 2048 channels
- High power options for ARFI and Elastography



To learn more, please visit  
our booth [here](#).

[www.verasonics.com](http://www.verasonics.com)  
[info@verasonics.com](mailto:info@verasonics.com)

# Optical metrology solutions for advancing ultrasonic driven technologies



## Non-contact measurements for

- Design validation at frequencies from DC up to 2.5 GHz
- Calibration and quality control with high accuracy
- Optimization of energy efficiency with full surface displacement mapping
- Roughness and shape measurements
- Traveling wave analysis for improving system behavior
- Wafer-level test integration for process control
- Troubleshooting mechanical behavior down to sub-pm levels
- And more...

# Vevo<sup>®</sup> F2

TRULY REVOLUTIONARY!

## The World's First Ultra High to Low Frequency (71-1 MHz) Ultrasound Imaging System

With the Vevo F2, FUJIFILM VisualSonics is expanding our reach to satisfy the imaging needs of acoustic researchers, ultrasound engineers and those that may benefit from ultra high to low frequency ultrasound imaging capabilities.



### Flexible

Ultra high to low frequency imaging (71-1 MHz)



### Open Architecture

Access pre-beamformed individual channel data (VADA)



### One System

Adaptable for imaging small to large animals



### Intuitive

Easy-to-use graphical interface



### Photoacoustic Capable

Compatible with the Vevo LAZR-X laser cart for multi-modal imaging

Imagine the possibilities:



### Plane-wave Implementation

Implement plane-wave techniques for ultrafast ultrasound imaging for applications such as ultrafast Doppler and super-resolution ultrasound



### Beamforming Algorithm Development

Test novel beamforming techniques for image reconstruction



### External Devices Syncing

Coordinate timing between HIFU pulses for imaging, or shear wave generation for elastography measurements



### Small to Large Animals

Conduct imaging and analysis of small and large animals on one platform to streamline data collection

Technical Program Table of Contents

**\*PLEASE NOTE THAT THIS PROGRAM IS LISTED IN PACIFIC TIME (PDT).**

**6:45:00 AM - 7:45:00 AM**

**A1L-01: Plenary 1: David B. Tanner**

**06:45 AM**

**2503: Advanced LIGO: When Black Holes Collide**  
David B. Tanner  
University of Florida, United States

**9:00:00 AM - 10:00:00 AM**

**A2L-01: MTH: Transcranial Ultrasound I**  
**Session Chair(s):** Jean-Francois Aubry (Langevin Institute)

**09:00 AM**

**1089: Bringing Transcranial Focused Ultrasound Into Focus**  
Kim Butts Pauly  
Stanford University, United States

**09:30 AM**

**1623: Microelectrode Array (MEA) Measurements of Focused Ultrasound (FUS)-Induced Neural Responses in Ex Vivo Acute Hippocampal Brain Slices**  
Ivan Suarez Castellanos<sup>{2}</sup>, Elena Dossi<sup>{1}</sup>, Jeremy Vion-Bailly<sup>{2}</sup>, Jean-Yves Chapelon<sup>{2}</sup>, Alexandre Carpentier<sup>{3}</sup>, Gilles Huberfeld<sup>{4}</sup>, Apoutou N'Djin<sup>{2}</sup>  
<sup>{1}</sup>Center for Interdisciplinary Research in Biology / CIRB - CNRS UMR 7241 / INSERM U1050, France; <sup>{2}</sup>INSERM U1032 / LabTAU, France; <sup>{3}</sup>Research Laboratory on Advanced Surgical Technologies, La Pitié-Salpêtrière Hospital, Paris, France; <sup>{4}</sup>Sorbonne Université, AP-HP, La Pitié-Salpêtrière Hospital, France

**09:45 AM**

**2025: Noninvasive Focused Ultrasonic Glymphatic Control Improves Intrathecal Drug Delivery**  
Muna Aryal, Quan Zhou, Eben Rosenthal, Raag Airan  
Stanford University, United States

**9:00:00 AM - 10:00:00 AM**

**A2L-02: MBB: Adaptive Beamforming**  
**Session Chair(s):** Brett Byram (Vanderbilt University)

**09:00 AM**

**1604: Spatial Coherence Volumetric Beamforming of Microbubbles Using a Sparse Array**  
Luxi Wei<sup>{3}</sup>, Gerald Wahyulaksana<sup>{3}</sup>, Alessandro Ramalli<sup>{4}</sup>, Emile Noothout<sup>{1}</sup>, Enrico Boni<sup>{4}</sup>, Piero Tortoli<sup>{4}</sup>, Antonius F.W. van der Steen<sup>{3}</sup>, Nico de Jong<sup>{2}</sup>, Hendrik J. Vos<sup>{3}</sup>  
<sup>{1}</sup>Delft University of Technology, Netherlands; <sup>{2}</sup>Erasmus University Medical Center / Delft University of Technology, Netherlands; <sup>{3}</sup>Erasmus University Medical Center / University Medical Center Rotterdam, Netherlands; <sup>{4}</sup>Università degli Studi di Firenze, Italy

**09:15 AM**

**1770: Adaptive Ultrasound Beamforming and Compounding Through Model Based Deep Learning**

Ben Luijten<sup>{1}</sup>, Frederik de Bruijn<sup>{2}</sup>, Harold Schmeitz<sup>{2}</sup>, Massimo Mischi<sup>{1}</sup>, Yonina C. Eldar<sup>{3}</sup>, Ruud van Sloun<sup>{1}</sup>  
<sup>{1}</sup>Eindhoven University of Technology, Netherlands; <sup>{2}</sup>Philips Research, Netherlands; <sup>{3}</sup>Weizmann Institute of Science, Israel

**09:30 AM**

**1850: Sparse Convolutional Plane-Wave Compounding for Ultrasound Imaging**  
Baptiste Heriard-Dubreuil<sup>{2}</sup>, Adrien Besson<sup>{1}</sup>, Frederic Wintzenrieth<sup>{1}</sup>, Jean-Philippe Thiran<sup>{3}</sup>, Claude Cohen-Bacrie<sup>{1}</sup>  
<sup>{1}</sup>E-Scopics SAS, France; <sup>{2}</sup>E-Scopics SAS / École Polytechnique Fédérale de Lausanne, France; <sup>{3}</sup>École Polytechnique Fédérale de Lausanne, Switzerland

**09:45 AM**

**1863: Ultrasound Beamforming with Empirical Mode Decomposition**  
Jun Seob Shin  
Philips Research North America, United States

**9:00:00 AM - 10:00:00 AM**

**A2L-03: THF: Electronics & Miniature Transducers**  
**Session Chair(s):** David Cowell (University of Leeds) Jeremy Brown (Dalhousie University)

**09:00 AM**

**1773: Sub-Array Beamforming with Time-Division Multiplexing System-on-Chip for Massive Cable Reduction in Ultrasound Imaging Systems**  
Coskun Tekes<sup>{3}</sup>, Gwangrok Jung<sup>{1}</sup>, Ahmad Rezvanitabar<sup>{2}</sup>, Thomas Carpenter<sup>{4}</sup>, David Cowell<sup>{4}</sup>, Steven Freear<sup>{4}</sup>, F. Levent Degertekin<sup>{2}</sup>  
<sup>{1}</sup>Broadcom Inc., United States; <sup>{2}</sup>Georgia Institute of Technology, United States; <sup>{3}</sup>Kennesaw State, United States; <sup>{4}</sup>University of Leeds, United Kingdom

**09:15 AM**

**2406: A 2D Ultrasonic Transmit Phased Array Based on a 32x32 CMUT Array Flip-Chip Bonded to an ASIC for Neural Stimulation**  
Chunkyun Seok, Oluwafemi Adelegan, Ali Biliroglu, Feysel Yalcin Yamaner, Omer Oralkan  
North Carolina State University, United States

**09:30 AM**

**1581: Large Area 1.75D Array for Liver Cancer by Tiling of Multi-Generation ASIC Array Modules**  
Robert Wodnicki<sup>{3}</sup>, Haochen Kang<sup>{3}</sup>, Yizhe Sun<sup>{3}</sup>, Ruimin Chen<sup>{3}</sup>, Josquin Foiret<sup>{1}</sup>, Douglas Stephens<sup>{2}</sup>, Qifa Zhou<sup>{3}</sup>, Katherine Ferrara<sup>{1}</sup>  
<sup>{1}</sup>Stanford University, United States; <sup>{2}</sup>University of California, Davis, United States; <sup>{3}</sup>University of Southern California, United States

**9:00:00 AM - 10:00:00 AM**

**A2L-04: MTC: Attenuation Measurements for Tissue Characterization**  
**Session Chair(s):** Michael Oelze (University of Illinois)

09:00 AM

**1950: Regularized framework for simultaneous estimation of ultrasonic attenuation and backscatter coefficients**

*Hector Chahuara{1}, Adrian Basarab{2}, Roberto Lavarello{1}*

*{1}Pontificia Universidad Católica del Perú, Peru; {2}Université Toulouse III - Paul Sabatier, France*

09:15 AM

**1441: System-Independent Ultrasound Attenuation Coefficient Estimation in Harmonic Imaging**

*Ping Gong, Pengfei Song, Chengwu Huang, U-Wai Lok, Shanshan Tang, Chenyun Zhou, Lulu Yang, Kimberly Watt, Matthew Callstrom, Shigao Chen*  
Mayo Clinic, United States

09:30 AM

**2218: Tomographic Attenuation Imaging with Pulse-Echo Ultrasound**

*Xiran Cai{2}, Josquin Foiret{2}, Dinah Brandner{1}, Bernhard Zagar{1}, Katherine W. Ferrara{2}*  
{1}Johannes Kepler University Linz, Austria; {2}Stanford University, United States

09:45 AM

**1590: Quantitative Fibroglandular Tissue Volume Estimation: Comparison of Three Methods**

*James Wiskin, Sangyheeb Lee, Martin Cwikla, Bilal Malik*  
QT Ultrasound LLC, United States

9:00:00 AM - 10:00:00 AM

**A2L-05: POA: Opto-Acoustics I**

**Session Chair(s):** Alex Maznev (MIT)

09:00 AM

**1102: Acoustic Attenuation in Crystalline and Amorphous Solids in the Sub-THz Frequency Range via Ultrafast Optical Techniques**

*Agnès Huynh*

*Institut des NanoSciences de Paris / Sorbonne Université, France*

09:30 AM

**2401: Generation and Detection of 50 GHz Surface Acoustic Waves by Extreme Ultraviolet Pulses Produced by a Free Electron Laser**

*Alexei Maznev{2}, Filippo Bencivenga{1}, Stefano Bonetti{4}, Flavio Capotondi{1}, Zhiwei Ding{2}, Ryan Duncan{2}, Laura Foglia{1}, Maria Izzo{3}, Alessandro Martinelli{5}, Riccardo Mincigrucci{1}, Giulio Monaco{5}, Emanuele Pedersoli{1}, Vivek Unikandanun*

*{1}Elettra-Sincrotrone Trieste, Italy; {2}Massachusetts Institute of Technology, United States; {3}Sapienza University of Rome, Italy; {4}Stockholm University, Sweden; {5}University of Trento, Italy*

09:45 AM

**2410: Interferometric Detection of Optical Phase Modulation from a Planar Focusing Fresnel Type GHz Ultrasonic Transducer**

*Adarsh Ravi, Amit Lal*

*Cornell University, United States*

10:15:00 AM - 11:15:00 AM

**A3L-01: MTH: Transcranial Ultrasound II**

**Session Chair(s):** Hairong Zheng (Shenzhen Institutes of Advanced Technology)

10:15 AM

**2098: Transcranial Focused Ultrasound for Non-Invasive Neuromodulation of the Visual Cortex**

*Gengxi Lu, Xuejun Qian, Runze Li, Johnny Castillo, Laiming Jiang, Haotian Lu, Kirk Shung, Mark Humayun, Biju Thomas, Qifa Zhou*

*University of Southern California, United States*

10:30 AM

**1067: Transducer Design for Transcranial Ultrasound Therapy: Challenges and Recent Breakthroughs**

*Jean-Francois Aubry*

*Inserm, ESPCI Paris, CNRS, PSL Research University, France*

10:45 AM

**1500: Transcranial Histotripsy Initiates Immune Cascade in Murine Glioblastoma Tumors and Prolongs Survival**

*Sarah Duclos, Sang Won Choi, Rachel Surowiec, Badih Junior Daou, Adam Fox, Aditya Pandey, Stefanie Gablan, Zhen Xu*

*University of Michigan, United States*

10:15:00 AM - 11:15:00 AM

**A3L-02: MBB: Adaptive Image Correction**

**Session Chair(s):** Gregg Trahey (Duke University)

10:15 AM

**1226: Medical Pulse-Echo Ultrasound Imaging Based on the Cross-Correlation of Transmitted and Backpropagated-Receive Wavefields**

*Rehman Ali, Joseph Jennings, Jeremy Dahl*

*Stanford University, United States*

10:30 AM

**1392: SVD Beamforming for Ultrafast Aberration Correction and Real-Time Speed-of-Sound Quantification**

*Hanna Bendjador{1}, Thomas Defieux{3}, Mickaël Tanter{2}*

*{1}ESPCI, PSL Research University, INSERM, CNRS, France; {2}Physics for Medicine Paris, INSERM U1273, ESPCI Paris, PSL University, CNRS FRE 2031, France; {3}Physics for Medicine Paris, Inserm, ESPCI Paris, CNRS, PSL University, France*

10:45 AM

**1912: Matrix Approach of Aberration Correction in Ultrasound Imaging: an In-Vivo Proof-of-Concept**

*William Lambert{3}, Laura Cobus{2}, Thomas Frappart{5}, Christophe Fraschini{5}, Jeremy Bercoff{5}, Mathias Fink{4}, Alexandre Aubry{1}*

*{1}ESPCI Paris, PSL University, CNRS, Institut Langevin, France; {2}Institut Langevin, Canada; {3}Institut Langevin / SuperSonic Imagine, France; {4}Institut Langevin, ESPCI Paris, CNRS UMR 7587, PSL University, France; {5}SuperSonic Imagine, France*

11:00 AM

**2316: Reduction of Bright Off-Axis Clutter in Plane-Wave Ultrasound Imaging**

Ryan Hammond, Zin Khaing, Matthew O'Donnell, Christoph Hofstetter, Matthew Bruce  
University of Washington, United States

10:15:00 AM - 11:15:00 AM

**A3L-03: TPM: Single Crystal Piezoelectrics**

Session Chair(s): Shujun Zhang (University of Wollongong)  
Yongrae Roh (Kyungpook National University,)

10:15 AM

**1109: Current Status of Alternate Current (AC) Poling of PMN-PT Single Crystals**

Xiaoning Jiang  
North Carolina State University, United States

10:45 AM

**2176: Gen Iii "Ultrahigh Strain ( $d_{33} > 4,000$  pC/N)" PMN-PZT Single Crystals for Ultrasonic Transducers, Piezoelectric Actuators, and Composites**

Hyun-Jae Joo<sup>{1}</sup>, Hyun-Taek Oh<sup>{1}</sup>, Moon-Chan Kim<sup>{1}</sup>, Ho-Yong Lee<sup>{2}</sup>  
<sup>{1}</sup>Ceracomp Co., Ltd., Korea; <sup>{2}</sup>Ceracomp Co., Ltd. / Sunmoon University, Korea

10:15:00 AM - 11:15:00 AM

**A3L-04: MTC: In-vivo Translation of Tissue Characterization Methods**

Session Chair(s): Massimo Mischi (Eindhoven University of Technology)

10:15 AM

**1141: Overcoming Challenges to Quantitative Ultrasound Implementation in Vivo**

Michael Oelze  
University of Illinois at Urbana-Champaign, United States

10:45 AM

**1289: High-Frequency Quantitative Ultrasound to Evaluate Biomechanical and Structural Changes in the Posterior Sclera**

Cameron Hoerig<sup>{4}</sup>, Kazuyo Ito<sup>{5}</sup>, Johannes Aichele<sup>{3}</sup>, Sally McFadden<sup>{2}</sup>, Stefan Catheline<sup>{3}</sup>, Quan Hoang<sup>{1}</sup>, Jonathan Mamou<sup>{4}</sup>  
<sup>{1}</sup>Columbia University / Singapore Eye Research Institute, Singapore National Eye Centre, Duke-NUS, Singapore; <sup>{2}</sup>Hunter Medical Research Institute / University of Newcastle, Australia; <sup>{3}</sup>INSERM Labtau, University of Lyon, France; <sup>{4}</sup>Lizzi Center for Biomedical Engineering, Riverside Research, United States; <sup>{5}</sup>Singapore Eye Research Institute, Singapore

11:00 AM

**1701: Assessment of Posterior Eye Shape Changes of Myopic Eyes by Means of 20-MHz Ultrasound**

Kazuyo Ito<sup>{4}</sup>, Daryle Jason G Yu<sup>{4}</sup>, Kazuki Tamura<sup>{2}</sup>, Myo Thu Khine<sup>{4}</sup>, Jeffery A. Ketterling<sup>{3}</sup>, Jonathan Mamou<sup>{3}</sup>, Quan V. Hoang<sup>{1}</sup>  
<sup>{1}</sup>Columbia University / Singapore Eye Research Institute, Singapore National Eye Centre, Duke-NUS, Singapore; <sup>{2}</sup>Hamamatsu University School of Medicine, Japan; <sup>{3}</sup>Lizzi Center for Biomedical Engineering,

Riverside Research, United States; <sup>{4}</sup>Singapore Eye Research Institute, Singapore

10:15:00 AM - 11:15:00 AM

**A3L-05: PAT: Acoustic Tweezers & Particle Manipulation I**

Session Chair(s): Amit Lal (Cornell University)

10:15 AM

**1079: 3D Spiral Manipulation of Particle with Twisted Focusing Beam Induced by a Metasurface with Spiral Structure**

Xiangxiang Xia, Yongchuan Li, Feiyan Cai, Teng Ma, Qin Lin, Jinping Wang, Hui Zhou, Hairong Zheng  
Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

10:30 AM

**1847: On-Demand Droplet Loading of Ultrasonic Acoustic Levitator with Small Droplets for Protein Crystallography Applications**

Soichiro Tsujino, Takashi Tomizaki, Michal Kepa  
Paul Scherrer Institut, Switzerland

10:45 AM

**1031: Design of Acoustic Pillar Array Chip for Programmable Particle Sorting**

Guanyu Zhang<sup>{1}</sup>, Weiwei Cui<sup>{1}</sup>, Shuchang Liu<sup>{1}</sup>, Xingchen Li<sup>{1}</sup>, Mark Reed<sup>{2}</sup>  
<sup>{1}</sup>Tianjin University, China; <sup>{2}</sup>Yale University, United States

11:30:00 AM - 1:30:00 PM

**A4P-06: MSD: Poster PM - Medical System Design - Volumetric 2D/3D Imaging**

Session Chair(s): Roger Zemp (University of Alberta)

11:30 AM

**1793: A Fast Three-Dimensional Ultrasound Microvessel Imaging Using Linear Transducer Array and Continuous Scan Strategy**

Shanshan Tang, Chengwu Huang, Ping Gong, U-Wai Lok, Shigao Chen  
Mayo Clinic, United States

11:40 AM

**1900: Designing a System for Forward-Viewing 3D Intravascular Ultrasound Imaging of Blood Flow Velocity: Assessing the Effect of the Catheter on Velocity Estimation in Stenoses**

Saeyoung Kim, Bowen Jing, Brooks Lindsey  
Georgia Institute of Technology, United States

11:50 AM

**2104: Large-Area Abdominal Body Scanner: Initial Swept-Aperture Prototype**

Carl Herickhoff, Dongwoon Hyun, Stefan Bran-Meléndez, Jeremy Dahl  
Stanford University, United States

12:00 PM

**2378: Wearable 64x64 Element 2D Tobe Ultrasound Array**

Chris Ceroici, Roger Zemp  
University of Alberta, Canada

11:30:00 AM - 1:30:00 PM

**A4P-07: MSD: Poster PM - Medical System Design - Real-Time Imaging**

**Session Chair(s):** Kathy Nightingale (Duke University)

12:10 PM

**2024: Hybrid Hardware and Software-Based Fully-Flexible Ultrasound Open Platform**

*Alexandre Osorio{1}, Santiago Rodriguez{1}, Rafael Silva{1}, Leonardo Domingues{1}, Guilherme Fonseca{1}, José Bertuzzo{1}, Haroldo Onisto{1}, Joaquim Maia{2}, Amauri Assef{2}, Adilton Carneiro{4}, Eduardo Costa{3}{1}Eldorado Research Institute, Brazil; {2}Federal University of Technology – Paraná (UTFPR), Brazil; {3}State University of Campinas (UNICAMP), Brazil; {4}University of São Paulo (USP), Brazil*

12:20 PM

**2135: Linear Signal Cancellation of Nonlinear Pulsing Schemes Implemented on the Verasonics Research Scanner**

*Ting-Yu Lai, Michalakis Averkiou  
University of Washington, United States*

12:30 PM

**2155: Real-Time, Simultaneous DAS, ADMIRE, and SLSC Imaging Using GPU-Based Processing**

*Christopher Khan{2}, Kazuyuki Dei{1}, Siegfried Schlunk{2}, Kathryn Ozgun{2}, Brett Byram{2}{1}GE Healthcare, United States; {2}Vanderbilt University, United States*

12:40 PM

**2436: Real-Time Power Doppler on an Ultrafast High-Frequency Hardware-Based Beamformer**

*Nicholas Campbell, Chris Samson, Jeremy Brown  
Dalhousie University, Canada*

11:30:00 AM - 1:30:00 PM

**A4P-08: MSD: Poster PM - Medical System Design - Application Specific**

**Session Chair(s):** William O'Brien (University of Illinois)

11:30 AM

**1151: Reproducible Thyroid Ultrasound Procedure Enabled by Robot-Assisted Scanning**

*Jakub Tomasz Kaminski, Haichong K. Zhang  
Worcester Polytechnic Institute, United States*

11:40 AM

**1516: Cobot-Guided Histotripsy for Venous Clot Ablation in Vitro**

*Kenneth Bader, Samuel Hendley  
University of Chicago, United States*

11:50 AM

**1438: Use of Lorentz Force to Induce Shear Waves for Magnetic Resonance Elastography Applications**

*Guillaume Flé{3}, Guillaume Gilbert{2}, Pol Grasland-Mongrain{1}, Guy Cloutier{3}{1}École Normale Supérieure de Lyon, France; {2}Philips Healthcare Canada, Canada; {3}University of Montreal Hospital Research Center, Canada*

12:00 PM

**1513: Acoustic Characterization of Tissue-Mimicking Materials for Ultrasound Imaging Research**

*Peiran Chen{2}, Andreas Pollet{2}, Simona Turco{2}, Jaap Den Toonder{2}, Hessel Wijkstra{1}, Massimo Misch{2}{1}Amsterdam University Medical Centers, Netherlands; {2}Eindhoven University of Technology, Netherlands*

12:10 PM

**2428: Ultrasound Signal Detection with Multi-Bounce Laser Microphone**

*Qianqian Wan{4}, Chenchia Wang{1}, Keshuai Xu{4}, Jeeun Kang{2}, Yixuan Wu{4}, Sudhir Trivedi{1}, Peter Gehlbach{3}, Emad Boctor{3}{1}Brimrose Corporation of America, United States; {2}Johns Hopkins Medical Institute, United States; {3}Johns Hopkins School of Medicine, United States; {4}Johns Hopkins University, United States*

11:30:00 AM - 1:30:00 PM

**A4P-10: MEL: Poster PM - High Frequency Waves Used for Elastography**

**Session Chair(s):** Dainel Rohrbach (Verasonics)  
Mark Palmeri (Duke University)

12:20 PM

**1410: Diagnostic Performance of Shear Wave Elastography for Carpal Tunnel Syndrome Combined with High Frequency Ultrasound Imaging**

*Kibo Nam, Shawn Peterson, Corinne Wessner, Priscilla Machado, Flemming Forsberg  
Thomas Jefferson University, United States*

12:30 PM

**2035: In Vivo Elasticity Mapping in Human Skin with AuT-Based OCE to Monitor Skin Graft Surgeries**

*Mitchell Kirby, John Pitre Jr., David Li, Tueng Shen, Ruikang Wang, Matthew O'Donnell, Ivan Pelivanov  
University of Washington, United States*

12:40 PM

**2226: To Simultaneously Assess the Whole Eye Biomechanics in Vivo Using High Frequency Ultrasound Elastography**

*Runze Li, Xuejun Qian, Gengxi Lu, Kirk Shung, Mark Humayun, Qifa Zhou  
University of Southern California, United States*

12:50 PM

**2359: High Frequency Shear Wave Elastography (SWE) Imaging of a Rodent Spinal Cord Injury**

*John Pitre Jr., Zin Khaing, Brian Nhuyen, Christoph Hofstetter, Matthew O'Donnell, Matthew Bruce  
University of Washington, United States*

11:30:00 AM – 1:30:00 PM

**A4P-11: MEL: Poster PM – Cancer Elastography**

**Session Chair(s):** Marvin Doyley (University of Rochester)

11:30 AM

**2087: In Vivo Demonstration of Single Transducer Harmonic Motion Imaging (ST-HMI) in a Breast Cancer Mouse Model and Breast Cancer Patients**

Md Murad Hossain, Niloufar Saharkhiz, Elisa Konofagou  
Columbia University, United States

11:40 AM

**2102: Evaluating Image Quality Improvement in Multiparametric Ultrasound Imaging of Prostate Cancer by Combining ARFI, SWEI, B-mode, and QUS**  
Derek Chan<sup>{1}</sup>, D. Cody Morris<sup>{1}</sup>, Theresa Lye<sup>{2}</sup>, Thomas Polascik<sup>{1}</sup>, Mark Palmeri<sup>{1}</sup>, Jonathan Mamou<sup>{2}</sup>, Kathryn Nightingale<sup>{1}</sup>  
<sup>{1}</sup>Duke University, United States; <sup>{2}</sup>Lizzi Center for Biomedical Engineering, Riverside Research, United States

11:50 AM

**2288: Shear Wave Elastography of Invasive Breast Cancer: Correlation Between Quantitative Elasticity Values, Prognostic Histologic Features & Immunohistochemical Biomarkers**  
Juanjuan Gu, Mostafa Fatemi, Azra Alizad  
Mayo Clinic, United States

12:00 PM

**2500: Evaluating the Effectiveness of Combined Radiation Therapy and Interleukin-12 Treatment in Pancreatic Tumor Models Using Shear Wave Elastography**  
Rifat Ahmed, Reem Mislati, Bradley Mills, Scott Gerber, Marvin Dooley  
University of Rochester, United States

11:30:00 AM – 1:30:00 PM

**A4P-12: MEL: Poster PM – Elastography Acquisition Methods II**

**Session Chair(s):** Pengfei Song (University of Illinois)

12:10 PM

**1527: Hydrophone Spatial Averaging Artifacts for ARFI Beams from Array Transducers**  
Keith Wear<sup>{1}</sup>, Anant Shah<sup>{2}</sup>, Christian Baker<sup>{2}</sup>  
<sup>{1}</sup>Food and Drug Administration, United States; <sup>{2}</sup>National Physical Laboratory, United Kingdom

12:20 PM

**1927: Comparison of Ultrasound Shear Wave Elastography and Optical Coherence Elastography in Tissue-Mimicking Phantoms**  
Justin Rippy<sup>{1}</sup>, Manmohan Singh<sup>{2}</sup>, Salavat Aglyamov<sup>{2}</sup>, Kirill Larin<sup>{2}</sup>  
<sup>{1}</sup>University of Houston, United States; <sup>{2}</sup>University of Houston, United States

12:30 PM

**2066: Experimental Study to Evaluate the Generation of Reverberant Shear Wave Fields (R-SWF) in Phantoms**  
Gilmer Flores<sup>{1}</sup>, Juvenal Ormachea<sup>{3}</sup>, Stefano Romero<sup>{1}</sup>, Fernando Zviatovich<sup>{2}</sup>, Kevin Parker<sup>{3}</sup>, Benjamin Castaneda<sup>{1}</sup>  
<sup>{1}</sup>Pontificia Universidad Católica del Perú, Peru; <sup>{2}</sup>University of Houston, United States; <sup>{3}</sup>University of Rochester, United States

12:40 PM

**2132: Optimizing the Receive Beamforming for Improving the Performance of Focused-Transmit Based Single Track Location Shear Wave Elastography**

Rifat Ahmed, Marvin Dooley  
University of Rochester, United States

12:50 PM

**2225: Frequency Dependence of Inclusion Characterization in Harmonic Motion Imaging**

Niloufar Saharkhiz, Hermes A. S. Kamimura, Md Murad Hossain, Elisa E. Konofagou  
Columbia University, United States

01:00 PM

**2314: Evaluating the Feasibility of Nondiffractive Bessel Beams for Shear Wave Elasticity Imaging: a Simulation Study**

Fan Feng, Soumya Goswami, Siladitya Khan, Stephen McAleavey  
University of Rochester, United States

01:10 PM

**2345: Imaging Shear Shock Waves in the in Situ Porcine Brain**

Sandhya Chandrasekaran<sup>{1}</sup>, Francisco Santibanez<sup>{3}</sup>, Bharat Tripathi<sup>{2}</sup>, Gianmarco Pinton<sup>{2}</sup>  
<sup>{1}</sup>North Carolina State University, United States; <sup>{2}</sup>North Carolina State University / University of North Carolina at Chapel Hill, United States; <sup>{3}</sup>University of North Carolina at Chapel Hill, United States

11:30:00 AM – 1:30:00 PM

**A4P-13: MEL: Poster PM – Elastographic Interrogation of Atherosclerotic Plaque**

**Session Chair(s):** George Kapodistrias (Samsung Research America)

11:30 AM

**1043: 4D Pulse Wave Imaging with Sub Aperture Compounding in the Carotid Artery in Simulations, Phantoms and Human Subjects**

Nirvedh Meshram, Julien Grondin, Grigorios Karageorgos, Rachel Weber, Elisa Konofagou  
Columbia University, United States

11:40 AM

**1463: Premature Carotid Artery Atherosclerosis Assessment with Non-Invasive Ultrasound Elastography in HIV Positive Individuals**

Marie-Hélène Roy Cardinal<sup>{2}</sup>, Madeleine Durand<sup>{2}</sup>, Carl Chartrand-Lefebvre<sup>{2}</sup>, Gilles Soulez<sup>{2}</sup>, Cécile Tremblay<sup>{1}</sup>, Guy Cloutier<sup>{2}</sup>  
<sup>{1}</sup>University of Montreal Hospital, Canada; <sup>{2}</sup>University of Montreal Hospital Research Center, Canada

11:50 AM

**2206: Carotid Strain Imaging with a Locally Optimized Adaptive Bayesian Regularized Motion Tracking Algorithm**

Carol Mitchell, Rashid Mukaddim, Ashley Weichmann, Kevin Eliceiri, Melissa Graham, Tomy Varghese  
University of Wisconsin-Madison, United States

12:00 PM

**2271: In Vivo Comparison of Pulse Wave Velocity Estimation Based on Ultrafast Plane Wave Imaging and High Frame Rate Focused Transmissions**  
*Melissa van de Steeg, Stein Fekkes, Anne Saris, Chris de Korte, Rik Hansen*  
Radboud University Medical Center, Netherlands

12:10 PM

**2324: On the Influence of External Force Induced by the Ultrasound Probe on Internal Carotid Artery Elastography Features**  
*Boris Chayer{2}, Marie-Hélène Roy Cardinal{2}, Louise Allard{2}, Noémie Cloutier{1}, Clara Petit{1}, Guy Cloutier{2}*  
{1}Collège André-Grasset, Canada; {2}University of Montreal Hospital Research Center, Canada

12:20 PM

**2414: Monitoring Progression of Atherosclerotic Plaque Initiation and Development in WMS-FH Pigs**  
*Paul Kemper, Pierre Nauleau, Grigorios Karageorgos, Rachel Weber, Elisa Konofagou*  
Columbia University, United States

12:30 PM

**2446: Harmonic Imaging Improves Delineation of Human Carotid Plaque Features by ARFI Variance of Acceleration**  
*Gabriela Torres{1}, Keerthi Anand{1}, Jonathon Homeister{2}, Mark Farber{2}, Caterina Gallippi{1}*  
{1}North Carolina State University / University of North Carolina at Chapel Hill, United States; {2}University of North Carolina at Chapel Hill, United States

12:40 PM

**2449: Combination of ARFI Excitation Powers, Tracking Frequencies, and Acquisitions at Diastole and Systole for Improving Automatic Segmentation of Vulnerable Carotid Plaque Features**  
*Gabriela Torres{1}, Keerthi Anand{1}, Jonathon Homeister{2}, Mark Farber{2}, Caterina Gallippi{1}*  
{1}North Carolina State University / University of North Carolina at Chapel Hill, United States; {2}University of North Carolina at Chapel Hill, United States

12:50 PM

**1749: Investigation of Acoustic Radiation Force Beam Shape and Location on Guided Wave Spectral Content for Arterial Elastography**  
*Margherita Capriotti, James Greenleaf, Matthew Urban*  
Mayo Clinic, United States

11:30:00 AM – 1:30:00 PM

**A4P-14: MEL: Poster PM – Elastography Algorithms & Modelling**  
**Session Chair(s):** Aiguo Han (University of Illinois at Urbana-Champaign)

11:30 AM

**1734: Time-Aligned Plane Wave Compounding for Motion Detection for Shear Wave Elastography in Dispersive Media**  
*Margherita Capriotti, James Greenleaf, Matthew Urban*  
Mayo Clinic, United States

11:40 AM

**1760: A 3D Motion Tracking Algorithm Using Ultrasound B-Mode Images: a Feasibility Study**  
*Hongliang Li, Guy Cloutier, Samuel Kadoury, Gilles Soulez*  
University of Montreal Hospital Research Center, Canada

11:50 AM

**2122: Adaptive Data Function for Robust Ultrasound Elastography**  
*Md Ashikuzzaman{1}, Timothy J. Hall{2}, Hassan Rivaz{1}*  
{1}Concordia University, Canada; {2}University of Wisconsin-Madison, United States

12:00 PM

**2163: Robust and Fast Algorithm for Estimating 2D Shear Wave Speed**  
*Hyungkyi Lee{2}, Donggeon Kong{1}, Kiwan Choi{1}, Reem Mislati{2}, Marvin Doyle{2}*  
{1}Samsung Electronics, Korea; {2}University of Rochester, United States

12:10 PM

**2302: BSS-Based Displacement Tracking Improves Quantitative, On-Axis Shear Elastic Modulus Estimation by DoPlo Ultrasound**  
*Keita Yokoyama, Caterina Gallippi*  
North Carolina State University / University of North Carolina at Chapel Hill, United States

12:20 PM

**2335: A Framework for Strain Simulations in the k-Wave Toolbox**  
*Jan-Willem Muller{2}, Hans-Martin Schwab{2}, Marcel Rutten{2}, Frans van de Vosse{2}, Marc van Sambeek{1}, Richard Lopata{2}*  
{1}Catharina Hospital, Netherlands; {2}Eindhoven University of Technology, Netherlands

12:30 PM

**2419: Numerical Simulation of Dye Diffusion Altered by Shear Wave Propagation Induced by Acoustic Radiation Force Acting on an In-Situ Forming Implant**  
*Tae-hoon Bok{2}, Agata Exner{1}, Michael C. Kolios{2}*  
{1}Case Western Reserve University, United States; {2}Ryerson University, Canada

12:40 PM

**2432: Experimental Evaluation of the Impact of Signal Decorelation on Plane Wave Versus Focused ARFI VoA Measurements**  
*Keerthi Anand, Gabriela Torres, Caterina Gallippi*  
North Carolina State University / University of North Carolina at Chapel Hill, United States

11:30:00 AM – 1:30:00 PM

**A4P-15: MTC: Poster PM – Tissue Characterization: the Role of Phantoms**  
**Session Chair(s):** Roberto Lavarello (Pontificia Universidad Católica del Perú)

11:30 AM

**1217: Repeatability and Reproducibility of Quantitative Ultrasound Parameter Estimation Using Spatially Weighted Total Variation (SWTV) Regularization**

Farah Deeba, Robert Rohling  
University of British Columbia, Canada

11:40 AM

**2004: Ultrasound Characterization of Porous Phantoms Mimicking Lung Using Backscatter Statistics**

Yasamin Karbalaiesadegh, Marie Muller  
North Carolina State University, United States

11:50 AM

**2207: Technique to Compensate Unknown Laminar Transmission Loss in Phantom Attenuation Measurements**

Karthik Nagabhushana, William D. O'Brien Jr., Aiguo Han  
University of Illinois at Urbana-Champaign, United States

12:00 PM

**2217: Characterization and Evaluation of a Hydrogel-PVC Aberrator Phantom**

Siladitya Khan, Soumya Goswami, Fan Feng, Stephen McAleavey  
University of Rochester, United States

12:10 PM

**2402: Evaluation of Contrast-to-Noise Ratio of Parametric Images of Regularized Estimates of Quantitative Ultrasound Parameters**

Noushin Jafarpisheh<sup>{1}</sup>, Ivan M Rosado-Mendez<sup>{2}</sup>, Timothy J Hall<sup>{3}</sup>, Hassan Rivaz<sup>{1}</sup>  
<sup>{1}</sup>Concordia University, Canada; <sup>{2}</sup>Universidad Nacional Autónoma de México, Mexico; <sup>{3}</sup>University of Wisconsin-Madison, United States

11:30:00 AM – 1:30:00 PM

**A4P-18: MBF: Poster PM – Blood Flow Detection/Measurements**

Session Chair(s): Guy Cloutier (University of Montreal)

12:20 PM

**1475: Towards an Operator Independent Blood Flow Volume Quantification Using 3D Ultrasound**

Sibo Li<sup>{2}</sup>, William Shi<sup>{2}</sup>, Stephen Pinter<sup>{3}</sup>, Jonathan Rubin<sup>{3}</sup>, Oliver Kriptgans<sup>{3}</sup>, Brian Fowlkes<sup>{3}</sup>, Ronald Leichner<sup>{1}</sup>, James Jago<sup>{1}</sup>, Shriram Sethuraman<sup>{2}</sup>  
<sup>{1}</sup>Philips Healthcare, United States; <sup>{2}</sup>Philips Research North America, United States; <sup>{3}</sup>University of Michigan, United States

12:30 PM

**1488: Ultrasonic Measurement of Hematocrit Using Blood Non-Newtonian Properties**

Baptiste Pialot<sup>{1}</sup>, Jérémie Gachelin<sup>{1}</sup>, Jean Provost<sup>{2}</sup>, Olivier Couture<sup>{3}</sup>  
<sup>{1}</sup>Aenitis Technologies, France; <sup>{2}</sup>Polytechnique Montréal, Canada; <sup>{3}</sup>Sorbonne Université, CNRS, INSERM, Laboratoire d'Imagerie Biomédicale, France

12:40 PM

**1530: Hydrophone Spatial Averaging Artifacts for Pulsed Doppler Beams from Array Transducers**

Keith Wear<sup>{1}</sup>, Anant Shah<sup>{2}</sup>, Christian Baker<sup>{2}</sup>  
<sup>{1}</sup>Food and Drug Administration, United States; <sup>{2}</sup>National Physical Laboratory, United Kingdom

12:50 PM

**1841: Intraosseous Blood Circulation: a First Assessment Using Plane Wave Ultrasound Imaging and Transverse Oscillations**

Sébastien Salles<sup>{3}</sup>, Jami L. Johnson<sup>{4}</sup>, Pierre Clouzet<sup>{2}</sup>, Hendrik J. Vos<sup>{1}</sup>, Guillaume Renaud<sup>{2}</sup>  
<sup>{1}</sup>Erasmus University Medical Center, Netherlands; <sup>{2}</sup>Sorbonne Université, France; <sup>{3}</sup>Sorbonne Université / Norwegian University of Science and Technology, France; <sup>{4}</sup>University of Auckland, New Zealand

01:00 PM

**2082: Transcranial Ultrafast Doppler Imaging Beyond Acoustic Windows Using Unfocused Shear Waves at a Large Angle of Incidence**

Bowen Jing, Costas Arvanitis, Brooks Lindsey  
Georgia Institute of Technology, United States

01:10 PM

**2134: High Frame Rate Color Doppler to Measure Intra-Ventricular Pressure Gradients**

Alessandro Ramalli<sup>{2}</sup>, Stéphanie Bézy<sup>{1}</sup>, Enrico Boni<sup>{2}</sup>, Jens-Uwe Voigt<sup>{1}</sup>, Jan D'Hooge<sup>{1}</sup>  
<sup>{1}</sup>Katholieke Universiteit Leuven, Belgium; <sup>{2}</sup>Università degli Studi di Firenze, Italy

11:30:00 AM – 1:30:00 PM

**A4P-16: MTC: Poster PM – Quantitative Ultrasound: Diagnostic Applications**

Session Chair(s): Mark Burgess (Riverside Research)

11:30 AM

**1431: On the Potential Uses of Ultrasound Imaging for the Detection of Anesthesia-Induced Neuronal Apoptosis in the Developing Brain**

Swapnil Dolui, Shreya Reddy, June Bryan de la Pena, Jane Song, Haowei Tai, Zachary Campbell, Kenneth Hoyt  
University of Texas at Dallas, United States

11:40 AM

**1435: Interpretation Based on Stochastic Geometry of Homodyned-K Distribution Scatterer Clustering Parameter for Quantitative Ultrasound Imaging**

François Destrempe, Guy Cloutier  
University of Montreal Hospital Research Center, Canada

11:50 AM

**1739: Ultrasound Pulse Shaping for Improved H-Scan Imaging and Tissue Classification**

Swapnil Dolui, Haowei Tai, Mawia Khairalseed, Kenneth Hoyt  
University of Texas at Dallas, United States

12:00 PM

**1430: Early Assessment of Nonalcoholic Fatty Liver Disease Using Multiparametric Ultrasound Imaging**

Lokesh Basavarajappa<sup>{2}</sup>, Haowei Tai<sup>{2}</sup>, Girdhari Rijal<sup>{2}</sup>, Kevin Parker<sup>{1}</sup>, Kenneth Hoyt<sup>{2}</sup>  
<sup>{1}</sup>University of Rochester, United States; <sup>{2}</sup>University of Texas at Dallas, United States

12:10 PM

**1433: Spatial Comparison Between the H-Scan Format for Classification of Ultrasound Scatterers and Histology – Preliminary Results Using an Animal Model of Breast Cancer**

Mawia Khairalseed, Giridhari Rijal, Kenneth Hoyt  
University of Texas at Dallas, United States

12:20 PM

**1499: Machine Learning Based on Quantitative Ultrasound for Assessment of Chronic Liver Disease**

François Destrempe{3}, Marc Gesnik{3}, Boris Chayer{3}, Marie-Hélène Roy Cardinal{3}, Damien Olivie{2}, Jeanne-Marie Giard{3}, Giada Sebastini{1}, Bich Nguyen{3}, Guy Cloutier{3}, An Tang{3}  
{1}McGill University, Canada; {2}University of Montreal Hospital, Canada; {3}University of Montreal Hospital Research Center, Canada

12:30 PM

**1743: Liver Fat Droplet Dependency on Ultrasound Backscatter Coefficient in Nonalcoholic Fatty Liver Disease Subjects**

Yashuo Wu{2}, Leonardo Lopez{2}, Michael Andre{1}, Rohit Loomba{1}, Mark Valasek{1}, Matthew Wallig{2}, William O'Brien Jr.{2}, Aiguo Han{2}  
{1}University of California, San Diego, United States; {2}University of Illinois at Urbana-Champaign, United States

12:40 PM

**2003: Multi-Parametric Ultrasound Tissue Characterization (MUTC) as a Surrogate to Magnetic Resonance Imaging (MRI) for Non-Alcoholic Fatty Liver Disease (NAFLD) Characterization**

Sergio Sanabria, Jeremy Dahl, Amir Pirmoazen, Aya Kamaya, Ahmed El Kaffas  
Stanford University, United States

12:50 PM

**2154: In Vivo Assessment of Interstitial Fibrosis and Tubular Atrophy (IFTA) and Inflammation in Renal Allografts Using Spectral-Based Quantitative Ultrasound Parameters**

Edgar Acosta{3}, Piotr Kijanka{1}, Carolina Amador{2}, Sara Aristizabal{4}, Maria Luisa Montero{3}, Sandra Pérez-Buitrago{3}, Matthew Urban{1}, Roberto Lavarello{3}  
{1}Mayo Clinic, United States; {2}Philips Research North America, United States; {3}Pontificia Universidad Católica del Perú, Peru; {4}Well Living Lab, Inc., United States

11:30:00 AM – 1:30:00 PM

**A4P-17: MTC: Poster PM – Machine Learning in Tissue Characterization**

Session Chair(s): Matthew Bruce (University of Washington)

11:30 AM

**1593: Enhancing the Resolution of 250-MHz Quantitative Acoustic Maps with a Unet-Like Convolutional Neural Network**

James von Albade{3}, Jonathan Mamou{2}, Thomas Pellegrini{4}, Adrian Basarab{1}

{1}IRIT / Université de Toulouse, France; {2}Lizzi Center for Biomedical Engineering, Riverside Research, United States; {3}Open Innovation Center, Riverside Research, United States; {4}University of Toulouse, France

11:40 AM

**1693: DNN-Based Speed-of-Sound Reconstruction for Automated Breast Ultrasound**

Farnaz Khun Jush{3}, Markus Biele{2}, Peter Michael Dueppenbecker{2}, Oliver Schmidt{2}, Andreas Maier{1}  
{1}Friedrich-Alexander-University Erlangen-Nuremberg, Germany; {2}Siemens Healthcare GmbH, Germany; {3}Siemens Healthcare GmbH/ Friedrich-Alexander-University, Germany

11:50 AM

**1767: Quantitative Ultrasound a Priori Prediction of Breast Cancer Chemotherapy Outcomes**

Lakshmanan Sannachi, Hadi Tadayyon, William Tran, Maureen Trudeau, Kasia Jerzak, Gregory Czarnota  
Sunnybrook Research Institute, Canada

12:00 PM

**1831: Breast Lesion Characterization Using Quantitative Ultrasound (QUS) and Derivative Texture Methods**

Laurentius Osapoetra, Lakshmanan Sannachi, Daniel Diczno, Karina Quiaoit, Kashuf Fatima, Gregory Czarnota  
Sunnybrook Research Institute, Canada

12:10 PM

**1837: Comparison of Automated Breast Volume Scanning and Handheld Ultrasound in Breast Lesion Characterization Using Quantitative Ultrasound and Texture Analysis Methods**

Alec Hughes, Lakshmanan Sannachi, Mehrdad Gangeh, Ali Sadeghi-Naini, Gregory Czarnota  
Sunnybrook Research Institute, Canada

12:20 PM

**1849: Predictive Quantitative Ultrasound Radiomic Markers Associated with Radiation Treatment Response in Head and Neck Cancer**

Kashuf Fatima, Daniel Diczno, Harini Suraweera, Karina Quiaoit, Divya Bhardwaj, Irene Karam, Ian Poon, Mehrdad Gangeh, Ali Sadeghi-Naini, William Tran, Lakshmanan Sannachi, Gregory Czarnota  
Sunnybrook Research Institute, Canada

12:30 PM

**1995: Learning Steatosis Staging with Two-Dimensional Convolutional Neural Networks: Comparison of Accuracy of Clinical B-Mode with a Co-Registered Spectrogram Representation of RF Data**

Sergio Sanabria, Jeremy Dahl, Amir Pirmoazen, Aya Kamaya, Ahmed El Kaffas  
Stanford University, United States

12:40 PM

**2118: Deep Compressed Sensing for Characterizing Inflammation Severity with Microultrasound**

Shufan Yang{2}, Christina Lemke{2}, Ben F. Cox{1}, Ian P. Newton{1}, Sandy Cochran{2}, Inke Näthke{1}  
{1}University of Dundee, United Kingdom; {2}University of Glasgow, United Kingdom

11:30:00 AM – 1:30:00 PM

A4P-30: MIS: Poster PM – Tissue Characterization

Session Chair(s): Jonathan Mamou (Riverside Research)

11:30 AM

**1482: Adversarial Attacks on Deep Learning Models for Fatty Liver Disease Classification by Modification of Ultrasound Image Reconstruction Method**

*Michał Byra*<sup>{3}</sup>, *Grzegorz Styczyński*<sup>{2}</sup>, *Cezary Szmigielski*<sup>{2}</sup>, *Piotr Kalinowski*<sup>{2}</sup>, *Lukasz Michalowski*<sup>{2}</sup>, *Rafał Paluszkiwicz*<sup>{2}</sup>, *Bogna Ziarkiewicz-Wroblewska*<sup>{2}</sup>, *Krzysztof Zieniewicz*<sup>{2}</sup>, *Andrzej Nowicki*<sup>{1}</sup>

<sup>{1}</sup>*Institute of Fundamental Technological Research, Polish Academy of Sciences, Poland*; <sup>{2}</sup>*Medical University of Warsaw, Poland*; <sup>{3}</sup>*Polish Academy of Sciences, Poland*

11:40 AM

**1489: SVM (Support Vector Machine) Based Liver Classification: Fibrosis, Steatosis, and Inflammation**

*Jihye Baek*, *Kevin Parker*  
*University of Rochester, United States*

11:50 AM

**1490: Robustness Analysis of Texture Features with Different Beamforming Techniques**

*Silvia Seoni*<sup>{1}</sup>, *Giulia Matrone*<sup>{2}</sup>, *Kristen Meiburger*<sup>{1}</sup>  
<sup>{1}</sup>*Politecnico di Torino, Italy*; <sup>{2}</sup>*University of Pavia, Italy*

12:00 PM

**1589: Multifractal Characterization of Tissues in Ultrasound Imaging: a Study on the Influence of Deconvolution**

*Herwig Wendt*<sup>{1}</sup>, *Mohamad Hourani*<sup>{3}</sup>, *Adrian Basarab*<sup>{2}</sup>, *Denis Kouamé*<sup>{2}</sup>  
<sup>{1}</sup>*CNRS, France*; <sup>{2}</sup>*IRIT / Université de Toulouse, France*; <sup>{3}</sup>*University of Toulouse, France*

12:10 PM

**1722: Automated Characterization of Muscle Architectural Variation in Ultrasound Images**

*Jan Egil Kirkebø*<sup>{2}</sup>, *Amelie Werkhausen*<sup>{1}</sup>, *Olivier Seynnes*<sup>{1}</sup>, *Andreas Austeng*<sup>{2}</sup>  
<sup>{1}</sup>*Norwegian School of Sport Sciences, Norway*; <sup>{2}</sup>*University of Oslo, Norway*

12:20 PM

**1798: Ultrasound-Based Estimation of Remaining Cardiac Function in LVAD-Supported Ex Vivo Hearts**

*Louis Fixsen*<sup>{2}</sup>, *Niels Petterson*<sup>{2}</sup>, *Patrick Houthuizen*<sup>{1}</sup>, *Marcel Rutten*<sup>{2}</sup>, *Frans van de Vosse*<sup>{2}</sup>, *Richard Lopata*<sup>{2}</sup>  
<sup>{1}</sup>*Catharina Hospital, Netherlands*; <sup>{2}</sup>*Eindhoven University of Technology, Netherlands*

12:30 PM

**2067: Wrist-Side Pulse Sensing: Pilot Comparison Between Ultrasound Imaging and a Wearable Pulse-Taking Sensor**

*Yuchen Tang*, *Wei-Ning Lee*  
*University of Hong Kong, Taiwan*; *University of Hong Kong, China*

12:40 PM

**2161: Ultrasound Sagittal Projection Imaging for the Assessment of Scoliosis**

*Dong-Sheng Li*<sup>{2}</sup>, *Guang-Quan Zhou*<sup>{2}</sup>, *Yi-Kang He*<sup>{3}</sup>, *Ping Zhou*<sup>{2}</sup>, *Si-Yuan He*<sup>{2}</sup>, *Yong-Ping Zheng*<sup>{1}</sup>  
<sup>{1}</sup>*Hong Kong Polytechnic University, Hong Kong*; <sup>{2}</sup>*Southeast University, China*; <sup>{3}</sup>*Zhongda Hospital Affiliated to Southeast University, China*

12:50 PM

**2171: Ultrasonic Measurement of Luminal Surface Roughness of Carotid Artery Wall with Removal of Local Displacement Induced by Blood Vessel Pulsation**

*Shohei Mori*<sup>{2}</sup>, *Takahisa Abe*<sup>{2}</sup>, *Motoyuki Kimura*<sup>{2}</sup>, *Mototaka Arakawa*<sup>{2}</sup>, *Jens E. Wilhjelm*<sup>{1}</sup>, *Hiroshi Kanai*<sup>{2}</sup>  
<sup>{1}</sup>*Technical University of Denmark, Denmark*; <sup>{2}</sup>*Tohoku University, Japan*

01:00 PM

**2366: Electromechanical Cycle Length Mapping for Atrial Arrhythmia Characterization and Cardioversion Success Assessment**

*Melina Tourni*, *Lea Melki*, *Rachel Weber*, *Elisa Konofagou*  
*Columbia University, United States*

11:30:00 AM – 1:30:00 PM

A4P-19: MBF: Poster PM – Blood Flow Imaging

Session Chair(s): Brett Byram (Vanderbilt University)

11:30 AM

**1507: An Organ Flow Model for Developing Vascular Characterization Using Contrast Enhanced Ultrasound (CEUS) Imaging**

*Vasiliki Voulgaridou*<sup>{1}</sup>, *Steven McDougall*<sup>{1}</sup>, *Ahmed Boujelben*, *Mairead Buttler*<sup>{1}</sup>, *Konstantinos Diamantis*<sup>{2}</sup>, *Vassilis Sboros*<sup>{1}</sup> <sup>{1}</sup>*Heriot Watt University, United Kingdom*; <sup>{2}</sup>*University of Edinburgh, United Kingdom*

11:40 AM

**1549: Ultrasound-Based Microvascular Parameters for Classification of Anti-Angiogenic Tumor Treatment Response: a Scalable Preclinical Approach**

*Mahsa Bataghva*, *Danielle Johnston*, *Nicholas Power*, *Silvia Penuela*, *James Laceyfield*  
*Western University, Canada*

11:50 AM

**1557: Dose Dependent Effect of Isoflurane on Cerebral Perfusion in Rats with Ultrafast Doppler**

*Bao-Yu Hsieh*<sup>{1}</sup>, *Shih-Ya Huang*<sup>{1}</sup>, *Yu-Chieh Jill Kao*<sup>{2}</sup>  
<sup>{1}</sup>*China Medical University, Taiwan*; <sup>{2}</sup>*National Yang-Ming University, Taiwan*

12:00 PM

**1582: Functional Ultrasound Imaging of Brain Activities for Retina Stimulation**

*Xuejun Qian*<sup>{2}</sup>, *Chengwu Huang*<sup>{1}</sup>, *Biju Thomas*<sup>{2}</sup>, *Kirk Shung*<sup>{2}</sup>, *Mark Humayun*<sup>{2}</sup>, *Shigao Chen*<sup>{1}</sup>, *Qifa Zhou*<sup>{2}</sup>  
<sup>{1}</sup>*Mayo Clinic, United States*; <sup>{2}</sup>*University of Southern California, United States*

12:10 PM

**1592: Human Placental Vasculature Imaging Using Long Ensemble Angular-Coherence-Based Doppler (LEAD)**

*You Li, Jane Chueh, Virginia Winn, Amen Ness, Dongwoon Hyun, Marko Jakovljevic, Jeremy Dahl  
Stanford University, United States*

12:20 PM

**1620: Hemodynamic Analysis of Single Vessel in the Cerebral Cortex with Ultrafast Doppler**

*Bao-Yu Hsieh{1}, Yi-Pei Lin{1}, Yu-Ying Mei{1}, Dong-Chuan Wu{1}, Yu-Chieh Jill Kao{2}, Ning Zhou{1}  
{1}China Medical University, China; {2}China Medical University, Taiwan; {3}National Yang-Ming University, Taiwan*

12:30 PM

**1754: Ultrafast Doppler Imaging Combined with Adaptive Spatiotemporal SVD Filtering Allows to Assess Complex Liver Blood Flows Down to 5 Mm/s in Healthy Volunteers**

*Sofiane Décombas-Deschamps{2}, Hanna Bendjador{1}, Mickaël Tanter{3}, Thomas Defieux{4}  
{1}ESPCI, PSL Research University, INSERM, CNRS, France; {2}Inserm, ESPCI Paris, CNRS, PSL University, France; {3}Physics for Medicine Paris, INSERM U1273, ESPCI Paris, PSL University, CNRS FRE 2031, France; {4}Physics for Medicine Paris, Inserm, ESPCI Paris, CNRS, PSL University, France*

12:40 PM

**1833: Side-Viewing Rotational IVUS Imaging of Slow Flow with Adaptive SVD Filtering**

*Graham Collins{2}, Natalia Pato Montemayor{1}, Kathryn Ozgun{3}, Brett Byram{3}, Brooks Lindsey{1}  
{1}Georgia Institute of Technology, United States; {2}Georgia Institute of Technology / Emory University, United States; {3}Vanderbilt University, United States*

12:50 PM

**2272: In-Vivo 3D Power Doppler Imaging Using Mechanical Translation and Ultrafast Ultrasound**

*Chuan Chen{2}, Gijs A.G.M. Hendriks{1}, Stein Fekkes{2}, Hendrik H.G. Hansen{1}, Chris L. de Korte{1}  
{1}Medical UltraSound Imaging Center / Radboud University Medical Center, Netherlands; {2}Radboud University Medical Center, Netherlands*

01:00 PM

**2309: Estimation of Velocity Changes in Sub-Resolved Microvasculature Using Contrast Enhanced Ultrasound (CEUS)**

*Matthew Bruce{2}, Zin Khain{2}, Charles Tremblay-Darveau{1}, Ming Xin{2}, Bryan Cunitz{2}, Christoph Hofstetter{2}  
{1}Philips Medical Systems, United States; {2}University of Washington, United States*

01:10 PM

**2311: Intraventricular Pressure Gradients – Vector Flow Imaging Versus Color M-Mode**

*Solveig Fadnes, Kristian Sørensen, Siri Ann Nyrnes, Morten S. Wiggen, Lasse Løvstakken  
Norwegian University of Science and Technology, Norway*

01:20 PM

**2346: Pre-Clinical Functional Ultrasound Imaging of Rat Brain Activation During Thalamic Deep Brain Stimulation**

*Rohit Nayak, Jeyeon Lee, Mostafa Fatemi, Su-Youne Chang, Azra Alizad  
Mayo Clinic, United States*

11:30:00 AM – 1:30:00 PM

**A4P-20: MPA: Poster PM – Photoacoustic Vascular Imaging**

**Session Chair(s):** Thanasis Loupas (Philips Ultrasound)

11:30 AM

**1555: Photoacoustic Imaging as a Tool for Assessing the Biomechanical Behavior of Aqueous Veins and Perilimbal Sclera Complex**

*Guan Xu{2}, Linyu Ni{2}, John Riesterer{2}, Wonsuk Kim{2}, Layla Berry{2}, Kara Blackburn{2}, Jonathan Chuang{2}, Huaizhou Wang{2}, Wei Zhang{2}, Yanniss Paulus{2}, Alan Argento{2}, Sayoko Moroi{1}  
{1}Ohio State University, United States; {2}University of Michigan, United States*

11:40 AM

**1924: Intraoperative Carotid Artery Plaque Hemorrhage Detection with Hand-Held Photoacoustic Probe**

*Jan-Willem Muller{2}, Min Wu{2}, Roy van Hees{2}, Marcel Rutten{2}, Frans van de Vosse{2}, Marc van Sambeek{1}, Richard Lopata{2}  
{1}Catharina Hospital, Netherlands; {2}Eindhoven University of Technology, Netherlands*

11:50 AM

**2127: Photoacoustic Guided Endovenous Laser Ablation: Calibration and in Vivo Canine Studies**

*Samuel John{2}, Yan Yan{2}, Tanyeem Shaik{2}, Loay Kabbani{1}, Mohammad Mehrmohammadi{2}  
{1}Henry Ford Health System, United States; {2}Wayne State University, United States*

12:00 PM

**2239: Transcranial Photoacoustic Imaging of Photothrombotic Stroke in Neonatal Piglet in Vivo**

*Jeeun Kang, Xiuyun Liu, Shawn Adams, Ernest Graham, Raymond Koehler, Emad Boctor  
Johns Hopkins Medical Institute, United States*

11:30:00 AM – 1:30:00 PM

**A4P-21: MPA: Poster PM – Quantitative Photoacoustic Imaging**

**Session Chair(s):** Xueding Wang (University of Michigan)

12:10 PM

**1857: Fluence Compensation for Improving Quantitative Photoacoustic Spectroscopy**

*Alexander Pattyn, Naser Alijabbari, Mohammad Mehrmohammadi  
Wayne State University, United States*

12:20 PM

**1867: Calibrated Photoacoustic Spectrometry with a Standard Imaging Setup**

Mitradeep Sarkar<sup>{3}</sup>, Théotim Lucas<sup>{2}</sup>, Gilles Renault<sup>{1}</sup>, Lori Bridal<sup>{2}</sup>, Jérôme Gateau<sup>{2}</sup>  
<sup>{1}</sup>Institut Cochin, France; <sup>{2}</sup>Sorbonne Université, CNRS, INSERM, France; <sup>{3}</sup>Université de Paris, Inserm, PARCC, France

12:30 PM

**2071: The International Photoacoustic Standardisation Consortium: a Community-Driven Consensus-Based Initiative Towards Standardisation in Photoacoustic Imaging**

Sarah Bohndiek<sup>{5}</sup>, Ben Cox<sup>{4}</sup>, James Joseph<sup>{5}</sup>, Janek Groehl<sup>{1}</sup>, Lina Hacker<sup>{5}</sup>, Stefan Morscher<sup>{2}</sup>, William Vogt<sup>{3}</sup>

<sup>{1}</sup>German Cancer Research Center, Germany; <sup>{2}</sup>iThera Medical, Germany; <sup>{3}</sup>U.S. Food and Drug Administration, United States; <sup>{4}</sup>University College London, United Kingdom; <sup>{5}</sup>University of Cambridge, United Kingdom

12:40 PM

**2232: A Cost-Effective Spectral Equalization Method for Multispectral Photoacoustic Imaging**

Yixuan Wu<sup>{2}</sup>, Jeeun Kang<sup>{1}</sup>, Christopher Yung<sup>{3}</sup>, Hanh Le<sup>{3}</sup>, Jeeseong Hwang<sup>{3}</sup>, Emad Boctor<sup>{1}</sup>

<sup>{1}</sup>Johns Hopkins Medical Institute, United States; <sup>{2}</sup>Johns Hopkins University, United States; <sup>{3}</sup>National Institute of Standards and Technologies, United States

12:50 PM

**2327: Fluence Correction in Ultrasound-Guided Photoacoustic Imaging Using External Tissue Deformation**

David Qin<sup>{1}</sup>, Timothy Sowers<sup>{1}</sup>, Lingyi Zhao<sup>{2}</sup>, Stanislav Emelianov<sup>{1}</sup>

<sup>{1}</sup>Georgia Institute of Technology, United States; <sup>{2}</sup>Peking University, China

11:30:00 AM – 1:30:00 PM

**A4P-22: MPA: Poster PM – Technical Advances In Photoacoustic Imaging**

**Session Chair(s):** Stanislav Emelianov (Georgia Inst. of Technology & Emory Univ. School of Medicine)

11:30 AM

**2077: Theory-Based Predictions of Generalized Contrast-to-Noise Ratios for Photoacoustic Images**

Mardava Gubbi, Muyinatu Lediju Bell  
Johns Hopkins University, United States

11:40 AM

**2137: Dual-Illumination Ultrasound/Photoacoustic Endoscopic System**

Maryam Basij<sup>{3}</sup>, Andrei Karpiouk<sup>{2}</sup>, Ira Winer<sup>{1}</sup>, Stanislav Emelianov<sup>{2}</sup>, Mohammad Mehrmohammadi<sup>{3}</sup>  
<sup>{1}</sup>Barbara Ann Karmanos Cancer Institute, United States; <sup>{2}</sup>Georgia Institute of Technology, United States; <sup>{3}</sup>Wayne State University, United States

11:50 AM

**2164: A New Photoacoustic Imaging Platform for Potential Applications in Prostate Cancer**

Nidhi Singh<sup>{4}</sup>, Emmanuel Chérin<sup>{3}</sup>, Yohannes Soenjaya<sup>{2}</sup>, Felipe Roa<sup>{4}</sup>, Samuel Papernick<sup>{2}</sup>, Brian Wodlinger<sup>{1}</sup>, Stuart Foster<sup>{5}</sup>, Christine Démoré<sup>{6}</sup>

<sup>{1}</sup>Exact Imaging, Canada; <sup>{2}</sup>Sunnybrook Health Sciences Centre, Canada; <sup>{3}</sup>Sunnybrook Research Institute, Canada; <sup>{4}</sup>University of Toronto, Canada; <sup>{5}</sup>University of Toronto, Sunnybrook Health Sciences Centre, Canada; <sup>{6}</sup>University of Toronto, Sunnybrook Research Institute, Canada

12:00 PM

**2433: Real-Time Thermoacoustic Imaging and Thermometry Using Self Calibration for Guiding Hyperthermia Therapy**

Ehab Tamimi, Waleed Ahmad, Hao Xin, Russell Witte  
University of Arizona, United States

11:30:00 AM - 1:30:00 PM

**A4P-23: MPA: Poster PM - Advances In Photoacoustic Reconstruction / Beamforming**

**Session Chair(s):** Julien Grondin (Columbia University)  
Muyinatu Bell (Johns Hopkins University)

12:10 PM

**1239: Speed-of-Sound Mapping with Laser-Induced Ultrasound**

David Thompson<sup>{2}</sup>, Damien Gasteau<sup>{2}</sup>, Jeffrey Nagel<sup>{2}</sup>, Maura Dantuma<sup>{2}</sup>, Michael Jaeger<sup>{1}</sup>, Martin Frenz<sup>{1}</sup>, Srirang Manohar<sup>{2}</sup>

<sup>{1}</sup>University of Bern, Switzerland; <sup>{2}</sup>University of Twente, Netherlands

12:20 PM

**1573: Photoacoustic Delay-and-Sum Beamforming with Spatiotemporal Coherence Factor**

Rashid Al Mukaddim, Ashley M. Weichmann, Tomy Varghese

University of Wisconsin-Madison, United States

12:30 PM

**2017: Compact and Low-Cost Acoustic-Resolution Photoacoustic Microscopy Based on Delta Configuration Actuator**

Shang Gao<sup>{3}</sup>, Tsumura Ryosuke<sup>{3}</sup>, Doua Vang<sup>{3}</sup>, Keion Bisland<sup>{3}</sup>, Keshuai Xu<sup>{1}</sup>, Yasuyuki Tsunoi<sup>{2}</sup>, Haichong K. Zhang<sup>{3}</sup>

<sup>{1}</sup>Johns Hopkins University, United States; <sup>{2}</sup>National Defense Medical College Research Institute, Japan; <sup>{3}</sup>Worcester Polytechnic Institute, United States

12:40 PM

**2048: Deep-Learning Reconstruction for Integrated Photoacoustic and Ultrasound System**

Minwoo Kim, David Li, Geng-Shi Jeng, Ivan Pelivanov, Matthew O'Donnell

University of Washington, United States

11:30:00 AM - 1:30:00 PM

**A4P-24: MPA: Poster PM - Pre-Clinical Photoacoustic Imaging**

**Session Chair(s):** Michael Kolios (Ryerson University)

11:30 AM

**1093: In Vivo Photoacoustic Chemical Imaging of Potassium**

Joel Tan, Jeff Folz, Raoul Kopelman, Xueding Wang  
University of Michigan, United States

11:40 AM

**1153: Functional Neuroimaging of Mice Using Ultrasound and Optoacoustics**

Richard Rau<sup>{1}</sup>, Justine Robin<sup>{1}</sup>, Berkan Lafci<sup>{1}</sup>, Aileen Schröter<sup>{3}</sup>, Michael Reiss<sup>{1}</sup>, Xose Luis Dean Ben<sup>{1}</sup>, Orcun Goksel<sup>{1}</sup>, Daniel Razansky<sup>{2}</sup>  
<sup>{1}</sup>ETH Zürich, Switzerland; <sup>{2}</sup>ETH Zürich / Universität Zürich, Switzerland; <sup>{3}</sup>University of Zurich, Switzerland

11:50 AM

**1199: The Use of Nanobubbles for Enhancing Radiation Therapy: Biophysical Insights from Photoacoustic Imaging and Histology**

Eno Hysi<sup>{2}</sup>, Muhannad Fadhel<sup>{2}</sup>, Yanjie Wang<sup>{2}</sup>, Joseph Sebastian<sup>{2}</sup>, Anoja Giles<sup>{3}</sup>, Gregory Czarnota<sup>{4}</sup>, Agata Exner<sup>{1}</sup>, Michael C. Kolios<sup>{2}</sup>  
<sup>{1}</sup>Case Western Reserve University, United States; <sup>{2}</sup>Ryerson University, Canada; <sup>{3}</sup>Sunnybrook Health Sciences Centre, Canada; <sup>{4}</sup>Sunnybrook Research Institute, Canada

12:00 PM

**1890: Spectroscopic Photoacoustic Imaging of Cervical Tissue Composition in Preterm Murine Model**

Yan Yan, Jose Galaz, Nardhy Gomez-Lopez, Mohammad Mehrmohammadi  
Wayne State University, United States

12:10 PM

**2237: Supervised Machine Learning for Effective Differential Diagnosis of Cerebral Arterial Occlusion Versus Global Hypoxia in Vivo**

Jeeun Kang, Shawn Adams, Ernest Graham, Raymond Koehler, Emad Boctor  
Johns Hopkins Medical Institute, United States

12:20 PM

**2341: In Vivo Quantitative Photoacoustic Imaging with PAtrace in TNBC Model**

Cayla Wood<sup>{2}</sup>, Sangheon Han<sup>{2}</sup>, William Schuler<sup>{2}</sup>, Jason Cook<sup>{1}</sup>, Mark Page<sup>{2}</sup>, Konstantin Sokolov<sup>{2}</sup>, Richard Bouchard<sup>{2}</sup>  
<sup>{1}</sup>NanoHybrids, Inc., United States; <sup>{2}</sup>University of Texas MD Anderson Cancer Center, United States

11:30:00 AM - 1:30:00 PM

**A4P-32: MTH: Poster PM - Ultrasound Mediated Delivery II**

Session Chair(s): Mostafa Fatemi (Mayo Clinic)  
Hong Chen (Washington University in St. Louis)

12:30 PM

**1294: A Novel Gold Nanoparticles Drug Delivery System: Design and Ex Vivo Tissue Testing**

Anshuman Jakhmola<sup>{1}</sup>, Tyler Hornsby<sup>{1}</sup>, Kevin Rod<sup>{2}</sup>, Jahan Tavakkoli<sup>{1}</sup>  
<sup>{1}</sup>Ryerson University, Canada; <sup>{2}</sup>Toronto Poly Clinic Inc, Canada

12:40 PM

**1469: Controlled Release of Basic Fibroblast Growth Factor (bFGF) Using Therapeutic Ultrasound Enhances Angiogenesis and Reperfusion in Ischemic Muscle**

Hai Jin<sup>{2}</sup>, Carole Quesada<sup>{2}</sup>, Leidan Huang<sup>{3}</sup>, Mitra Aliabouzar<sup>{2}</sup>, Aniket Jivani<sup>{2}</sup>, Oliver Kripfgans<sup>{2}</sup>, J. Brian Fowlkes<sup>{2}</sup>, Renny Franceschi<sup>{2}</sup>, Jianhua Liu<sup>{1}</sup>, Andrew Putnam<sup>{2}</sup>, Mario Fabiilli<sup>{2}</sup>  
<sup>{1}</sup>South China University of Technology, China; <sup>{2}</sup>University of Michigan, United States; <sup>{3}</sup>University of Michigan, United States

12:50 PM

**1477: Incubation Method for Loading Lonidamine in Oxygen Microbubbles for Targeted Drug Delivery**

Quezia Lacerda<sup>{3}</sup>, Brian Oeffinger<sup>{1}</sup>, Margaret Wheatley<sup>{1}</sup>, Dennis Leeper<sup>{2}</sup>, Flemming Forsberg<sup>{2}</sup>, Patrick O'Kane<sup>{2}</sup>, Ankit Rochani<sup>{2}</sup>, Gagan Kaushal<sup>{2}</sup>, John Eisenbrey<sup>{2}</sup>  
<sup>{1}</sup>Drexel University, United States; <sup>{2}</sup>Thomas Jefferson University, United States; <sup>{3}</sup>Thomas Jefferson University / Drexel University, United States

01:00 PM

**1540: Sequential Release of Two Pro-Angiogenic Growth Factors from Acoustically-Responsive Scaffolds Using Standing Wave Assisted Acoustic Droplet Vaporization**

Mitra Aliabouzar, Aniket Jivani, Xiaofang Lu, Oliver Kripfgans, Brian Fowlkes, Mario Fabiilli  
University of Michigan, United States

01:10 PM

**1811: Characterization of Ultrasound-Mediated Delivery of Trastuzumab to Normal and Pathologic Spinal Cord Tissue**

Paige Smith<sup>{3}</sup>, Natalia Ogrodnik<sup>{1}</sup>, Janani Satkunarajah<sup>{1}</sup>, Meaghan O'Reilly<sup>{2}</sup>  
<sup>{1}</sup>Sunnybrook Research Institute, Canada; <sup>{2}</sup>Sunnybrook Research Institute / University of Toronto, Canada; <sup>{3}</sup>University of Toronto, Canada

01:20 PM

**1868: Characterization of Focused Ultrasound-Mediated Brainstem Delivery of Intranasal Administered Agents**

Dezhuang Ye<sup>{1}</sup>, Jingyi Luan<sup>{1}</sup>, Hannah Pang<sup>{1}</sup>, Yaoheng Yang<sup>{1}</sup>, Arash Nazeri<sup>{2}</sup>, Joshua B. Rubin<sup>{2}</sup>, Hong Chen<sup>{1}</sup>  
<sup>{1}</sup>Washington University in St. Louis, United States; <sup>{2}</sup>Washington University School of Medicine, United States

11:30:00 AM - 1:30:00 PM

**A4P-25: MIS: Poster PM - Lung Ultrasound**

Session Chair(s): John Hossack (University of Virginia)  
Marie Muller (North Carolina State University)

11:30 AM

**1039: Effect of Imaging Parameters on the Visualization of Lung Ultrasound B-Line Artifacts**

Federico Mento, Libertario Demi  
University of Trento, Italy

11:40 AM

**1041: Differentiation of Pulmonary Fibrosis by Means of Quantitative Lung Ultrasound Spectroscopy, First Clinical Study in Humans**

Federico Mento{3}, Gino Soldati{4}, Renato Prediletto{2},  
Marcello Demi{1}, Libertario Demi{3}  
{1}Fondazione Toscana Gabriele Monasterio, Italy;  
{2}National Research Council Pisa, Italy; {3}University of  
Trento, Italy; {4}Valle del Serchio General Hospital, Italy

11:50 AM

**2103: Detecting Lung Nodules by Investigating  
Ultrasound Multiple Scattering**

Roshan Roshankhah{2}, John Blackwell{3}, Mir Ali{2},  
Kaustav Mohanty{1}, Thomas Egan{3}, Marie Muller{1}  
{1}North Carolina State University, United States; {2}North  
Carolina State University / University of North Carolina at  
Chapel Hill, United States; {3}University of North Carolina  
at Chapel Hill, United States

12:00 PM

**2253: Lung Ultrasound for Point-of-Care COVID-19  
Pneumonia Stratification: Computer-Aided  
Diagnostics in a Smartphone. First Experiences  
Classifying Semiology from Public Datasets**

Aitor Almeida{3}, Aritz Bilbao{3}, Lisa Ruby{2}, Marga  
Rominger{2}, Diego Lopez-de-Ipiña{3}, Jeremy Dahl{1},  
Ahmed El Kaffas{1}, Sergio Sanabria{1}  
{1}Stanford University, United States; {2}University  
Hospital Zurich, Switzerland; {3}University of Deusto,  
Spain

11:30:00 AM - 1:30:00 PM

**A4P-26: MIS: Poster PM - Coherence Imaging, Speckle  
tracking and Clutter Suppression**

Session Chair(s): Marie Muller (North Carolina State  
University)  
Muyinatu Bell (Johns Hopkins University)

12:10 PM

**2115: Deep Learning Based Motion Tracking of  
Ultrasound Image Sequences**

Skanda Bharadwaj, Mohamed Almekkawy  
Pennsylvania State University, United States

12:20 PM

**2389: Constrained RF Level Interpolation for  
Normalized Cross Correlation Based Speckle Tracking**

Brandon Rebholz, Mohamed Almekkawy  
Pennsylvania State University, United States

12:30 PM

**1955: A Channel Domain Higher-Order SVD Clutter  
Rejection Filter for Small Vessel Ultrasound Imaging**

Kathryn Ozgun, Brett Byram  
Vanderbilt University, United States

12:40 PM

**1478: Congruence of Frequency-Dependent Spatial  
Coherence Between Linear Frequency-Modulated  
Pulses and Conventional Pulses**

James Long{1}, Nick Bottenus{2}, Gregg Trahey{1}  
{1}Duke University, United States; {2}University of  
Colorado Boulder, United States

12:50 PM

**2296: Machine Learning-Based Double-Profile  
Intersection (ML-DoPIo) for Pointwise Prediction of**

**Shear Elastic Modulus Through Support Vector  
Regression**

Nada Rahmouni, Keita Yokoyama, Caterina Gallippi  
North Carolina State University / University of North  
Carolina at Chapel Hill, United States

01:00 PM

**1959: UltraNet: Deep Learning Dataset for Modeling  
Acoustic Wall Clutter**

Ouwen Huang{1}, James Long{1}, Will Long{1},  
Gianmarco Pinton{2}, Gregg Trahey{1}, Mark Palmeri{1}  
{1}Duke University, United States; {2}North Carolina State  
University / University of North Carolina at Chapel Hill,  
United States

01:10 PM

**2323: Adaptive Slow-Time Singular Value  
Thresholding (SVT) Based on Stein's Unbiased Risk  
Estimate (SURE) for Ultrasound Image Random Noise  
Reduction**

Jason Zacharias Apostolakis, Jun Seob Shin, F. Can  
Meral, Jean-Luc Robert, Ali Sadeghi, Francois Vignon  
Philips Research North America, United States

01:20 PM

**2340: A Coherence-Based Technique to Separate and  
Quantify Sources of Image Degradation in Vivo with  
Application to Transcranial Imaging**

Emelina Viennau, Kathryn Ozgun, Brett Byram  
Vanderbilt University, United States

11:30:00 AM - 1:30:00 PM

**A4P-27: MBB: Poster PM - Adaptive Beamforming  
Methods II**

Session Chair(s): Larry Mo (Independent Consultant)

11:30 AM

**1172: Angular Apodization Estimation Using  
Independent Component Analysis in Coherent Plane-  
Wave Compounding**

Sobhan Goudarzi{1}, Amir Asif{2}, Hassan Rivaz{1}  
{1}Concordia University, Canada; {2}York University,  
Canada

11:40 AM

**1717: Implementation of Adaptive Transmit Parameter  
Adjustment in Ultrasound Imaging**

Matthew Huber{1}, James Long{1}, Katelyn Flint{1}, Will  
Long{1}, Nick Bottenus{2}, Gregg Trahey{1}  
{1}Duke University, United States; {2}University of  
Colorado Boulder, United States

11:50 AM

**1225: Application of Common Midpoint Gatherers to  
Medical Pulse-Echo Ultrasound for Optimal  
Coherence and Improved Sound Speed Estimation in  
Layered Media**

Rehman Ali, Dongwoon Hyun, Jeremy Dahl  
Stanford University, United States

12:00 PM

**1437: Rapid Phase Correction Methods for Focused  
Ultrasound in the Vertebral Canal**

David Martin{2}, Meaghan O'Reilly{1}

*{1}Sunnybrook Research Institute / University of Toronto, Canada; {2}University of Toronto, Canada*

**12:10 PM**

**2350: Correcting Transcranial Ultrasound Aberrations Through Acoustoelectric Derived Time Reversal Operations**

*Chet Preston, Alexander Alvarez, Russell Witte  
University of Arizona, United States*

**12:20 PM**

**2387: Estimating Phase Aberration from Noisy Radiofrequency Data in Synthetic Aperture Ultrasound Imaging**

*Dena Monjazebi, Yuan Xu  
Ryerson University, Canada*

**12:30 PM**

**1931: Synthetic Aperture Focusing for Extended Depth of Field in MIST**

*William Walker, Gregg Trahey, Matthew Morgan, Rifat Ahmed  
Duke University, United States*

**11:30:00 AM - 1:30:00 PM**

**A4P-28: MBB: Poster PM - Volumetric Beamforming & Imaging**

**Session Chair(s):** Carl Herickhoff (Stanford University)

**11:30 AM**

**1056: Improvement of Focusing for Coarse 2D Phased Arrays Using the Biaxial Driving Method: a Numerical Study**

*Sagid Delgado{1}, Laura Curiel{2}, Samuel Pichardo{2}  
{1}Lakehead University, Canada; {2}University of Calgary, Canada*

**11:40 AM**

**1439: High-Resolution 3D Ultrasound Imaging Using a Clinical Linear Array**

*Théotim Lucas{2}, Isabelle Quidu{1}, Lori Bridal{2}, Jérôme Gateau{2}  
{1}École Nationale Supérieure de Techniques Avancées Bretagne / Université de Bretagne Occidentale, France; {2}Sorbonne Université, CNRS, INSERM, France*

**11:50 AM**

**1497: Optimal Virtual Sources Distributions for Coherent Compounding Method in 2D and 3D Echography**

*Goulven Le Moign{2}, Patrice Masson{2}, Hervé Liebgott{1}, Olivier Basset{1}, Nicolas Quaegebeur{2}  
{1}Creatis - INSA Lyon, France; {2}Université de Sherbrooke, Canada*

**12:00 PM**

**1560: Ultrafast 2D/3D Orthogonal Row-Column Electronic Scanning (uFORCES) with Top-Orthogonal-to-Bottom Electrode (TOBE) 2D Arrays**

*Roger Zemp, Chris Ceroici, Afshin Kashani Ilkhechi, Mohammad Rahim Sobhani  
University of Alberta, Canada*

**12:10 PM**

**1600: Image Quality of Conventional and Plane-Wave Imaging in Automated Breast Volume Scanners**

*Gijs Hendriks{1}, Gert Weijers{1}, Chuan Chen{1}, Madeleine Hertel{2}, Chi-Yin Lee{3}, Peter Dueppenbecker{2}, Marcus Radicke{2}, Andy Milkowski{3}, Hendrik Hansen{1}, Chris de Korte{1}  
{1}Radboud University Medical Center, Netherlands; {2}Siemens Healthcare GmbH, Germany; {3}Siemens Ultrasound, United States*

**12:20 PM**

**1774: Using Sparse Array for 3D Passive Cavitation Imaging**

*Audrey Sivadon{3}, François Varray{1}, Barbara Nicolas{1}, Jean-Christophe Béra{2}, Bruno Gilles{2}  
{1}Creatis - INSA Lyon, France; {2}Inserm, LabTau, U1032, France; {3}Univ Lyon, INSA-Lyon, Université Claude Bernard Lyon 1, UJM-Saint Etienne, CNRS, Inserm, CREATIS, France*

**12:30 PM**

**1903: Boundary Array Transducer and Beamforming for Low-Cost Real-Time 3D Imaging**

*Jesse Yen  
University of Southern California, United States*

**12:40 PM**

**2245: High Volume Rate 3D Ultrasound Imaging Using Fast-Tilting Reflectors**

*Zhijie Dong{2}, Shuangliang Li{1}, Matthew Lowerison{2}, Jun Zou{1}, Pengfei Song{2}  
{1}Texas A&M University, United States; {2}University of Illinois at Urbana-Champaign, United States*

**12:50 PM**

**2250: A Volumetric Transrectal Ultrasound Imaging Robust to Scanning-Angle Disorientation Using Radial Synthetic Aperture Focusing Technique**

*Hyunwoo Song{2}, Jeeun Kang{1}, Emad Boctor{1}  
{1}Johns Hopkins Medical Institute, United States; {2}Johns Hopkins University, United States*

**11:30:00 AM - 1:30:00 PM**

**A4P-29: MBB: Poster PM - Enhancing Images Through Novel Beamforming I**

**Session Chair(s):** Kai Thomenius (Massachusetts Institute of Technology)

**11:30 AM**

**1875: Expanded Beamforming Models for High Dynamic Range Scenarios**

*Siegfried Schlunk, Brett Byram  
Vanderbilt University, United States*

**11:40 AM**

**1945: Coherence Estimation Using Random Selection of Spatial Frequencies**

*Yang Lou, Jesse Yen  
University of Southern California, United States*

**11:50 AM**

**1985: Revisiting the Wiener Postfilter for Ultrasound Image Quality Improvement**

Francois Vignon, Ali Sadeghi, Jason Yu, F. Can Meral, Iason Apostolakis, Jun Seob Shin, Jean-Luc Robert  
Philips Research North America, United States

12:00 PM

**1994: Noise and Clutter Reduction with MIST-Based Wiener Filtering**

William Walker, Gregg Trahey, Matthew Morgan, Rifat Ahmed

Duke University, United States

12:10 PM

**1134: A Retrospective Look at Retrospective Transmit Beamforming**

Larry Mo

GE Research, United States

12:20 PM

**1786: Decorrelated Compounding in Synthetic Transmit Aperture (STA) Ultrasound Imaging to Detect Low-Contrast Lesions**

Na Zhao, Yuan Xu

Ryerson University, Canada

12:30 PM

**2107: Application of a Range Doppler Algorithm to Frequency Domain Beamforming of Ultrasound Signals**

Marko Jakovljevic, Roger Michaelides, Ettore Biondi, Carl Herickhoff, Dongwoon Hyun, Howard Zebker, Jeremy Dahl

Stanford University, United States

12:40 PM

**2108: A New Approach for Passive Cavitation Imaging and Detection**

Colin Hill, Mohamed Almekkawy

Pennsylvania State University, United States

12:50 PM

**2382: Resolution Improvement in Phantom and in Vivo Through l1 Regularized Coherent Compounding**

Jean-Luc Robert<sup>{3}</sup>, Guillaume David<sup>{1}</sup>, Bo Zhang<sup>{2}</sup>, Francois Vignon<sup>{3}</sup>, F. Can Meral<sup>{3}</sup>, Iason Apostolakis<sup>{3}</sup>

<sup>{1}</sup>Columbia University, United States; <sup>{2}</sup>Philips Research, France; <sup>{3}</sup>Philips Research North America, United States

11:30:00 AM - 1:30:00 PM

**A4P-31: MIM: Poster PM - Machine Learning Applications II**

**Session Chair(s):** James Wiskin (QT Ultrasound Inc.)  
Roger Zemp (University of Alberta)

11:30 AM

**2146: Ultrasonographic Risk Stratification of Indeterminate Thyroid Nodules, a Comparison of an Artificial Intelligence Algorithm with Radiologist Performance**

Aylin Tahmasebi<sup>{2}</sup>, Shuo Wang<sup>{2}</sup>, Kelly Daniels<sup>{2}</sup>, Elizabeth Cottrill<sup>{2}</sup>, Ji-Bin Liu<sup>{2}</sup>, Jiajun Xu<sup>{1}</sup>, Andrej Lyschchik<sup>{2}</sup>, John Eisenbrey<sup>{2}</sup>

<sup>{1}</sup>Nanjing First Hospital, China; <sup>{2}</sup>Thomas Jefferson University, United States

11:40 AM

**1445: Faster Motion Correction of Clinical Contrast-Enhanced Ultrasound Images Using Deep Learning**

Ipek Oezdemir<sup>{2}</sup>, Corinne Wessner<sup>{1}</sup>, Colette Shaw<sup>{1}</sup>, John Eisenbrey<sup>{1}</sup>, Kenneth Hoyt<sup>{2}</sup>

<sup>{1}</sup>Thomas Jefferson University, United States;

<sup>{2}</sup>University of Texas at Dallas, United States

11:50 AM

**1467: Deep Variational Network for High Quality 3D Ultrasound Imaging Using Sparse Array**

U-Wai Lok, Joshua Trzasko, Ping Gong, Chengwu Huang, Shanshan Tang, Shigao Chen

Mayo Clinic, United States

12:00 PM

**2456: Machine Learning Approaches for Quantitative Viscoelastic Response (QVisR) Ultrasound**

Joseph Richardson, Christopher Moore, Keerthi Anand, Keita Yokoyama, Caterina Gallippi

North Carolina State University / University of North Carolina at Chapel Hill, United States

12:10 PM

**1691: MI-Net: a Deep Neural Network for Image Reconstruction in Ultrasound Computed Tomography**

Yuling Fan<sup>{2}</sup>, Hongjian Wang<sup>{1}</sup>, Hartmut Gemmeke<sup>{3}</sup>, Juergen Hesser<sup>{2}</sup>

<sup>{1}</sup>Donghua University, China; <sup>{2}</sup>Heidelberg University, Germany; <sup>{3}</sup>Karlsruhe Institute of Technology, Germany

12:20 PM

**1902: Data Augmentation to Aid 3D Convolutional Neural Network Segmentation of Landmarks in a Small Volumetric Ultrasound Dataset of the Pelvic Floor**

Helena Williams<sup>{1}</sup>, Laura Cattani<sup>{1}</sup>, Mohammad Yaqub<sup>{3}</sup>, Tom Vercauteren<sup>{2}</sup>, Jan Deprest<sup>{1}</sup>, Jan D'Hooge<sup>{1}</sup>

<sup>{1}</sup>Katholieke Universiteit Leuven, Belgium; <sup>{2}</sup>King's College London, United Kingdom; <sup>{3}</sup>University of Oxford, United Kingdom

12:30 PM

**1914: Ultrafast Doppler Image Denoising Using a Convolutional Neural Network with Perceptual Loss (fUS-net)**

Matthieu Blons<sup>{3}</sup>, Béatrice Berthon<sup>{3}</sup>, Bruno Osmanski<sup>{1}</sup>, Pierre Lemaire<sup>{1}</sup>, Mickaël Tanter<sup>{2}</sup>

<sup>{1}</sup>Icoeus, France; <sup>{2}</sup>Physics for Medicine Paris, INSERM U1273, ESPCI Paris, PSL University, CNRS

FRE 2031, France; <sup>{3}</sup>Physics for Medicine Paris, Inserm, ESPCI Paris, CNRS, PSL Research University, France

12:40 PM

**2099: CNN-Based Image Reconstruction for Tracking Displacements Under Extreme Conditions**

Dimitris Perdios, Manuel Vonlanthen, Florian Martinez, Marcel Arditi, Jean-Philippe Thiran

École Polytechnique Fédérale de Lausanne, Switzerland

12:50 PM

**2100: High-Dynamic-Range-Sensitive Training Loss for CNN-Based Ultrasound Image Reconstruction**

Dimitris Perdios, Manuel Vonlanthen, Florian Martinez, Marcel Arditi, Jean-Philippe Thiran

Tuesday, September 8

*École Polytechnique Fédérale de Lausanne, Switzerland*

**01:00 PM**

**2101: Single-Shot CNN-Based Ultrasound Imaging with Sparse Linear Arrays**

*Dimitris Perdios, Manuel Vonlanthen, Florian Martinez, Marcel Arditi, Jean-Philippe Thiran*

*École Polytechnique Fédérale de Lausanne, Switzerland*

**01:10 PM**

**2186: Automatic Apical Standard Views Extraction from 3D Ultrasound Volumes Using Deep Learning**

*David Pasdeloup<sup>{2}</sup>, Andreas Østvik<sup>{1}</sup>, Erik Smistad<sup>{1}</sup>, Thomas Grønli<sup>{1}</sup>, Sindre Hellum Olaisen<sup>{1}</sup>, Lasse Løvstakken<sup>{1}</sup>*

*<sup>{1}</sup>Norwegian University of Science and Technology, Norway; <sup>{2}</sup>Norwegian University of Science and Technology, Norwa*

4:15:00 AM – 6:15:00 AM

**Student Paper Finalist Session #1 (Groups 1 & 2)**

**Group 1**

**04:15 AM:** 2352

**4D Flow and Wall Shear Stress Using Volumetric Ultrasound Image Velocimetry**

*Kai Riemer*

*Department of Bioengineering  
Imperial College London*

**04:25 AM:** 1392

**SVD Beamforming for Ultrafast Aberration Correction and Real-Time Speed-of-Sound Quantification**

*Hanna Bendjador*

*Physics for Medicine Paris, ESPCI,  
PSL Research University, INSERM, CNRS*

**04:35 AM:** 1762

**Determinants of the Propagation Velocity of Natural Shear Waves in Cardiac Shear Wave elastography**

*Stéphanie Bézy*

*Katholieke Universiteit Leuven*

**04:45 AM:** 2455

**Non-Invasive Optogenetic Activation with Functional Ultrasound**

*Christian Aurup*

*Columbia University*

**04:55 AM:** 1500

**Transcranial Histotripsy Initiates Immune Cascade in Murine Glioblastoma Tumors and Prolongs Survival**

*Sarah Duclos*

*Department of Biomedical Engineering  
University of Michigan*

**05:05 AM:** 1197

**Photoacoustic Imaging of Organ Fibrosis**

*Eno Hysi*

*Department of Physics  
Ryerson University*

**Group 2**

**05:15 AM:** 1492

**Tracking Performance in Ultrasound Super-Resolution Imaging**

*Iman Taghavi*

*Department of Health Technology  
Technical University of Denmark (DTU)*

**05:25 AM:** 1233

**Photoacoustic tomography system using a ring-array sensor for early detection of inflammatory arthritis in a human finger**

*Misaki Nishiyama*

*Graduate School of Medicine  
Kyoto University*

**05:35 AM:** 2301

**Enabling fast charging lithium ion batteries with surface acoustic wave devices**

*An Huang*

*Department of Material Science and Engineering  
University of California San Diego*

4:15:00 AM - 6:15:00 AM

**B1P-06: MSD: Poster AM - Medical System Design - Needle Applications**

**Session Chair(s):** Alessandro Ramalli (University of Florence)

**04:15 AM**

**1417: A Novel Transducer Construct Enables Miniaturisation of an Ultrasonically Actuated Medical Needle**

*Yohann Le Boulout, Emanuele Perra, Gösta Ehnholm, Heikki Nieminen  
Aalto University, Finland*

**04:25 AM**

**1789: Observations of Nonlinear Acoustic Phenomena Near the Tip of an Ultrasonically Actuated Medical Needle**

*Emanuele Perra<sup>{1}</sup>, Eetu Lampsjärvi<sup>{2}</sup>, Muhammad Arif<sup>{1}</sup>, Tuomas Puranen<sup>{2}</sup>, Edward Hæggström<sup>{2}</sup>, Kenneth Pritzker<sup>{3}</sup>, Heikki Nieminen<sup>{1}</sup>  
<sup>{1}</sup>Aalto University, Finland; <sup>{2}</sup>University of Helsinki, Finland; <sup>{3}</sup>University of Toronto and Mount Sinai Hospital, Canada*

**04:35 AM**

**2178: Modified Surface Structure of an Ultrasonically Actuated Medical Needle Enhances Cavitation**

*Kai Liu<sup>{1}</sup>, Tuovinen Pauli<sup>{1}</sup>, Kenneth P.H. Pritzker<sup>{2}</sup>, Robin H. A. Ras<sup>{1}</sup>, Heikki J. Nieminen<sup>{1}</sup>  
<sup>{1}</sup>Aalto University, Finland; <sup>{2}</sup>University of Toronto and Mount Sinai Hospital Toronto, Canada*

4:15:00 AM - 6:15:00 AM

**B1P-08: MEL: Poster AM - Myocardial Elastography**

**Session Chair(s):** Annette Caenen (Ghent University)

**04:45 AM**

**1332: Myocardial Strain Imaging of Murine Left Ventricles by Using Ultrafast High-Frequency Vector Doppler Imaging**

*Xi-Rui Qiu, Hsin Huang, Chih-Chung Huang  
National Cheng Kung University, Taiwan*

**04:55 AM**

**1444: Ex-Vivo Study of Inter-Probe Angle in Myocardial Deformation Improvement Using Multi-Perspective Ultrafast Ultrasound**

*Peilu Liu, Hein de Hoop, Marloes Sjoerdsma, Hans-Martin Schwab, Richard Lopata  
Eindhoven University of Technology, Netherlands*

**05:05 AM**

**1567: Cardiac Strain Imaging with Dynamically Skipped Frames: a Simulation Study**

*Rashid Al Mukaddim, Tomy Varghese  
University of Wisconsin-Madison, United States*

**05:15 AM**

**1632: Detection of HIFU Lesions in Ex-Vivo Cardiac Tissues Using Passive Elastography**

## Wednesday, September 9

Jade Robert<sup>{2}</sup>, Elodie Cao<sup>{2}</sup>, Louis Reynouard<sup>{2}</sup>, Bruno Giannarino<sup>{2}</sup>, Francis Bessière<sup>{2}</sup>, Stefan Catheline<sup>{1}</sup>, Cyril Lafon<sup>{2}</sup>  
<sup>{1}</sup>INSERM Labtau, University of Lyon, France;  
<sup>{2}</sup>INSERM U1032 / LabTAU, France

**05:25 AM**

**1746: The Effect of Different Coherence-Based Beamforming Techniques on the Accuracy of High Frame Rate Speckle Tracking Echocardiography**  
Marta Orlowska<sup>{1}</sup>, Alessandro Ramalli<sup>{2}</sup>, Stephanie Bézy<sup>{1}</sup>, Giulia Matrone<sup>{3}</sup>, Jens-Uwe Voigt<sup>{1}</sup>, Jan D'Hooge<sup>{1}</sup>

<sup>{1}</sup>Katholieke Universiteit Leuven, Belgium; <sup>{2}</sup>Katholieke Universiteit Leuven / Università degli Studi di Firenze, Belgium; <sup>{3}</sup>University of Pavia, Italy

**05:35 AM**

**2377: Myocardial Elastography Is Improved with Minimum Variance Beamforming in Silico and in Vivo**  
Jad El Harake, Changhee Lee, Paul Kemper, Vincent Sargsyan, Julien Grondin, Elisa Konofagou  
Columbia University, United States

**05:45 AM**

**1052: Myocardial Stretch Propagation Measurement with Focused and Diverging Beams: a Feasibility and Reproducibility Study in Healthy Volunteers**  
Ali Sadeghi, Francois Vignon, Carolina Amador Carrascal, Patrick Rafter  
Philips Research North America, United States

**4:15:00 AM - 6:15:00 AM**

**B1P-07: MEL: Poster AM - Elastography of Muscles**  
Session Chair(s): Stefan Catheline (INSERM, LabTAU)

**04:15 AM**

**1443: Acoustoelasticity in Transverse Isotropic Soft Tissues: Quantification of Muscles' Nonlinear Elasticity**  
Marion Bied, Laurène Jourdain, Jean-Luc Gennisson  
BioMaps, Université Paris Saclay, CNRS, Inserm, CEA, France

**04:25 AM**

**1719: In Vivo Quantification of Diaphragm Viscoelasticity by Guided Shear Wave Analysis**  
Thomas Poulard<sup>{1}</sup>, Javier Brum<sup>{4}</sup>, Jérôme Laurent<sup>{2}</sup>, Damien Bachasson<sup>{3}</sup>, Jean-Luc Gennisson<sup>{1}</sup>  
<sup>{1}</sup>BioMaps, Université Paris Saclay, CNRS, Inserm, CEA, France; <sup>{2}</sup>CEA Leti, France; <sup>{3}</sup>Institut de Myologie, France; <sup>{4}</sup>University of the Republic, Uruguay

**04:35 AM**

**1791: Viscoelastic Characterization in Muscle Using Group Speed Analysis and Volumetric Shear Wave Elasticity Imaging**  
Courtney Trutna, Anna Knight, Ned Rouze, Lisa Hobson-Webb, Mark Palmeri, Kathryn Nightingale  
Duke University, United States

**04:45 AM**

**1839: 3D Ultrasound Strain Imaging of the Puborectalis Muscle**

Shreya Das<sup>{1}</sup>, Rik Hansen<sup>{1}</sup>, Gijs Hendriks<sup>{1}</sup>, Frieda van Den Noort<sup>{3}</sup>, Claudia Manzini<sup>{2}</sup>, Huub van der Vaart<sup>{2}</sup>, Chris de Korte<sup>{1}</sup>  
<sup>{1}</sup>Radboud University Medical Center, Netherlands;  
<sup>{2}</sup>University Medical Center, Netherlands; <sup>{3}</sup>University of Twente, Netherlands

**04:55 AM**

**2467: Feasibility of Reverberant Shear Wave Elastography for in Vivo Assessment of Skeletal Muscle Viscoelasticity**  
Estefano Machado, Stefano Romero, Gilmer Flores, Benjamin Castaneda  
Pontificia Universidad Católica del Perú, Peru

**4:15:00 AM - 6:15:00 AM**

**B1P-10: MEL: Poster AM - Arterial Wall Elastography**  
Session Chair(s): Hiroshi Kanai (Tohoku University)

**05:05 AM**

**1587: Quantitative Assessment of Arterial Anisotropy by Spontaneous Pulsatile Waves**  
Dan Ran, He Li, Wei-Ning Lee  
University of Hong Kong, China

**05:15 AM**

**1797: Assessing Carotid Wall Stiffness with Ultrasound After Unilateral Irradiation Therapy**  
Judith Pruijssen, Joyce Wilbers, Ashwin Wenmakers, Chris de Korte, Johannes Kaanders, Hendrik Hansen  
Radboud University Medical Center, Netherlands

**05:25 AM**

**1964: Multimodal Inversion for Shear Modulus and Thickness of Arteries**  
Tuhin Roy<sup>{2}</sup>, Matthew W. Urban<sup>{1}</sup>, James Greenleaf<sup>{1}</sup>, Murthy N. Guddati<sup>{2}</sup>  
<sup>{1}</sup>Mayo Clinic, United States; <sup>{2}</sup>North Carolina State University, United States

**05:35 AM**

**2036: Enhancing Arterial Dispersion Analysis via Mode Control**  
Nicholas Hugenberg<sup>{1}</sup>, Hadiya Harrigan<sup>{1}</sup>, Tuhin Roy<sup>{3}</sup>, Murthy N. Guddati<sup>{3}</sup>, James Greenleaf<sup>{2}</sup>, Matthew Urban<sup>{2}</sup>, Wilkins Aquino<sup>{1}</sup>  
<sup>{1}</sup>Duke University, United States; <sup>{2}</sup>Mayo Clinic, United States; <sup>{3}</sup>North Carolina State University, United States

**05:45 AM**

**2116: Improving Vascular Strain Imaging Using Ultrafast Multi-Perspective Ultrasound**  
Hein de Hoop<sup>{2}</sup>, Niels Petterson<sup>{2}</sup>, Marc van Sambeek<sup>{1}</sup>, Hans-Martin Schwab<sup>{2}</sup>, Richard Lopata<sup>{2}</sup>  
<sup>{1}</sup>Catharina Hospital, Netherlands; <sup>{2}</sup>Eindhoven University of Technology, Netherlands

**05:55 AM**

**2355: Beam-Steered Shear Wave Elastography to Assess Stiffness Along the Arterial Circumference: a Proof-of-Principle Study**  
Judith Pruijssen, Chris de Korte, Stein Fekkes, Hendrik Hansen  
Radboud University Medical Center, Netherlands

06:05 AM

**2424: Measurement of Change in Viscoelasticity of Radial Artery During Flow-Mediated Dilatation Using a Single Ultrasonic Probe**

Yuto Shoji{2}, Takumi Saito{2}, Shohei Mori{2}, Mototaka Arakawa{2}, Shigeo Ohba{2}, Kazuto Kobayashi{1}, Hiroshi Kanai{2}  
{1}Honda Electronics Co., Ltd., Japan; {2}Tohoku University, Japan

4:15:00 AM - 6:15:00 AM

**B1P-11: MEL: Poster AM - Viscoelasticity, Anisotropy, and Nonlinearity I**

**Session Chair(s):** Jean Luc Gennisson (Universite Paris-Saclay)

04:15 AM

**1081: Development of a Viscoelastic Phantom for Ultrasound and MR Elastography Satisfying the QIBA Acoustic Specifications**

Mikio Suga{1}, Masashi Usumura{1}, Riwa Kishimoto{2}, Takeru Mizoguchi{1}, Tadashi Yamaguchi{1}, Takayuki Obata{2}  
{1}Chiba University, Japan; {2}National Institute of Radiological Sciences, QST, Japan

04:25 AM

**1781: Stress Estimation by Ultrasound: a Proof of Concept with Preliminary Results**

Yue Xu, Yahua Wang, Wei-Ning Lee  
University of Hong Kong, China

04:35 AM

**1790: Estimation of Viscoelasticity for Anisotropic Phantom by Dual Ultrasound Excitation**

Mototaka Arakawa, Hibiki Kawamura, Narumi Fukuzawa, Shohei Mori, Hiroshi Kanai  
Tohoku University, Japan

04:45 AM

**2204: A Comparison of Single- and Multiple- Tracking Location Shear Wave Elastography (SWE) for Viscosity Mapping by System Identification (SI)**

Xufei Chen{1}, Rogier Wildeboer{2}, Alex Kolen{2}, Ruud Sloun{1}, Massimo Mischi{1}  
{1}Eindhoven University of Technology, Netherlands; {2}Philips Research, Netherlands

04:55 AM

**2423: In Vivo Monitoring of Corneal Viscoelasticity in Rabbits with Collagen Cross-Linking Treatment Using Ultrasound Elastography**

Linfeng Zhao, Yuxi Zhang, Xin Chen, Siping Chen, Xinyu Zhang  
Shenzhen University, China

4:15:00 AM - 6:15:00 AM

**B1P-12: MEL: Poster AM - Kidney & Liver Elastography**

**Session Chair(s):** Jean Luc Gennisson (Universite Paris-Saclay)

05:05 AM

**1162: Shear Wave Viscoelastography on Fatty Mulard Duck Livers in Vivo**

Manish Bhatt{2}, Ladan Yazdani{2}, François Destrempes{2}, Louise Allard{2}, Bich Nguyen{1}, An Tang{2}, Guy Cloutier{2}  
{1}University of Montreal Hospital, Canada; {2}University of Montreal Hospital Research Center, Canada

05:15 AM

**1608: Verification of Effect of Lipid Droplet Distribution in the Liver on Evaluation of Shear Wave Velocity**

Daiki Ito{1}, Takuma Oguri{2}, Kenji Yoshida{1}, Tadashi Yamaguchi{1}  
{1}Chiba University, Japan; {2}GE Healthcare, Japan

05:25 AM

**1810: Imaging Nonlinear Shear Modulus of an Ex Vivo Porcine Kidney Using Multi-Compression and Shear Wave Elastography Techniques**

Yuqi Wang, Matthew Urban  
Mayo Clinic, United States

05:35 AM

**2030: Can Early-Stage Nonalcoholic Steatohepatitis in Mouse Models be Effectively Identified by Shear Wave Elastography as a Non-Invasive Biomarker?**

Xiaohong Wang, Tuo Shao, Viksit Kumar, Steven H. Liang, Anthony E. Samir  
Massachusetts General Hospital, United States

4:15:00 AM - 6:15:00 AM

**B1P-13: MBE: Poster AM - Microbubble & Cavitation Phenomena**

**Session Chair(s):** Sevan Harput (London South Bank University)  
Bajram Zeqiri (National Physical Laboratory)

04:15 AM

**1123: Evaluation of Damage on Vascular Endothelial Cells Under Exposure of Burst Wave with Presence of Lipid Bubbles**

Tatsuya Saito{3}, Masakazu Seki{3}, Kiyonobu Nozaki{3}, Yoshitaka Miyamoto{1}, Daiki Omata{2}, Ryo Suzuki{2}, Kohji Masuda{3}  
{1}National Center for Child Health and Development, Japan; {2}Teikyo University, Japan; {3}Tokyo University of Agriculture and Technology, Japan

04:25 AM

**1180: Ultrasonic Modulation of Neural Activity Mediated by Biogenic Nano Gas Vesicles**

Xuandi Hou, Zhihai Qiu, Shashwati Kala, Jiejun Zhu, Jinghui Guo, Ting Zhu, Lei Sun  
Hong Kong Polytechnic University, China

04:35 AM

**1243: All-in-One Nanoplatfrom Augments in Situ Glioma Therapy Combining Ultrasound-Targeted Microbubble Destruction**

Pengying Wu{2}, Mingting Zhu{2}, Yan Li{2}, Yuchen Yuan{2}, Lei Zhang{2}, Wei Dong{2}, Yujin Zong{2}, Ayache Bouakaz{1}, Mingxi Wan{2}  
{1}iBrain, Université de Tours, Inserm, France; {2}Xi'an Jiaotong University, China

04:45 AM

**1252: Cell Sonoporation and Lysis Based on Stable Cavitating Bubble Array**

*Xiufang Liu{2}, Wei Zhou{2}, Umar Farooq{2}, Long Meng{2}, Lisheng Xu{1}, Lili Niu{2}, Hairong Zheng{2}*  
{1}Northeastern University, China; {2}Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

04:55 AM

**1320: Evaluation of the Lifetime and Size Distribution of Daughter Bubbles Generated by Inertial Cavitation**

*Yanglin Li{1}, Chunjie Tan{1}, Tao Han{1}, Alfred.C.H Yu{2}, Peng Qin{1}*  
{1}Shanghai Jiao Tong University, China; {2}University of Waterloo, Canada

05:05 AM

**1330: Ultrasound-Mediated Delivery of siRNA Silencing miRNAs Transcription Factor Using Targeted Cationic Polymeric Nanodroplet for Ischemic Stroke Therapy**

*Wei Dong, Mengfan Qin, Haiyang Yu, Anqi Huang, Mingxi Wan, Yujin Zong*  
Xi'an Jiaotong University, China

05:15 AM

**1359: Biophysical Impact of Acoustic Droplet Vaporization on Single Cell in a Tissue Mimicking Hydrogel Phantom**

*Lei Zhang{2}, Pengying Ni{2}, Junjie Chen{2}, Yi Feng{1}, Mingxi Wan{2}*  
{1}Stanford University / Xi'an Jiaotong University, China; {2}Xi'an Jiaotong University, China

05:25 AM

**1404: Visualization of Endothelial Cell Damage Caused by Ultrasonically Induced Microbubble Oscillation Inside a Capillary Phantom**

*Riichiro Shimizu, Nobuki Kudo*  
Hokkaido University, Japan

05:35 AM

**1551: A Real-Time Proportional Feedback Controller for Sustaining Uniform Inertial Cavitation Dynamics of Flowing Bubbles**

*Chunjie Tan{1}, Bo Yan{1}, Tao Han{1}, Alfred.C.H Yu{2}, Peng Qin{1}*  
{1}Shanghai Jiao Tong University, China; {2}University of Waterloo, Canada

05:45 AM

**1616: Precise Cellular Drug Delivery and Underlying Mechanisms of Drug-Loaded Microbubbles Cavitation**

*Ching-Hsiang Fan, Ho-Chun Chang, Chih-Kuang Yeh*  
National Tsing Hua University, Taiwan

05:55 AM

**1840: Single Proton Acoustic Pressure for Dosimetry in Proton Therapy**

*Floris Deurvorst{1}, Gonzalo Collado Lara{2}, Agisilaos Matalliotakis{1}, Hendrik Vos{2}, Martin Verweij{1}, Nico de Jong{3}, Verya Daeichin{1}*  
{1}Delft University of Technology, Netherlands; {2}Erasmus University Medical Center, Netherlands;

{3}Erasmus University Medical Center / Delft University of Technology, Netherlands

4:15:00 AM - 6:15:00 AM

**B1P-14: MBE: Poster AM - Stimulation**

**Session Chair(s):** Jérôme Gâteau (CNRS at Sorbonne University)  
Bajram Zeqiri (National Physical Laboratory)

04:15 AM

**1273: Delayed and Prolonged Response Effect of Primary Hippocampal Neurons Under High-Frequency Ultrasound Stimulation**

*Yiming Chen{1}, Wenyong Fan{2}, Long Meng{3}, Hairong Zheng{3}, Liming Cheng{1}, Lei Xue{2}, Qian Cheng{1}*  
{1}Tongji University, China; {2}Fudan University, China; {3}Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

04:25 AM

**1529: Correction for Spatial Averaging Artifacts for Circularly-Symmetric Nonlinear Pressure Beams Measured with Membrane Hydrophones**

*Keith Wear{1}, Anant Shah{2}, Christian Baker{2}*  
{1}Food and Drug Administration, United States; {2}National Physical Laboratory, United Kingdom

04:35 AM

**1597: Transcranial Focused Ultrasonic Stimulation to Modulate the Human Primary Somatosensory Cortex**

*Julien Lambert, André Mouraux*  
Université catholique de Louvain, Belgium

04:45 AM

**1655: Ultrasonic Stimulation of Dorsal Root Ganglion Neurons at 20 MHz**

*Sungjae Yoo{1}, Elena Brunet{1}, Eric Debieu{2}, Olivier Macherey{2}, Aziz Moqrich{1}, Emilie Franceschini{2}*  
{1}Aix-Marseille University / CNRS / IBDM, France; {2}Aix-Marseille University / CNRS / LMA, France

04:55 AM

**2248: Intracellular Calcium Influx Induced by Acoustic Radiation Force and its Effects on Stiffness**

*Wei-Wen Liu, Pei-Yu Chao, Pai-Chi Li*  
National Taiwan University, Taiwan

05:05 AM

**2409: Sonication of in Situ Forming Implants Cause Concentration Dependent Changes to Dye Area**

*Elizabeth Berndt{2}, Emily Budziszewski{1}, Selva Jeganathan{1}, Agata Exner{1}, Michael C. Kolios{2}*  
{1}Case Western Reserve University, United States; {2}Ryerson University, Canada

4:15:00 AM - 6:15:00 AM

**B1P-15: MTC: Poster AM - Attenuation & Sound Speed Imaging**

**Session Chair(s):** Hideyuki Hasegawa (University of Toyama)  
Jonathan Mamou (Riverside Research)

04:15 AM

**1229: Changes of Longitudinal Wave Velocity in Wet Collagen Film Due to Glycation**

## Wednesday, September 9

Keita Yano, Itsuki Michimoto, Shoya Ueno, Mami Matsukawa  
Doshisha University, Japan

**04:25 AM**

### **1882: Average Sound Speed Estimation Using Backscattered Signals from Inhomogeneous Media and its Error Analysis**

Naotaka Nitta<sup>{1}</sup>, Toshikatsu Washio<sup>{2}</sup>  
<sup>{1}</sup>National Institute of Advanced Industrial Science and Technology, Japan; <sup>{2}</sup>National Institute of Advanced Industrial Science and Technology (AIST), Japan

**04:35 AM**

### **2293: Basic Study for Size Estimation of Red Blood Cell Aggregates by Analyzing Ultrasonic Backscattering Properties Considering Ultrasonic Propagation Attenuation**

Mototaka Arakawa<sup>{2}</sup>, Kanta Nagasawa<sup>{2}</sup>, Akiyo Fukase<sup>{2}</sup>, Kyohei Higashiyama<sup>{2}</sup>, Shohei Mori<sup>{2}</sup>, Satoshi Yashiro<sup>{1}</sup>, Yasushi Ishigaki<sup>{1}</sup>, Hiroshi Kanai<sup>{2}</sup>  
<sup>{1}</sup>Iwate Medical University, Japan; <sup>{2}</sup>Tohoku University, Japan

**04:45 AM**

### **2483: Ultrasound Shear Wave Velocity and Attenuation for Characterizing the Recovery of Contused Muscles**

Da-Ming Huang, Shyh-Hau Wang  
National Cheng Kung University, Taiwan

**4:15:00 AM - 6:15:00 AM**

### **B1P-16: MTC: Poster AM - Bone & Cartilage Characterization Using Ultrasound**

**Session Chair(s):** Kay Raum (Charité - Universitätsmedizin Berlin)

**04:55 AM**

### **1310: Matrix Pencil Estimation of Guided Waves Dispersion in a Human Skull**

Matteo Mazzotti<sup>{2}</sup>, Christopher Sugino<sup>{1}</sup>, Alper Erturk<sup>{1}</sup>, Massimo Ruzzene<sup>{2}</sup>  
<sup>{1}</sup>Georgia Institute of Technology, United States; <sup>{2}</sup>University of Colorado Boulder, United States

**05:05 AM**

### **1502: Bone Health Assessment Using Synthetic Aperture Ultrasound Reflectometry**

Jonathan Richardson<sup>{2}</sup>, Shakti Davis<sup>{2}</sup>, Emily Joback<sup>{2}</sup>, Lars Gjestebjy<sup>{2}</sup>, Viksit Kumar<sup>{1}</sup>, Anthony Samir<sup>{1}</sup>  
<sup>{1}</sup>Massachusetts General Hospital, United States; <sup>{2}</sup>MIT Lincoln Laboratory, United States

**05:15 AM**

### **1669: Ultrasound Characterization of Cortical Bone Using Backscatter Statistics**

Yasamin Karbalaieisadegh<sup>{1}</sup>, Quentin Grimal<sup>{2}</sup>, Marie Muller<sup>{1}</sup>  
<sup>{1}</sup>North Carolina State University, United States; <sup>{2}</sup>Sorbonne Université, France

**05:25 AM**

### **1680: Applicability of Axial Transmission Technique to the Evaluation of Equine Periostitis**

Kazuki Miyashita<sup>{1}</sup>, Takashi Misaki<sup>{1}</sup>, Mineaki Takata<sup>{1}</sup>, Ko Chiba<sup>{3}</sup>, Hiroshi Mita<sup>{2}</sup>, Norihisa Tamura<sup>{2}</sup>, Mami Matsukawa<sup>{1}</sup>  
<sup>{1}</sup>Doshisha University, Japan; <sup>{2}</sup>JRA Equine Research Institute, Japan; <sup>{3}</sup>Nagasaki University, Japan

**05:35 AM**

### **1704: Effects of Inflammation on the Longitudinal Wave Velocity in Equine Cortical Bone**

Mineaki Takata<sup>{1}</sup>, Norihisa Tamura<sup>{2}</sup>, Hiroshi Mita<sup>{2}</sup>, Tsukasa Nakamura<sup>{1}</sup>, Kazuki Miyashita<sup>{1}</sup>, Mami Matsukawa<sup>{1}</sup>  
<sup>{1}</sup>Doshisha university, Japan; <sup>{2}</sup>JRA Equine Research Institute, Japan

**05:45 AM**

### **1937: Quantitative Ultrasound Characterization of Human Articular Cartilage**

Theresa Lye<sup>{2}</sup>, Omar Gachouch<sup>{1}</sup>, Lisa Renner<sup>{1}</sup>, Kay Raum<sup>{1}</sup>, Jonathan Mamou<sup>{2}</sup>  
<sup>{1}</sup>Charité – Universitätsmedizin Berlin, Germany; <sup>{2}</sup>Lizzi Center for Biomedical Engineering, Riverside Research, United States

**05:55 AM**

### **2156: Change of Piezoelectric Signal in Water-Saturated Cancellous Bone with Irradiated Ultrasound Frequency**

Atsushi Hosokawa  
National Institute of Technology, Akashi College, Japan

**4:15:00 AM - 6:15:00 AM**

### **B1P-17: MTC: Poster AM - Quantitative Ultrasound: Diagnostic Applications**

**Session Chair(s):** Chris de Korte (Radboud University Medical Center)

**04:15 AM**

### **1346: Effective Depth Expansion for Reliable Fatty Liver Assessment Using a Double Nakagami Distribution Model**

Kazuki Tamura<sup>{2}</sup>, Jonathan Mamou<sup>{3}</sup>, Kenji Yoshida<sup>{1}</sup>, Hiroyuki Hachiya<sup>{4}</sup>, Tadashi Yamaguchi<sup>{1}</sup>  
<sup>{1}</sup>Chiba University, Japan; <sup>{2}</sup>Hamamatsu University School of Medicine, Japan; <sup>{3}</sup>Lizzi Center for Biomedical Engineering, Riverside Research, United States; <sup>{4}</sup>Tokyo Institute of Technology, Japan

**04:25 AM**

### **2415: Acoustic Radiation Force Impulse Imaging for Predicting Response of Triple Negative Breast Cancer to Therapy**

Amber Moody<sup>{3}</sup>, Tomasz Czernuszewicz<sup>{2}</sup>, William Zamboni<sup>{3}</sup>, Paul Dayton<sup>{1}</sup>  
<sup>{1}</sup>North Carolina State University / University of North Carolina at Chapel Hill, United States; <sup>{2}</sup>Sonovol, Inc., United States; <sup>{3}</sup>University of North Carolina at Chapel Hill, United States

**04:35 AM**

### **1086: Detection of Motor Endplates in Deep and Pennate Skeletal Muscles In-Vivo Using Ultrafast Ultrasound**

## Wednesday, September 9

Christoph Leitner<sup>{2}</sup>, Sergei Vostrikov<sup>{1}</sup>, Harald Penasso<sup>{3}</sup>, Pascal Hager<sup>{1}</sup>, Andrea Cossettini<sup>{1}</sup>, Luca Benini<sup>{1}</sup>, Christian Baumgartner<sup>{2}</sup>  
<sup>{1}</sup>ETH Zürich, Switzerland; <sup>{2}</sup>Graz University of Technology, Austria; <sup>{3}</sup>University of Colorado Boulder, United States

### 04:45 AM

#### 1274: Ultrafast Ultrasound Plane Wave Imaging as a Novel Non-Invasive Technique to Assess Diaphragm Contractility in Response to Phrenic Nerve Magnetic Stimulation

Thomas Poulard<sup>{1}</sup>, Martin Dres<sup>{4}</sup>, Marie-Cécile Niérat<sup>{5}</sup>, Jean-Yves Hogrel<sup>{3}</sup>, Thomas Similowski<sup>{4}</sup>, Damien Bachasson<sup>{2}</sup>, Jean-Luc Gennisson<sup>{1}</sup>  
<sup>{1}</sup>BioMaps, Université Paris Saclay, CNRS, Inserm, CEA, France; <sup>{2}</sup>Institut de Myologie, France; <sup>{3}</sup>Neuromuscular Physiology Laboratory, France; <sup>{4}</sup>Sorbonne Université / AP-HP, France; <sup>{5}</sup>Sorbonne Université, INSERM, France

### 04:55 AM

#### 1586: High-Frame-Rate Imaging for Ultrasonic Backscatter and Functional Analyses of Vascular System

Masaaki Omura<sup>{2}</sup>, Ryo Nagaoka<sup>{2}</sup>, Hideyuki Hasegawa<sup>{2}</sup>, Kenji Yoshida<sup>{1}</sup>, Tadashi Yamaguchi<sup>{1}</sup>  
<sup>{1}</sup>Chiba University, Japan; <sup>{2}</sup>University of Toyama, Japan

### 05:05 AM

#### 1602: Backscattering Analysis for Characterization of Lymphedema Dermis and Hypodermis

Wakana Saito, Masaaki Omura, Shinsuke Akita, Kenji Yoshida, Tadashi Yamaguchi  
Chiba University, Japan

### 05:15 AM

#### 1660: Experimental Performance Comparison Between CMUT and Piezoelectric Probes in Measuring Backscatter Anisotropy

Lenin Chinchilla<sup>{2}</sup>, Emilie Franceschini<sup>{1}</sup>, Alessandro Savoia<sup>{3}</sup>  
<sup>{1}</sup>Aix-Marseille University / CNRS / LMA, France; <sup>{2}</sup>Aix-Marseille University / CNRS / Roma Tre University, France; <sup>{3}</sup>Roma Tre University, Italy

### 4:15:00 AM - 6:15:00 AM

#### B1P-21: MPA: Poster AM - Bone Assessment Using Photoacoustics

Session Chair(s): Mami Matsukawa (Doshisha University)

### 05:25 AM

1044: Photoacoustic Bone Assessment - a Clinical Feasibility Study on Human Calcaneus Bone in Vivo Ting Feng<sup>{1}</sup>, Yunhao Zhu<sup>{1}</sup>, Richard Morris<sup>{2}</sup>, Ken Kozloff<sup>{1}</sup>, Xueding Wang<sup>{1}</sup>  
<sup>{1}</sup>University of Michigan, United States; <sup>{2}</sup>Walnut Bank, United States

### 05:35 AM

#### 1355: Wavelet Transform-Based Photoacoustic Time-Frequency Spectral Analysis for Assessment of Bone Quality

Weiya Xie<sup>{1}</sup>, Ting Feng<sup>{2}</sup>, Dean Ta<sup>{3}</sup>, Liming Cheng<sup>{1}</sup>, Qian Cheng<sup>{1}</sup>  
<sup>{1}</sup>Tongji University, China; <sup>{2}</sup>Nanjing University of Science and Technology, China; <sup>{3}</sup>Fudan university, China;

### 05:45 AM

#### 1596: The Feasibility Study of the Photoacoustic Signal Detection in Human Calcaneus Bone in Vivo

Ting Feng<sup>{1,2,3}</sup>, Yunhao Zhu<sup>{3}</sup>, Chengcheng Liu<sup>{3}</sup>, Weiya Xie<sup>{3}</sup>, Dean Ta<sup>{4}</sup>, Xueding Wang<sup>{1}</sup>, Qian Cheng<sup>{2}</sup>  
<sup>{1}</sup>University of Michigan, China; <sup>{2}</sup>Tongji University, China; <sup>{3}</sup>Nanjing University of Science and Technology, China; <sup>{4}</sup>Fudan university, China.

### 05:55 AM

#### 1645: Assessment of Bone Chemical Composition Using Multi-Wavelength Photoacoustic Analysis

Ting Feng<sup>{1,2}</sup>, Yejing Xie<sup>{2}</sup>, Weiya Xie<sup>{1}</sup>, Jie Yuan<sup>{4}</sup>, Dean Ta<sup>{3}</sup>, Xueding Wang<sup>{5}</sup>, Qian Cheng<sup>{2}</sup>  
<sup>{1}</sup>Tongji University, China; <sup>{2}</sup>Nanjing University of Science and Technology, China; <sup>{3}</sup>Fudan university, China; <sup>{4}</sup>Nanjing University, China; <sup>{5}</sup>University of Michigan, United States

### 4:15:00 AM - 6:15:00 AM

B1P-18: MBF: Poster AM - Directional Flow Estimation Session Chair(s): Pauline Muleki Seya (CREATIS / Lyon INSA)

### 04:15 AM

#### 1185: High-Frame-Rate 3-D Vector Flow Imaging in the Frequency Domain

Stefano Rossi<sup>{2}</sup>, Fabian Fool<sup>{1}</sup>, Alessandro Ramalli<sup>{2}</sup>, Piero Tortoli<sup>{2}</sup>  
<sup>{1}</sup>Medical Imaging, ImPhys, Applied Sciences / Delft University of Technology, Netherlands; <sup>{2}</sup>Università degli Studi di Firenze, Italy

### 04:25 AM

#### 1284: Influence of the Acoustic Lens on Vector Doppler Measurements Based on Plane Wave Transmission: a Simulation Study

Stefano Rossi<sup>{2}</sup>, Alessandro Ramalli<sup>{2}</sup>, Lorenzo Francalanci<sup>{1}</sup>, Piero Tortoli<sup>{2}</sup>  
<sup>{1}</sup>Esaote S.p.A., Italy; <sup>{2}</sup>Università degli Studi di Firenze, Italy

### 04:35 AM

#### 1388: Murine Intraventricular Vector Flow Mapping from Color-Doppler Velocities

Florian Vixège<sup>{1}</sup>, Jeffrey Ketterling<sup>{2}</sup>, Akshay Shekhar<sup>{4}</sup>, Orlando Aristizabal<sup>{3}</sup>, Damien Garcia<sup>{1}</sup>  
<sup>{1}</sup>Creatis - INSA Lyon, France; <sup>{2}</sup>Lizzi Center for Biomedical Engineering, Riverside Research, United States; <sup>{3}</sup>New York University School of Medicine, United States; <sup>{4}</sup>NYU Langone Health / Regeneron, United States

04:45 AM

**1470: Tensor Velocity Imaging with Motion Correction**  
Lasse Thurmman Jørgensen, Mikkel Schou, Matthias Bo Stuart, Jørgen Arendt Jensen  
Technical University of Denmark, Denmark

04:55 AM

**1598: 3-D Directional Transverse Oscillations Synthetic Aperture Tensor Velocity Imaging with a 1024 Element Matrix Probe in a Flow Phantom**  
Fatemeh Makouei<sup>{1}</sup>, Babak Mohammadzadeh Asl<sup>{1}</sup>, Lasse Thurmman Jørgensen<sup>{2}</sup>, Borislav Gueorguiev Tomov<sup>{2}</sup>, Matthias Bo Stuart<sup>{2}</sup>, Jørgen Arendt Jensen<sup>{2}</sup>  
<sup>{1}</sup>Tarbiat Modares University, Iran; <sup>{2}</sup>Technical University of Denmark, Denmark

05:05 AM

**1779: Clutter Removal for High Frame Rate Vector Flow Imaging with a 2-D Sparse Array**  
Fabian Fool<sup>{3}</sup>, Stefano Rossi<sup>{4}</sup>, Alessandro Ramalli<sup>{4}</sup>, Hendrik Vos<sup>{2}</sup>, Enrico Boni<sup>{4}</sup>, Piero Tortoli<sup>{4}</sup>, Nico de Jong<sup>{1}</sup>, Martin Verweij<sup>{3}</sup>  
<sup>{1}</sup>Erasmus University Medical Center / Delft University of Technology, Netherlands; <sup>{2}</sup>Erasmus University Medical Center / University Medical Center Rotterdam, Netherlands; <sup>{3}</sup>Medical Imaging, ImPhys, Applied Sciences / Delft University of Technology, Netherlands; <sup>{4}</sup>Università degli Studi di Firenze, Italy

05:15 AM

**2133: On the Choice of the f-Number in Ultrafast Vector Doppler**  
Vincent Perrot<sup>{2}</sup>, Damien Garcia<sup>{1}</sup>  
<sup>{1}</sup>Creatis - INSA Lyon, France; <sup>{2}</sup>Polytechnique Montréal, Canada

05:25 AM

**2281: Vector-Flow Imaging in Convex-Array Configurations**  
Adrien Besson, Frédéric Wintzenrieth, Claude Cohen-Bacrie  
E-Scopics SAS, France

05:35 AM

**2480: An Overlapped Electrical Scanning Configuration of a 2D Matrix Array Transducer for 3D Vector Flow Imaging Using a Single 256-ch US Platform**  
Naoya Kanno, Takuro Ishii, Yoshifumi Saijo  
Tohoku University, Japan

4:15:00 AM - 6:15:00 AM

**B1P-19: MBF: Poster AM - Ultrasound Localization Microscopy**  
Session Chair(s): Simona Turco (Eindhoven University)

04:15 AM

**1369: Intraoperative Ultrasound Localization Microscopy of Human Spinal Cord: an In-Vivo Feasibility Study**  
Yayu Hao<sup>{2}</sup>, Linkai Jing<sup>{1}</sup>, Qiong He<sup>{2}</sup>, Jianwen Luo<sup>{2}</sup>  
<sup>{1}</sup>Tsinghua Changgung Hospital, China; <sup>{2}</sup>Tsinghua University, China

04:25 AM

**1684: A Deep Learning Method for Reduction of Microbubble Accumulation Time in Ultrasound Localization Microscopy**  
Xi Zhang, Yi Yang, Jingke Zhang, Qiong He, Jianwen Luo  
Tsinghua University, China

04:35 AM

**1785: Automatic and Robust Inflammation Assessment for Crohn's Disease Using Ultrasound Microvessel Imaging**  
Shanshan Tang<sup>{1}</sup>, Chengwu Huang<sup>{1}</sup>, Ping Gong<sup>{1}</sup>, U-Wai Lok<sup>{1}</sup>, Chenyun Zhou<sup>{2}</sup>, Lulu Yang<sup>{2}</sup>, Kate Knoll<sup>{1}</sup>, Britta Thomforde<sup>{1}</sup>, Ida Smith<sup>{1}</sup>, Shannon Sheedy<sup>{1}</sup>, John Knudsen<sup>{1}</sup>, David Bruining<sup>{1}</sup>, Shigao Chen<sup>{1}</sup>  
<sup>{1}</sup>Mayo Clinic, United States; <sup>{2}</sup>West China Hospital of Sichuan University, China

04:45 AM

**1917: In-Human Super-Resolution Ultrasound Microvessel Imaging on a Clinical Ultrasound Scanner: a Pilot Study**  
Chengwu Huang<sup>{1}</sup>, Wei Zhang<sup>{3}</sup>, Ping Gong<sup>{1}</sup>, U-Wai Lok<sup>{1}</sup>, Shanshan Tang<sup>{1}</sup>, Xirui Zhang<sup>{2}</sup>, Lei Zhu<sup>{2}</sup>, Maodong Sang<sup>{2}</sup>, Lili Wu<sup>{3}</sup>, Rongqin Zheng<sup>{3}</sup>, Shigao Chen<sup>{1}</sup>  
<sup>{1}</sup>Mayo Clinic, United States; <sup>{2}</sup>Shenzhen Mindray Bio-Medical Electronics Co. Ltd, China; <sup>{3}</sup>Third Affiliated Hospital of Sun Yat-Sen University, China

04:55 AM

**1932: Multi-Resolution Data Processing for Accelerated and Robust Ultrasound Localization Microscopy**  
Matthew Lowerison<sup>{2}</sup>, Xi Chen<sup>{2}</sup>, Chengwu Huang<sup>{1}</sup>, Wei Zhang<sup>{2}</sup>, Shanshan Tang<sup>{1}</sup>, Nathiya Chandra Sekaran<sup>{2}</sup>, Daniel Llano<sup>{2}</sup>, Shigao Chen<sup>{1}</sup>, Pengfei Song<sup>{2}</sup>  
<sup>{1}</sup>Mayo Clinic, United States; <sup>{2}</sup>University of Illinois at Urbana-Champaign, United States

05:05 AM

**1954: Therapy Evaluation of Chemotherapy and Anti-Angiogenic Treated Colorectal Carcinoma Xenografts in Chicken Embryo via Ultrasound Localization Microscopy**  
Matthew Lowerison, Wei Zhang, Pengfei Song  
University of Illinois at Urbana-Champaign, United States

05:15 AM

**2196: Super-Resolution Ultrasound Localization Microscopy on a Rabbit Liver VX2 Tumor Model: an Initial Feasibility Study**  
Matthew Lowerison, Wei Zhang, Zhijie Dong, Rita Miller, Krista Keller, Pengfei Song  
University of Illinois at Urbana-Champaign, United States

05:25 AM

**2307: Can You Trust Your Ultrasound Microvascular Images?**  
Rohit Nayak, Mostafa Fatemi, Azra Alizad  
Mayo Clinic, United States

## Wednesday, September 9

05:35 AM

**2337: Motion-Robust Background Noise Bias Suppression for Contrast-Free Ultrasound Microvascular Imaging**

Rohit Nayak, Mostafa Fatemi, Azra Alizad  
Mayo Clinic, United States

4:15:00 AM - 6:15:00 AM

**B1P-20: MBF: Poster AM - Blood Flow Segmentation/Processing**

Session Chair(s): Magnus Cinthio (Lund University)

04:15 AM

**1309: Plane Wave Compounding with Blind Source Separation Framework for Perfusion Imaging During Tissue Acceleration**

Geraldi Wahyulaksana<sup>{2}</sup>, Luxi Wei<sup>{2}</sup>, Jason Voorneveld<sup>{2}</sup>, Antonius van der Steen<sup>{2}</sup>, Nico de Jong<sup>{1}</sup>, Hendrik Vos<sup>{2}</sup>  
<sup>{1}</sup>Erasmus University Medical Center / Delft University of Technology, Netherlands; <sup>{2}</sup>Erasmus University Medical Center / University Medical Center Rotterdam, Netherlands

04:25 AM

**1356: Visualization of Micro Flow Channel by Plane Wave Imaging and Temporal Variance**

Ryo Nagaoka<sup>{2}</sup>, Benjamin Meirza<sup>{1}</sup>, Maria Evertsson<sup>{1}</sup>, Magnus Cinthio<sup>{1}</sup>, Hideyuki Hasegawa<sup>{2}</sup>  
<sup>{1}</sup>Lund University, Sweden; <sup>{2}</sup>University of Toyama, Japan

04:35 AM

**1866: Adaptive Transmit Beamforming for Robust Flow Monitoring Using Cross-Sectional Doppler**

Luuk van Knippenberg<sup>{2}</sup>, Ruud van Sloun<sup>{2}</sup>, Arthur Bouwman<sup>{1}</sup>, Sergei Shulepov<sup>{3}</sup>, Massimo Mischì<sup>{2}</sup>  
<sup>{1}</sup>Catharina Hospital, Netherlands; <sup>{2}</sup>Eindhoven University of Technology, Netherlands; <sup>{3}</sup>Eindhoven University of Technology / Philips Research, Netherlands

04:45 AM

**1984: Left Ventricular High Frame Rate EchoPIV in Patients – Parameter Optimization**

Jason Voorneveld<sup>{1}</sup>, Lana Keijzer<sup>{1}</sup>, Mihai Strachinaru<sup>{1}</sup>, Daniel Bowen<sup>{1}</sup>, Jeffrey Goei<sup>{1}</sup>, Ferit Mutluer<sup>{1}</sup>, Folkert Ten Cate<sup>{1}</sup>, Antonius van der Steen<sup>{2}</sup>, Nico de Jong<sup>{2}</sup>, Hendrik Vos<sup>{1}</sup>, Annemien van Den Bosch<sup>{1}</sup>, Johan G. Bosch<sup>{1}</sup>  
<sup>{1}</sup>Erasmus University Medical Center, Netherlands; <sup>{2}</sup>Erasmus University Medical Center / Delft University of Technology, Netherlands

04:55 AM

**1987: Ultrafast Doppler Imaging Noise Suppression with Spectrum Desymmetrization, Bias Suppression, and Blind Deconvolution**

Guillaume Lacoïn<sup>{4}</sup>, Ilyess Zemmoura<sup>{4}</sup>, Jean Luc Gennisson<sup>{1}</sup>, Denis Kouamé<sup>{2}</sup>, Jean-Pierre Remeniéras<sup>{3}</sup>  
<sup>{1}</sup>BioMaps, Université Paris Saclay, CNRS, Inserm, CEA, France; <sup>{2}</sup>IRIT / Université de Toulouse, France; <sup>{3}</sup>Université de Tours, Inserm, iBrain, France; <sup>{4}</sup>Université de Tours, Inserm, UMR 1253, iBrain, France

05:05 AM

**2131: Background Noise Reduction in Ultrafast Power Doppler Imaging by Transmit Sub-Aperture Processing (TSAP)**

Rifat Ahmed, Wentao Hu, Marvin Doyley  
University of Rochester, United States

05:15 AM

**2392: Contrast-Free Ultrasound Microvascular Imaging with Optimal Clutter Shrinkage to Enhance Tumor Vascular Quantification**

Mahsa Bataghva, Danielle Johnston, Nicholas Power, Silvia Penuela, James Laceyfield  
Western University, Canada

05:25 AM

**2472: Sensitivity and Specificity Analysis of Singular Value Decomposition and Independent Component Analysis Clutter Filters**

Abbie Weeks, Jaime Tierney, Brett Byram  
Vanderbilt University, United States

4:15:00 AM - 6:15:00 AM

**B1P-22: MPA: Poster AM - Photoacoustic Ultrasound Frequency Analysis & Image Guided Interventions**

Session Chair(s): Sophinose Iskander-Rizk (Erasmus MC)

04:15 AM

**1169: Simulation and Experimental Validation of Photoacoustic Spectral Analysis for Quantifying Vascular Bleeding in Early Cancer Treatment Monitoring**

Muhannad Fadhel, Eno Hysi, Jason Zalev, Sila Appak-Baskoy, Yanji Wang, Michael C. Kolios  
Ryerson University, Canada

04:25 AM

**1358: Photoacoustic Spectrum Analysis for Quick Identification and Grading of Prostate Cancer**

Shiyong Wu<sup>{1}</sup>, Yingna Chen<sup>{1}</sup>, Shengsong Huang<sup>{2}</sup>, Chengdang Xu<sup>{2}</sup>, Denglong Wu<sup>{2}</sup>, Qian Cheng<sup>{1}</sup>  
<sup>{1}</sup>Tongji University, China; <sup>{2}</sup>Tongji Hospital, China

04:35 AM

**1794: Robot-Assisted Image Guidance for Prostate Nerve-Sparing Surgery**

Hamid Moradi<sup>{2}</sup>, Emad Boctor<sup>{1}</sup>, Septimiu Salcudean<sup>{3}</sup>  
<sup>{1}</sup>Johns Hopkins Medical Institute, United States; <sup>{2}</sup>Johns Hopkins University, United States; <sup>{3}</sup>University of British Columbia, Canada

## Wednesday, September 9

04:45 AM

**2043: Dual-Wavelength Photoacoustic-Guided Hysterectomy Demonstration with a Human Cadaver**

Alycen Wiacek<sup>{2}</sup>, Karen C. Wang<sup>{1}</sup>, Harold Wu<sup>{1}</sup>,  
Muyinatu A. Lediju Bell<sup>{2}</sup>  
<sup>{1}</sup>Johns Hopkins Medical Institute, United States;  
<sup>{2}</sup>Johns Hopkins University, United States

04:55 AM

**2059: Experimental Cadaver Investigation of Ocular Receiver Location for Photoacoustic Imaging of Intracranial Blood Vessels**

Michelle Graham<sup>{2}</sup>, Jiaqi Huang<sup>{2}</sup>, Francis Creighton<sup>{1}</sup>,  
Muyinatu Lediju Bell<sup>{2}</sup>  
<sup>{1}</sup>Johns Hopkins Medical Institute, United States;  
<sup>{2}</sup>Johns Hopkins University, United States

05:05 AM

**2085: Acoustic Frequency-Based Differentiation of Photoacoustic Signals from Surgical Biomarkers**

Eduardo Gonzalez<sup>{1}</sup>, Muyinatu A. Lediju Bell<sup>{2}</sup>  
<sup>{1}</sup>Johns Hopkins Medical Institute, United States;  
<sup>{2}</sup>Johns Hopkins University, United States

4:15:00 AM - 6:15:00 AM

**B1P-23: MPA: Poster AM - New Approaches For Photoacoustic Imaging & Contrast**

Session Chair(s): Libertario Demi (University of Trento)

05:15 AM

**1251: The Hybrid Optical and Photoacoustic Microscopy: a Novel System to Image Morphological and Photoacoustic Characteristics of Cells**

Ryo Shintate<sup>{1}</sup>, Ryo Nagaoka<sup>{2}</sup>, Takuro Ishii<sup>{1}</sup>,  
Yoshifumi Saijo<sup>{1}</sup>  
<sup>{1}</sup>Tohoku University, Japan; <sup>{2}</sup>University of Toyama,  
Japan

05:25 AM

**2081: Aptamer-Decorated Gold Nanoparticles for the Detection of Matrixmetalloproteinase-9 Through Molecular Photoacoustic Imaging**

Jinhwan Kim<sup>{1}</sup>, Laura Suggs<sup>{2}</sup>, Stanislav Emelianov<sup>{1}</sup>  
<sup>{1}</sup>Georgia Institute of Technology, United States;  
<sup>{2}</sup>University of Texas at Austin, United States

05:35 AM

**2354: Real-Time Label-Free Ultraviolet Photoacoustic Remote Sensing Based Virtual Histopathology**

Nathaniel Haven, Brendon Restall, Pradyumna  
Kedariseti, Roger Zemp  
University of Alberta, Canada

05:45 AM

**2416: Photoacoustic Microscopy Using a Scanning Fourier Transform Spectrometer**

Takashi Buma  
Union College, United States

4:15:00 AM - 6:15:00 AM

**B1P-24: MIS: Poster AM - Imaging**

Session Chair(s): Steven Freear (University of Leeds)  
Wei-Ning Lee (University of Hong Kong)

04:15 AM

**1048: Unsupervised Deconvolution Neural Network for High Quality Ultrasound Imaging**

Shujaat Khan, Jaeyoung Huh, Jong Chul Ye  
Korea Advanced Institute of Science and Technology,  
Korea

04:25 AM

**1486: Automatic Dynamic Range Estimation for Ultrasound Image Visualization and Processing**

Kristen Meiburger<sup>{1}</sup>, Silvia Seoni<sup>{1}</sup>, Giulia Matrone<sup>{2}</sup>  
<sup>{1}</sup>Politecnico di Torino, Italy; <sup>{2}</sup>University of Pavia, Italy

04:35 AM

**1733: Block-Wise Ultrasound Image Deconvolution from Fundamental and Harmonic Images**

Mohamad Hourani<sup>{4}</sup>, Adrian Basarab<sup>{2}</sup>, François  
Varray<sup>{1}</sup>, Denis Kouamé<sup>{2}</sup>, Jean-Yves Tourneret<sup>{3}</sup>  
<sup>{1}</sup>Creatis - INSA Lyon, France; <sup>{2}</sup>IRIT / Université de  
Toulouse, France; <sup>{3}</sup>IRIT / University of Toulouse,  
France; <sup>{4}</sup>University of Toulouse, France

04:45 AM

**1873: Efficient GPU Implementation of 3D Spectral Domain Synthetic Aperture Imaging**

Marcin Lewandowski<sup>{2}</sup>, Piotr Jarosik<sup>{2}</sup>, Yuriy  
Tasinkevych<sup>{1}</sup>, Mateusz Walczak<sup>{2}</sup>  
<sup>{1}</sup>Institute of Fundamental Technological Research,  
Polish Academy of Sciences, Poland; <sup>{2}</sup>Jus4us Ltd.,  
Poland

04:55 AM

**1934: Deep Adaptive Beamforming: Reproducibility and Generalization**

Naama Kessler<sup>{4}</sup>, Ben Luijten<sup>{1}</sup>, Oded Drori<sup>{4}</sup>, Shai  
Tejman Yarden<sup>{3}</sup>, Israel Aharoni<sup>{2}</sup>, Ruud Van Sloun<sup>{1}</sup>,  
Yonina C. Eldar<sup>{4}</sup>  
<sup>{1}</sup>Eindhoven University of Technology, Netherlands;  
<sup>{2}</sup>Haemek Medical Center, Israel; <sup>{3}</sup>Sheba Medical  
Center, Israel; <sup>{4}</sup>Weizmann Institute of Science, Israel

05:05 AM

**2259: Programmable Single-Chip Solution of a Wearable Bladder Ultrasound Imaging System**

Hyeyun Han, Ilseob Song, Jongmin Yoon, Yangmo Yoo  
Sogang University, Korea

05:15 AM

**2356: Probe Localization in Multi-Perspective Ultrasound Using a Radon Domain Tracking Approach**

Hans-Martin Schwab, Frans van de Vosse, Richard  
Lopata  
Eindhoven University of Technology, Netherlands

05:25 AM

**1523: Localization of a Scatterer in 3D with a Single Measurement and Single Element Transducer**

Luzhen Nie<sup>{4}</sup>, Joshua Tjun Minh Moo<sup>{2}</sup>, Matthieu  
Toulemonde<sup>{1}</sup>, Meng-Xing Tang<sup>{1}</sup>, Steven Freear<sup>{4}</sup>,  
Sevan Harput<sup>{3}</sup>  
<sup>{1}</sup>Imperial College London, United Kingdom; <sup>{2}</sup>King's  
College London, United Kingdom; <sup>{3}</sup>London South Bank  
University / Imperial College London, United Kingdom;  
<sup>{4}</sup>University of Leeds, United Kingdom

05:35 AM

## Wednesday, September 9

### 2005: Deconvolution-Based Super-Resolution Photoacoustic Microscopy for Visualizing the Internal Structure of Cells

Ryo Shintate<sup>{1}</sup>, Ryo Nagaoka<sup>{2}</sup>, Takuro Ishii<sup>{1}</sup>, Yoshifumi Saijo<sup>{1}</sup>  
<sup>{1}</sup>Tohoku University, Japan; <sup>{2}</sup>University of Toyama, Japan

05:45 AM

### 1329: Multiplying Tilted Angles from Single Plane Wave for Compounding Imaging Using Convolutional Neural Network

Jui-Ying Lu, Po-Yang Lee, Yi-Chen Li, Chih-Chung Huang  
National Cheng Kung University, Taiwan

05:55 AM

### 1801: High Resolution Plane Wave Compounding Through Deep Proximal Learning

Nishith Chennakeshava<sup>{1}</sup>, Ben Luijten<sup>{1}</sup>, Oded Drori<sup>{2}</sup>, Massimo Mischi<sup>{1}</sup>, Yonina C. Eldar<sup>{2}</sup>, Ruud J.G. van Sloun<sup>{1}</sup>  
<sup>{1}</sup>Eindhoven University of Technology, Netherlands; <sup>{2}</sup>Weizmann Institute of Science, Israel

06:05 AM

### 1820: Raw Radiofrequency (RF) Tensor Completion from Sparse Observation in 3D Ultrafast Ultrasound Imaging

Dan Ran, Yang Zhang, Wei-Ning Lee  
University of Hong Kong, China

4:15:00 AM - 6:15:00 AM

### B1P-25: MIS: Poster AM - Coherence Imaging, Speckle tracking and Clutter Suppression

Session Chair(s): Quentin Grimal (CNRS at Sorbonne University)  
Brett Byram (Vanderbilt University)

04:15 AM

### 1631: Modified Local Variance Based Feature Detection and Enhancement Technique for Ultrasound Imaging

Wei-Hsiang Shen, Meng-Lin Li  
National Tsing Hua University, Taiwan

04:25 AM

### 1371: Prediction of Successful Fertilization by Machine Learning Applied to Uterine Motion and Coordination Features Estimated by Ultrasound Speckle Tracking

Yizhou Huang<sup>{1}</sup>, Federica Sammali<sup>{1}</sup>, Tom Bakkes<sup>{1}</sup>, Celine Blank<sup>{2}</sup>, Benedictus Schoot<sup>{2}</sup>, Massimo Mischi<sup>{1}</sup>  
<sup>{1}</sup>Eindhoven University of Technology, Netherlands; <sup>{2}</sup>Ghent University Hospital, Belgium

04:35 AM

### 1382: Noise Suppression in Blood Speckle Imaging by Estimation of Point Spread Function of Imaging System

Michiya Mozumi, Ryo Nagaoka, Hideyuki Hasegawa  
University of Toyama, Japan

04:45 AM

### 1611: Ultrasound Speckle Reduction Based on Deep Learning Trained by CT Dataset Using Various Loss Functions

Hongnam Kim, Jinbum Kang, Yangmo Yoo  
Sogang University, Korea

04:55 AM

### 1649: A Novel Adaptive Non-Local Means Filtering Technique for Ultrasound Image Speckle Reduction

Wei-Hsiang Shen, Meng-Lin Li  
National Tsing Hua University, Taiwan

4:15:00 AM - 6:15:00 AM

### B1P-26: MIS: Poster AM: Segmentation & Registration

Session Chair(s): Lasse Lovstakken (Norwegian University of Science and Technology)  
Jian-yu Lu (University of Toledo)

05:05 AM

### 1154: Joint Fusion and Registration of Magnetic Resonance and Ultrasound Images

Oumaima El Mansouri<sup>{2}</sup>, Adrian Basarab<sup>{1}</sup>, Fabien Vidal<sup>{3}</sup>, Denis Kouamé<sup>{1}</sup>, Jean-Yves Tourneret<sup>{2}</sup>  
<sup>{1}</sup>IRIT / Université de Toulouse, France; <sup>{2}</sup>IRIT / University of Toulouse, France; <sup>{3}</sup>Paule de viguier Hospital Toulouse, France

05:15 AM

### 1601: CNN-Based Semantic Segmentation Network for Multiple Fetal Biometric Measurements

Hyunwoo Cho<sup>{2}</sup>, Jinbum Kang<sup>{2}</sup>, Sunyeob Chang<sup>{1}</sup>, Yangmo Yoo<sup>{2}</sup>  
<sup>{1}</sup>Alphinion Medical Systems Co., Ltd., Korea; <sup>{2}</sup>Sogang University, Korea

05:25 AM

### 1687: Scanner Independent Deep Learning-Based Segmentation Framework Applied to Mouse Embryos

Orlando Aristizabal<sup>{3}</sup>, Ziming Qiu<sup>{2}</sup>, Tongda Xu<sup>{2}</sup>, Hannah Goldman<sup>{3}</sup>, Jonathan Mamou<sup>{1}</sup>, Yao Wang<sup>{2}</sup>, Jeffrey Ketterling<sup>{1}</sup>, Daniel Turnbull<sup>{3}</sup>  
<sup>{1}</sup>Lizzi Center for Biomedical Engineering, Riverside Research, United States; <sup>{2}</sup>New York University, United States; <sup>{3}</sup>New York University School of Medicine, United States

05:35 AM

### 1926: Multi-task learning for ultrasound image formation and segmentation directly from raw in vivo data

Manish Bhatt, Arun Asokan Nair, Kelley M Kempinski, Muyinatu A Lediju Bell  
Johns Hopkins University, United States

05:45 AM

### 1939: A Generalized Approach for Automatic Segmentation of Arteries in Transverse Us Images Using CNNs

Joerik de Ruijter<sup>{2}</sup>, Frans van de Vosse<sup>{2}</sup>, Marc van Sambeek<sup>{1}</sup>, Richard Lopata<sup>{2}</sup>  
<sup>{1}</sup>Catharina Hospital, Netherlands; <sup>{2}</sup>Eindhoven University of Technology, Netherlands

05:55 AM

### 2394: BEASnet: a Shape Prior-Based Deep Convolutional Neural Network for Left Ventricular Segmentation in 2D Echocardiography

## Wednesday, September 9

Somayeh Akbari Saghezchi<sup>{2}</sup>, Mahdi Tabassian<sup>{2}</sup>, Joao Pedrosa<sup>{1}</sup>, Sandro Queiros<sup>{3}</sup>, Jan D'Hooge<sup>{2}</sup>  
<sup>{1}</sup>INESC TEC, Portugal; <sup>{2}</sup>Katholieke Universiteit Leuven, Belgium; <sup>{3}</sup>University of Minho, Portugal

**4:15:00 AM - 6:15:00 AM**

**B1P-27: MIS: Poster AM - Speed of Sound Imaging**

**Session Chair(s):** Hervé Liebgott (CREATIS / Lyon INSA)

**04:15 AM**

**1021: Ultrasound DMAS Beamforming for Estimation of Tissue Speed of Sound in Multi-Angle Plane-Wave Imaging**

Kuan-Lin Tu, Che-Chou Shen, Yen-Chen Chu  
National Taiwan University of Science and Technology, Taiwan

**04:25 AM**

**1173: Stratified-Medium Sound Speed Profiling for CPWC Ultrasound Imaging**

Derrell D'Souza, Daler Rakhmatov  
University of Victoria, Canada

**04:35 AM**

**1341: Fourier Domain Remapping Technique for the Speed of Sound Estimation Using Image Data**

Misaki Hiroshima  
Hitachi Ltd., Japan

**04:45 AM**

**1823: Refraction-Aware Integral Operator for Speed-of-Sound Pulse-Echo Imaging**

Samuel Beuret, Dimitris Perdios, Jean-Philippe Thiran  
École Polytechnique Fédérale de Lausanne, Switzerland

**04:55 AM**

**2473: Displacement Estimation Methods for Speed-of-Sound Imaging in Pulse-Echo**

Richard Rau, Ece Ozkan, Batu Ozturkler, Leila Gastli, Orcun Goksel  
ETH Zürich, Switzerland

**4:15:00 AM - 6:15:00 AM**

**B1P-28: MTH: Poster AM - Blood-Brain Barrier & Brain Applications**

**Session Chair(s):** Richard Lopata (Eindhoven University) Hong Chen (Washington University in St. Louis)

**05:05 AM**

**1016: Impact of Ultrasound-Induced Blood-Brain Barrier Opening on the Distribution of Full Monoclonal Antibody Cetuximab (WITHDRAW)**

Vu Long Tran<sup>{1}</sup>, Anthony Novell<sup>{1}</sup>, Matthieu Gerstenmayer<sup>{3}</sup>, Claudia Mateos<sup>{1}</sup>, Benoit Jeco<sup>{1}</sup>, Alizée Bouleau<sup>{1}</sup>, Hervé Nozach<sup>{2}</sup>, Alexandra Winkeler<sup>{1}</sup>, Bertrand Kuhnast<sup>{1}</sup>, Nicolas Tournier<sup>{1}</sup>, Benoit Larrat<sup>{3}</sup>, Charles Truillet<sup>{1}</sup>  
<sup>{1}</sup>BioMaps, Université Paris Saclay, CNRS, Inserm, CEA, France; <sup>{2}</sup>IBITEC, CEA, France; <sup>{3}</sup>Neurospin, CEA, Université Paris Saclay, France

**05:15 AM**

**1071: MR-Guided Neuromodulation of Visual Networks in Rhesus Monkey**

Xiaojing Long, Yangzi Qiao, Chao Zou, Teng Ma, Weibao Qiu, Jo Lee, Changjun Tie, Lijuan Zhang, Xin Liu, Hairong Zheng  
Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

**05:25 AM**

**1249: Multifocal Acoustic Holograms for Deep-Brain Neuromodulation and BBB Opening**

Diana Andrés, Sergio Jiménez-Gambín, Noé Jiménez, Francisco Camarena  
Universitat Politècnica de València, Spain

**05:35 AM**

**1644: Modeling the Cortical Response of Transcranial Ultrasound Stimulation Based on Neural Mass Model**

Yibo Wang<sup>{1}</sup>, Long Meng<sup>{1}</sup>, Lili Niu<sup>{1}</sup>, Ping Xie<sup>{2}</sup>, Xiaowei Huang<sup>{1}</sup>, Hairong Zheng<sup>{1}</sup>  
<sup>{1}</sup>Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China; <sup>{2}</sup>Yanshan University, China

**05:45 AM**

**1679: Safety Assessment Over 48 Hours After Delivering Drugs Across the Blood-Brain Barrier Using Rapid Short-Pulse Sequences in Vivo**

Sophie V. Morse, Tiffany G. Chan, Nicholas J. Long, James J. Choi  
Imperial College London, United Kingdom

**05:55 AM**

**1697: Noninvasive Ultrasound Stimulation Mediates Synaptic Plasticity of Nucleus Accumbens for Treatment of Drug Addiction**

Zhengrong Lin, Lili Niu, Long Meng, Tianyuan Bian, Xiaowei Huang, Hairong Zheng  
Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Cambodia; Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

**4:15:00 AM - 6:15:00 AM**

**B1P-29: MTH: Poster AM - Ultrasound-Mediated Delivery I**

**Session Chair(s):** Nico de Jong (Erasmus Medical Centre)

**04:15 AM**

**1327: Ultrasound Stimulation Induced Augmented Exosome Release from Astrocytes and its Therapeutic Effects in Amyloid- $\beta$  Oligomers Toxicated Neurons**

Zhiting Deng, Long Meng, Hairong Zheng  
Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

**04:25 AM**

**1337: Focused Ultrasound-Augmented Delivery of Nanoparticle for CRISPR Interference System Mediated Glioma Treatment**

Yan Li<sup>{2}</sup>, Pengying Wu<sup>{2}</sup>, Mingting Zhu<sup>{2}</sup>, Meiling Liang<sup>{2}</sup>, Yujin Zong<sup>{2}</sup>, Ayache Bouakaz<sup>{1}</sup>, Mingxi Wan<sup>{2}</sup>  
<sup>{1}</sup>iBrain, Université de Tours, Inserm, France; <sup>{2}</sup>Xi'an Jiaotong University, China

04:35 AM

**1761: An Organoid-Derived Cell Layer as an in Vitro Model to Measure US-Mediated Drug Delivery Across the Intestinal Wall**

Mihnea Vlad Turcanu<sup>{3}</sup>, Alexandru Moldovan<sup>{4}</sup>, Stavros Vlatakis<sup>{1}</sup>, Driton Vllasaliu<sup>{1}</sup>, Maria Thanou<sup>{1}</sup>, Inke N  thke<sup>{2}</sup>, Sandy Cochran<sup>{3}</sup>  
<sup>{1}</sup>King's College London, United Kingdom; <sup>{2}</sup>University of Dundee, United Kingdom; <sup>{3}</sup>University of Glasgow, United Kingdom; <sup>{4}</sup>University of Strathclyde, United Kingdom

04:45 AM

**1961: Ultrasound Activation of Neuron Bound Piezoelectric Nanoparticles Induces Calcium and Glutamate Release**

Tomas Jordan, Scott Alpizar, Mikaela O'Brien, Michael Hoppa, Geoffrey Luke  
Dartmouth College, United States

04:55 AM

**2205: Noninvasive Targeted Delivery of Nucleic Acids to Brain Cancer Cells Using Focused Ultrasound and Cationic Nanoparticles**

Yutong Guo<sup>{2}</sup>, Jinhwan Kim<sup>{2}</sup>, Anastasia Velalopoulou<sup>{4}</sup>, Midhun Ben Thomas<sup>{1}</sup>, Yongtae Kim<sup>{2}</sup>, Daniel Pomeranz Krummel<sup>{3}</sup>, Soma Sengupta<sup>{3}</sup>, Tobey MacDonald<sup>{1}</sup>, Costas Arvanitis<sup>{2}</sup>  
<sup>{1}</sup>Emory University, United States; <sup>{2}</sup>Georgia Institute of Technology, United States; <sup>{3}</sup>University of Cincinnati, United States; <sup>{4}</sup>University of Pennsylvania, United States

4:15:00 AM - 6:15:00 AM

**B1P-30: MTH: Poster AM - Novel Devices & Methods for Therapy Delivery & Monitoring**

Session Chair(s): Cyril Lafon (INSERM, LabTAU)

05:05 AM

**1035: Modified Passive Acoustic Mapping with Diagnostic-Array Angular Response for Cavitation Monitoring During HIFU Ablation in Ex Vivo Tissue**

Chunqi Li<sup>{1}</sup>, Harry Clegg<sup>{1}</sup>, Thomas Carpenter<sup>{1}</sup>, Luzhen Nie<sup>{1}</sup>, Steven Freear<sup>{1}</sup>, David Cowell<sup>{1}</sup>, James McLaughlan<sup>{2}</sup>  
<sup>{1}</sup>University of Leeds, United Kingdom; <sup>{2}</sup>University of Leeds / Leeds Institute of Medical Research, United Kingdom

05:15 AM

**1339: Reduced Length/Width Ratio of Thermal Ablation Induced by High Intensity Focused Acoustic Vortex**

Shifang Guo, Xuyan Guo, Zhen Ya, Pengying Wu, Mingxi Wan  
Xi'an Jiaotong University, China

05:25 AM

**1585: Robust Artifacts Suppression in Ultrasound Passive Cavitation Mapping Using Multi-Apodization with Cross-Correlation**

Shukuan Lu, Yan Zhao, Xianbo Yu, Renyan Li, Diya Wang, Bo Zhang, Mingxi Wan  
Xi'an Jiaotong University, China

05:35 AM

**1627: Mixed Low Energy Ultrasound (LEUS)/Patch Clamp Platform for the Study of Electrophysiological Mechanisms Involved in**

**Neurostimulation/Neuromodulation by LEUS**  
Ivan Suarez Castellanos, Magali Perier, Jeremy Vion-Bailly, Jean-Yves Chapelon, Apoutou N'Djin  
INSERM U1032 / LabTAU, France

05:45 AM

**2070: A Computationally Efficient Angular Spectrum Method Based on Frequency Domain Hilbert Beamforming for Real-Time Passive Acoustic Mapping**

Sara Lee<sup>{2}</sup>, Pilsu Kim<sup>{1}</sup>, Euisuk Chung<sup>{2}</sup>, Tai-Kyong Song<sup>{2}</sup>  
<sup>{1}</sup>Samsung electronics, Korea; <sup>{2}</sup>Sogang University, Korea

05:55 AM

**2177: Investigation on Ultrasonic Exposure Sequence by Luminol Sonochemiluminescence for Highly Effective Sonodynamic Treatment**

Kenki Tsukahara, Shin-Ichiro Umemura, Shin Yoshizawa  
Tohoku University, Japan

4:15:00 AM - 6:15:00 AM

**B1P-31: MTH: Poster AM - Therapeutic Use of Bubbles, Microbubbles & Nanobubbles**

Session Chair(s): Chih-Kuang Yeh (National Tsing Hua University)

04:15 AM

**1363: Ultrasound Induced Microbubble Cavitation via a Transcanal or Transcranial Approach Facilitates Inner Ear Drug Delivery**

Ai-Ho Liao<sup>{2}</sup>, Chih-Hung Wang<sup>{3}</sup>, Cheng-Ping Shih<sup>{3}</sup>, Ho-Chiao Chuang<sup>{1}</sup>, Yu-An Lee<sup>{2}</sup>, Shi-Hong Liu<sup>{2}</sup>, Ching-En Chang<sup>{2}</sup>, Yu-Chen Chen<sup>{2}</sup>, Peng-Yi Jiang<sup>{2}</sup>, Nga-Ting Hui<sup>{2}</sup>, Bo-Han Wang<sup>{1}</sup>  
<sup>{1}</sup>National Taipei University of Technology, Taiwan; <sup>{2}</sup>National Taiwan University of Science and Technology, Taiwan; <sup>{3}</sup>Tri-Service General Hospital, Taiwan

04:25 AM

**2044: Effect of Alternate Transmission of Split Apertures on Bubble Behavior and Temperature Rise for Bubble-Enhanced Ultrasound Treatment**

Sayaka Ito, Shin-Ichiro Umemura, Shin Yoshizawa  
Tohoku University, Japan

04:35 AM

**2247: In Vivo Radiosensitization in Liver Cancer with Gold Nanoparticles Through Sonoporation with VEGFR2-Targeted Microbubbles**

Shao-Lun Lu, Wei-Wen Liu, Chia-Hsien Cheng, Pai-Chi Li  
National Taiwan University, Taiwan

04:45 AM

**2448: Increased Treatment Depth of Photothermal Therapy Due to Ultrasound-Induced Air Bubbles**

Jinwoo Kim, Haemin Kim, Jin Ho Chang  
Daegu Gyeongbuk Institute of Science and Technology, Korea

## Wednesday, September 9

**04:55 AM**

**2453: Photosensitizers Carbon Dots-Based Microbubbles with Ultrasound in Sonodynamic Therapy**

*Nan Wu, Chih-Kuang Yeh*

*National Tsing Hua University, Taiwan*

**4:15:00 AM - 6:15:00 AM**

**B1P-32: TMI: Poster AM - Biomedical Diagnostic & Imaging Transducers**

**Session Chair(s):** Weibao Qiu (Shenzhen Institutes of Advanced Technology)

**04:15 AM**

**1006: Design and Fabrication of a 20 MHz Endoscopic Transducer with Enhanced Sensitivity**

*Jie Xu<sup>{1}</sup>, Zhile Han<sup>{1}</sup>, Chen Yang<sup>{2}</sup>, Ninghao Wang<sup>{2}</sup>,*

*Zhangjian Li<sup>{2}</sup>, Yaoyao Cui<sup>{2}</sup>, Xiaohua Jian<sup>{2}</sup>*

*{1}Fudan University, China; {2}Suzhou Institute of Biomedical Engineering and Technology, Chinese Academy of Sciences, China*

**04:25 AM**

**1236: High Definition Intravascular Ultrasound Imaging (HD-IVUS): Ultrahigh Frequency (>100MHz) Transducer and Flushing Strategy**

*Suzi Liang, Zhiqiang Zhang, Min Su, Hairong Zheng, Weibao Qiu*

*Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China*

**04:35 AM**

**1256: Design and Fabrication of Focused Ultrasonic Transducers Using P(VDF-TrFE)/BT Single-Crystal Micro-Platelets Composite Film**

*Weicen Chen, Xiongjie Li, Liyuan He, Yiping Wang, Chunling Zhu, Dawei Wu*

*Nanjing University of Aeronautics and Astronautics, China*

**04:55 AM**

**2139: A Dual-Mode IVUS Catheter for Cardiac Output Monitoring**

*Shilin Hou, Chunxiao Zou, Yi Li, Hu Tang, Siping Chen, Jue Peng*

*ShenZhen University, China*

**05:05 AM**

**2224: Development of Two-Frequency Switchable Array Probe Consisting of Piezoelectric Elements with Polarization-Inverted Structure for Portable Ultrasonic Equipment**

*Ryo Nagaoka<sup>{2}</sup>, Shin-Ichiro Umemura<sup>{1}</sup>, Hideyuki Hasegawa<sup>{2}</sup>*

*{1}Tohoku University, Japan; {2}University of Toyama, Japan*

**05:15 AM**

**2395: Body Conformal Linear Ultrasound Array for Combined Ultrasound and Photoacoustic Imaging**

*Kaustav Roy<sup>{1}</sup>, Sumit Agrawal<sup>{2}</sup>, Ajay Dangi<sup>{2}</sup>, Tianning Liu<sup>{2}</sup>, Haoyang Chen<sup>{2}</sup>, Thomas Jackson<sup>{2}</sup>, Rudra Pratap<sup>{1}</sup>, Sri-Rajasekhar Kothapalli<sup>{2}</sup>*

*{1}Indian Institute of Science, India; {2}Pennsylvania State University, United States*

**4:15:00 AM - 6:15:00 AM**

**B1P-33: TTT: Poster AM - Biomedical Therapeutic Transducers**

**Session Chair(s):** Charles Emery (Ulthera Inc.)

**04:15 AM**

**1194: Dual-Mode Ultrasound 2D Array for Image-Guided Therapy Application**

*Zhiqiang Zhang<sup>{2}</sup>, Rong Liu<sup>{2}</sup>, Min Su<sup>{2}</sup>, Ruilin Cai<sup>{2}</sup>, Fei Li<sup>{3}</sup>, Thomas R. Shrout<sup>{1}</sup>, Hairong Zheng<sup>{2}</sup>, Weibao Qiu<sup>{2}</sup>*

*{1}Pennsylvania State University, United States;*

*{2}Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China; {3}Xi'an Jiaotong University, China*

**04:25 AM**

**1563: Pattern Interference Radiation Force (PIRF) Based on Large-Scale Focused Transducer Using Fresnel Lens**

*Young Hun Kim<sup>{1}</sup>, Ki Chang Kang<sup>{1}</sup>, Kamyar Firouzi<sup>{3}</sup>, Kwan Kyu Park<sup>{2}</sup>, Pierre Khuri-Yakub<sup>{3}</sup>*

*{1}Hanyang University, Korea; {2}Hanyang University / Stanford University, Korea; {3}Stanford University, United States*

**04:35 AM**

**1570: Transcranial Ultrasound Using Leaky Lamb Waves by an Array of Wedge Transducer**

*Ki Chang Kang<sup>{1}</sup>, Young Hun Kim<sup>{1}</sup>, Kwan Kyu Park<sup>{2}</sup>, Kamyar Firouzi<sup>{3}</sup>, Butrus Thomas Khuri-Yakub<sup>{3}</sup>*

*{1}Hanyang University, Korea; {2}Hanyang University / Stanford University, Korea; {3}Stanford University, United States*

**04:45 AM**

**1986: A PZT-PVDF Stacked Transducer for Acoustic Wavelet Therapy and Monitoring**

*Zheng Jiang<sup>{1}</sup>, Robert Dickinson<sup>{1}</sup>, Timothy Hall<sup>{2}</sup>, James Choi<sup>{1}</sup>*

*{1}Imperial College London, United Kingdom; {2}University of Michigan, United States*

**04:55 AM**

**2050: Rotating Dual-Mode Ultrasonic Transducer for High Intensity Ultrasound Treatment and High Resolution Imaging**

*Hyunhee Kim, Hae Gyun Lim, Hyung Ham Kim*  
*Pohang University of Science and Technology, Korea*

**05:05 AM**

**2052: Precise Control of Ultrasound Stimulation/Treatment by a High-Frequency Focused Ring Transducer**

*Hyunhee Kim, Hae Gyun Lim, Jinhee Yoo, Hyung Ham Kim*

*Pohang University of Science and Technology, Korea*

**05:15 AM**

**2060: Enhanced Modelling of a 1-D Linear Phased Ultrasonic Array for Intracorporeal Sonoporation**

*Alexandru Moldovan<sup>{2}</sup>, Zhen Qiu<sup>{2}</sup>, David Lines<sup>{2}</sup>, Sandy Cochran<sup>{1}</sup>, Anthony Gachagan<sup>{2}</sup>*

*{1}University of Glasgow, United Kingdom; {2}University of Strathclyde, United Kingdom*

05:25 AM

**2222: A Hand-Held Magnetic-Acoustic Probe for Targeted Drug Delivery with Integrated Treatment Monitoring**

*Bernard Shieh{2}, Alec Thomas{2}, Lester Barnsley{1}, Michael Gray{2}, Regent Lee{2}, Ashok Handa{2}, Eleanor Stride{2}*

*{1}Australia's Nuclear and Science Organisation, Australia; {2}University of Oxford, United Kingdom*

6:30:00 AM - 8:00:00 AM

**B2L-01: SPS: Advanced Imaging Technologies and Techniques**

**Session Chair(s):** Paul Dayton (University of North Carolina)

Alessandro Savoia (Università degli Studi Roma Tre)

06:30 AM

**2504: Cloud HPC to Design Next Generation Piezoelectric MEMS Devices**

*Gerry Harvey*

*OnScale Inc., United States*

06:45 AM

**2507: Photoacoustic Vision for Surgical Guidance**

*Muyinatu Bell*

*Johns Hopkins University, United States*

07:00 AM

**2508: Ionoacoustics for Pre-Clinical and Clinical Research in Proton Therapy: Opportunities and Challenges**

*Katia Parodi*

*Ludwig Maximilian University of Munich, Germany*

6:30:00 AM - 8:00:00 AM

**B2L-02: MSD: Medical System Design - Novel Medical Systems for Imaging & Therapy**

**Session Chair(s):** Svetoslav Nikolov (BK Ultrasound)  
Massimo Mischi (Eindhoven University of Technology)

06:30 AM

**1184: Real-Time System for 3D Doppler Spectral Analysis with Sparse Arrays**

*Alessandro Ramalli{2}, Paolo Mattesini{2}, Claudio Giangrossi{2}, Alessandro Dallai{2}, Rebekah Maffett{3}, Alfred Yu{3}, Hervé Liebgott{1}, Piero Tortoli{2}*

*{1}Creatis - INSA Lyon, France; {2}Università degli Studi di Firenze, Italy; {3}University of Waterloo, Canada*

06:45 AM

**1034: Video-Rate 2D Imaging with a Handheld All-Optical Ultrasound Imaging Probe**

*Erwin Jozef Alles, Eleanor C Mackle, Edward Z Zhang, Paul C Beard, Adrien Emmanuel Desjardins*

*University College London, United Kingdom*

07:00 AM

**1366: A Novel Ultrasonic Haptic Device Induces Touch Sensations with Potential Applications in Neuroscience Research**

*Nick Hayward{1}, Emelie Lewis{1}, Emanuele Perra{1}, Veikko Jousmäki{1}, Veli-Matti Saarinen{1}, Francis McGlone{2}, Mikko Sams{1}, Heikki Nieminen{1}*

*{1}Aalto University, Finland; {2}Liverpool John Moores University, United Kingdom*

07:15 AM

**1633: Design of a Transesophageal Ultrasound-Guided HIFU Probe to Treat Ventricular Arrhythmias**

*Elodie Cao, Jade Robert, Francis Bessière, Cyril Lafon*  
*INSERM U1032 / LabTAU, France*

07:30 AM

**1295: MR-Compatible Histotripsy System for in Vivo Transcranial Treatment**

*Ning Lu{2}, Tyler Gerhardson{2}, Dave Choi{2}, Timothy Hall{2}, Aleksandra Rakic{1}, Badih Daou{2}, Aditya Pandey{2}, Zhen Xu{2}*

*{1}Histosonic Inc, United States; {2}University of Michigan, United States*

07:45 AM

**1288: Real Time Synthetic Aperture and Plane Wave Ultrasound Imaging with the Xilinx VERSAL™ SIMD-VLIW Architecture**

*Giulio Corradi{2}, Jørgen Arendt Jensen{1}*

*{1}Technical University of Denmark, Denmark; {2}Xilinx GmbH, Germany*

6:30:00 AM - 8:00:00 AM

**B2L-03: SPS: Special Session on MEMS Technologies for Ultrasound**

**Session Chair(s):** Jessica Liu Strohmann (Qualcomm)  
Omer Oralkan (NC State University)

06:30 AM

**1112: Ultrasonic MEMS for Imaging and Sensing**

*F. Levent Degertekin*

*Georgia Institute of Technology, United States*

07:00 AM

**1531: Encounter Between SAW and MEMS Technologies**

*Shuji Tanaka, Michio Kadota*

*Tohoku University, Japan*

07:30 AM

**Panel**

*Levent Degertekin (Invited Speaker), Georgia Institute of Technology*

*Shuji Tanaka (Invited Speaker), Tohoku University*

*Jamie Zahorian, Butterfly Network*

*David Horsley, University of California Davis*

6:30:00 AM - 8:00:00 AM

**B2L-04: NAS: Acoustic Sensors**

**Session Chair(s):** David Greve (Carnegie Mellon University)

Kentaro Nakamura (Tokyo Institute of Technology)

06:30 AM

**2092: Quantitative Characterization of Viscoelastic Properties of Biofilms and Soft Materials Based on Optical Coherence Elastography**

*Oluwaseyi Balogun*

*Northwestern University, United States*

07:00 AM

## Wednesday, September 9

### 1053: Surface Acoustic Wave H2 and O2 Sensors Based on Conducting Metal Oxides/Langasite for Elevated Temperature Applications

Elizabeth Mao, Jagannath Devkota, John Baltrus, Paul Ohodnicki, Benjamin Chorpeneing  
National Energy Technology Laboratory, United States

07:15 AM

### 1115: Surface Acoustic Wave Sensor Array with Nanoporous Sensing Layers for CO2 and CH4

Jagannath Devkota<sup>{2}</sup>, David Greve<sup>{1}</sup>, Tao Hong<sup>{2}</sup>, Paul Ohodnicki<sup>{2}</sup>, Michael Buric<sup>{2}</sup>  
<sup>{1}</sup>DWGreve Consulting, United States; <sup>{2}</sup>National Energy Technology Laboratory, United States

07:30 AM

### 1481: Simultaneous Imaging of Nonlinear Contrast from Acoustic Biomolecules and Hemodynamics

Claire Rabut, Mikhail Shapiro  
California Institute of Technology, United States

07:45 AM

### 1457: Spiral Air-Coupled Ultrasonic Phased-Array for High Resolution 3D Imaging

Gianni Allevato<sup>{2}</sup>, Matthias Rutsch<sup>{2}</sup>, Jan Hinrichs<sup>{2}</sup>, Ennes Sarradj<sup>{1}</sup>, Marius Pesavento<sup>{2}</sup>, Mario Kupnik<sup>{2}</sup>  
<sup>{1}</sup>Technische Universität Berlin, Germany; <sup>{2}</sup>Technische Universität Darmstadt, Germany

6:30:00 AM - 8:00:00 AM

### B2L-05: ABD: BAW Devices I

Session Chair(s): Amelie Hagelauer (University of Bayreuth)  
Rich Ruby (Broadcom)

06:30 AM

### 1624: Lithium Niobate Film Bulk Acoustic Wave Resonator for Sub-6 GHz Filters

Marie Bousquet, Pierre Perreau, Catherine Maeder-Pachurka, Alice Joulie, Fanny Delaguillaumie, Julien Delprato, Gregory Enyedi, Gael Castellan, Clement Eleouet, Thierry Farjot, Christophe Billard, Alexandre Reinhardt  
Grenoble Alpes Université, CEA-Leti, France

06:45 AM

### 2119: Crystalline Y-Cut Lithium Niobate Layers for the Bulk Acoustic Wave Resonator (YBAR)

Victor Plessky<sup>{2}</sup>, Julius Koskela<sup>{1}</sup>, Soumya Yandrapalli<sup>{1}</sup>  
<sup>{1}</sup>GVR Trade SA, Switzerland; <sup>{2}</sup>GVR Trade SA / Resonant Inc, Switzerland

07:00 AM

### 2028: GHz BAW Piezoelectric Transformers with High Voltage Gain Using the Combination of High and Low Dielectric Constant Thin Films

Sarina Kinoshita<sup>{1}</sup>, Takahiko Yanagitani<sup>{2}</sup>  
<sup>{1}</sup>Waseda University, Japan; <sup>{2}</sup>Waseda University / ZAIKEN / JST-PRESTO, Japan

07:15 AM

### 2008: 40.6 Watt, High Power 3.55 GHz Single Crystal XBAW RF Filters for 5G Infrastructure Applications

Ya Shen, Runqi Zhang, Ramakrishna Vetury, Jeffrey Shealy

Akoustis Technologies Inc., United States

07:30 AM

### 2358: Highly Doped AlScN XBAW Resonators with 15.7% k<sup>2</sup> eff for 5G RF Filter Applications

Craig Moe<sup>{1}</sup>, Roy Olsson III<sup>{2}</sup>, Pinal Patel<sup>{1}</sup>, Zichen Tang<sup>{2}</sup>, Michael D'Agati<sup>{2}</sup>, Mary Winters<sup>{1}</sup>, Ramakrishna Vetury<sup>{1}</sup>, Jeffrey Shealy<sup>{1}</sup>  
<sup>{1}</sup>Akoustis Technologies Inc., United States; <sup>{2}</sup>University of Pennsylvania, United States

07:45 AM

### 2258: Enhancement of GHz Electromechanical Coupling Coefficient kt<sup>2</sup> of MgZnO and CaZnO Thin Film BAW Resonators

Kota Izumi<sup>{1}</sup>, Takahiko Yanagitani<sup>{2}</sup>  
<sup>{1}</sup>Waseda University, Japan; <sup>{2}</sup>Waseda University / ZAIKEN / JST-PRESTO, Japan

8:30:00 AM - 10:00:00 AM

### B3L-01: MBE: Biological Effects & Dosimetry

Session Chair(s): Bajram Zeqiri (National Physical Laboratory)

08:30 AM

### 1092: Biomolecular Ultrasound for Acoustically Targeted Cellular Therapy

Mikhail G. Shapiro  
California Institute of Technology, United States

09:00 AM

### 1267: Comparison of Rapid Short-Pulse to Long Burst Sequences for Focused Ultrasound and Microbubble-Mediated Blood-Brain Barrier Permeability Enhancement

Dallan McMahon<sup>{1}</sup>, Lulu Deng<sup>{1}</sup>, Kullervo Hynynen<sup>{2}</sup>  
<sup>{1}</sup>Sunnybrook Research Institute, Canada;  
<sup>{2}</sup>Sunnybrook Research Institute / University of Toronto, Canada

09:15 AM

### 2199: Sonogenetics for Noninvasive and Cellular-Level Neuromodulation in Rodent Brain

Yaoheng Yang<sup>{1}</sup>, Christopher Pham Pacia<sup>{1}</sup>, Dezhuang Ye<sup>{1}</sup>, Lifei Zhu<sup>{1}</sup>, Hongchae Baek<sup>{1}</sup>, Yimei Yue<sup>{1}</sup>, Jinyun Yuan<sup>{1}</sup>, Mark J Miller<sup>{1}</sup>, Jianmin Cui<sup>{1}</sup>, Joseph P Culver<sup>{1}</sup>, Michael R Bruchas<sup>{2}</sup>, Hong Chen<sup>{1}</sup>  
<sup>{1}</sup>Washington University in St. Louis, United States;  
<sup>{2}</sup>Washington University School of Medicine, United States

09:30 AM

### 1886: Comparison Between Mechanical and Mechanical-Thermal Effect of Ultrasound Neuromodulation

Hongchae Baek, Christopher Pacia, Yaoheng Yang, Lu Xu, Yimei Yue, Hong Chen  
Washington University in St. Louis, United States

## Wednesday, September 9

09:45 AM

**2202: Circulating Tumor Cell Detection Using High-Intensity Ultrasound-Enhanced Biomarker Release**  
*Pradyumna Kedariseti, Robert Paproski, John Lewis, Frank Wuest, Roger Zemp*  
University of Alberta, Canada

8:30:00 AM - 10:00:00 AM

**B3L-02: SPS: Special Session on Integrated and Portable Systems**  
**Session Chair(s):** Holly Lay (Fujifilm)  
Omer Oralkan (NC State University)

08:30 AM

**1947: Ultrasound Democratization: an Exponential Growth Opportunity**  
*Claude Cohen-Bacrie*  
E-Scopics SAS, France

09:00 AM

**1113: Integrated Front-End Electronics for Miniature Ultrasound Probes**  
*Michiel Pertijs*  
Delft University of Technology, Netherlands

09:30 AM

**Panel**  
*Claude Cohen-Bacrie (Invited Speaker), E-scopics*  
*Michiel Pertijs (Invited Speaker), TU Delft*  
*Kailiang Chen, Butterfly Network*  
*Piero Tortoli, Università di Firenze*

8:30:00 AM - 10:00:00 AM

**B3L-03: TMU: Micromachined Transducers & Imaging/Therapy Arrays**  
**Session Chair(s):** Alessandro Savoia (Università degli Studi Roma Tre)  
Sanli Ergun (Stanford University)

08:30 AM

**2179: An Ultra-Wideband Capacitive Micromachined Ultrasonic Transducer (CMUT) Array for Acoustic Angiography: Preliminary Results**  
*Jean Sanders{1}, Ali Önder Biliroğlu{1}, Isabel Newsome{2}, Oluwafemi Adelegan{1}, Feysel Yalcin Yamaner{1}, Paul Dayton{2}, Omer Oralkan{1}*  
*{1}North Carolina State University, United States; {2}North Carolina State University / University of North Carolina at Chapel Hill, United States*

08:45 AM

**1640: Large Scale High Voltage 192+192 Glass-Based Row-Column Addressed CMUTs Made with Anodic Bonding**  
*Rune Sixten Grass, Andreas Spandet Havreland, Mathias Engholm, Kitty Steenberg, Erik Vilain Thomsen*  
Technical University of Denmark, Denmark

09:00 AM

**2371: Transparent Capacitive Micromachined Ultrasound Transducer Arrays**  
*Afshin Kashani Ilkhechi, Chris Ceroici, Roger Zemp*  
University of Alberta, Canada

09:15 AM

**1885: Dual-Mode CMUT Probe for Endocavitary Ultrasound-Guided HIFU Therapy**  
*Alice Ganeau{3}, Ivan M. Suarez Castellanos{3}, Loïc Daunizeau{3}, Françoise Chavrier{3}, Tony Matéo{4}, Nicolas Guillen{1}, Nicolas Sénagond{4}, Jean-Yves Chapelon{2}, W. Apoutou N'Djin{3}*  
*{1}EDAP TMS, France; {2}INSERM U1032 / LabTAU, France; {3}INSERM, Bérard, Université de Lyon, France; {4}Vermon SA, France*

09:30 AM

**2379: Transcranial Neuromodulation Array for Non-Human Primates with Imaging Aperture**  
*Rebecca Jones{3}, Charles Caskey{4}, Paul Dayton{2}, Omer Oralkan{1}, Gianmarco Pinton{2}*  
*{1}North Carolina State University, United States; {2}North Carolina State University / University of North Carolina at Chapel Hill, United States; {3}University of North Carolina at Chapel Hill, United States; {4}Vanderbilt University / Vanderbilt University Medical Center, United States*

09:45 AM

**1787: A Comparison Study Between High-Frequency Kerfless and Fully Kerfed Ultrasonic Phased Arrays**  
*Andre Bezanson{1}, Phil Garland{2}, Jeremy Brown{1}*  
*{1}Dalhousie University, Canada; {2}University of New Brunswick, Canada*

8:30:00 AM - 10:00:00 AM

**B3L-04: NDE & NSH Structural Health Monitoring**  
**Session Chair(s):** Erdal Oruklu (Illinois Institute of Technology)  
Bernhard Tittmann (Pennsylvania State University)

08:30 AM

**1360: Long-Range Over 25 M Detection of Internal Defects of Shotcrete by SSE Analysis for Noncontact Acoustic Inspection**  
*Kazuko Sugimoto{2}, Tsuneyoshi Sugimoto{2}, Hiroshi Morioka{3}, Noriyuki Utagawa{1}, Chitose Kuroda{1}*  
*{1}SatoKogyo Co., Ltd., Japan; {2}Toin University of Yokohama, Japan; {3}Tokyo Electric Power Company Holdings, Inc., Japan*

08:45 AM

**1261: Characterization of a Flexible Piezopolymer-Based Interdigital Transducer for Selective Excitation of Ultrasonic Guided Waves**  
*Yevgeniya Lugovtsova{2}, Andrea Bulletti{3}, Pietro Giannelli{1}, Jens Prager{2}, Lorenzo Capineri{3}*  
*{1}Analog Devices S.r.l., Italy; {2}Federal Institute for Materials Research (BAM), Germany; {3}Università degli studi di Firenze, Italy*

09:00 AM

**1978: Delay-and-Sum Processing of Echo Data of Transducers Focused by 3D Printed Lenses**  
*Michael Schwarz, Daniel Eder, Bernhard Zagar*  
Johannes Kepler University Linz, Austria

09:15 AM

**1023: XACT Imaging for Nondestructive Testing**  
*Liangzhong Xiang, Yingtao Liu*  
University of Oklahoma, United States

09:30 AM

**2369: Measuring Temperature Distributions with Pulse-Echo Ultrasound and Dynamic Time Warping**

Joel Harley<sup>{1}</sup>, Mason John<sup>{2}</sup>, Kenneth Walton<sup>{2}</sup>, Mikhail Skliar<sup>{2}</sup>  
<sup>{1}</sup>University of Florida, United States; <sup>{2}</sup>University of Utah, United States

09:45 AM

**1231: Development of a High Precision Ultrasonic 2D Temperature Distribution System with Reconstruction Algorithm Based on a Hexagonal Mesh**

Soma Pal<sup>{2}</sup>, Fu-Sung Lin<sup>{2}</sup>, Ching-Chuan Hsieh<sup>{2}</sup>, Ya-Han Liu<sup>{2}</sup>, Chen-Yuan Lu<sup>{1}</sup>, Shan-Wen Du<sup>{1}</sup>, Chih-Hsien Huang<sup>{2}</sup>  
<sup>{1}</sup>China Steel Corp., Taiwan; <sup>{2}</sup>National Cheng Kung University, Taiwan

8:30:00 AM - 10:00:00 AM

**B3L-05: AMR: MEMS Resonators I**

**Session Chair(s):** Songbin Gong (University of Illinois at Urbana Champaign)  
Tuomas Pensala (VTT Technical Research Centre of Finland)

08:30 AM

**1106: MEMS Resonators in CMOS**

Dana Weinstein  
Purdue University, United States

09:00 AM

**1322: High Frequency Strip-Type Solidly-Mounted Shear Mode Bulk Wave Resonator Using X-LT**

Michio Kadota, Yoshimi Ishii, Shuji Tanaka  
Tohoku University, Japan

09:15 AM

**2056: A 14.7 GHz Lithium Niobate Acoustic Filter with Fractional Bandwidth of 2.93%**

Liuqing Gao, Yansong Yang, Songbin Gong  
University of Illinois at Urbana-Champaign, United States

09:30 AM

**2138: Broadband Piston Mode Operation for First-Order Antisymmetric Mode Resonators**

Yu-Po Wong<sup>{1}</sup>, Luyan Qiu<sup>{1}</sup>, Naoto Matsuoka<sup>{2}</sup>, Ken-Ya Hashimoto<sup>{1}</sup>  
<sup>{1}</sup>Chiba University, Japan; <sup>{2}</sup>Nihon Dempa Kogyo Co., Ltd., Japan

09:45 AM

**1336: High Frequency Solidly Mounted Resonator Using Ln Single Crystal Thin Plate**

Kohei Matsumoto, Michio Kadota, Shuji Tanaka  
Tohoku University, Japan

10:15:00 AM - 11:15:00 AM

**B4L-01: MTH: Pre-clinical Studies**

**Session Chair(s):** Ralf Seip (SonaCare Medical, LLC)

10:15 AM

**1559: Ultrasound Stimulation Suppresses Microglial Activity in an MPTP Mouse Model of Parkinson's Disease**

Hui Zhou, Lili Niu, Long Meng, Na Pang, Xiaowei Huang, Hairong Zheng  
Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

10:30 AM

**1778: Photo-Mediated Ultrasound Therapy for the Treatment of Corneal Neovascularization in Rabbit Eyes**

Yu Qin<sup>{4}</sup>, Yixin Yu<sup>{1}</sup>, Julia Fu<sup>{4}</sup>, Xinyi Xie<sup>{2}</sup>, Tao Wang<sup>{4}</sup>, Yannis Paulus<sup>{4}</sup>, Xueding Wang<sup>{4}</sup>, Xinmai Yang<sup>{3}</sup>  
<sup>{1}</sup>University of Michigan, United States; <sup>{2}</sup>Nanjing Medical University, China; <sup>{3}</sup>University of Kansas, United States; <sup>{4}</sup>University of Michigan, United States

10:45 AM

**2381: Characterization of Ultrasound Neurostimulation in Mice**

Tarik Iazourene<sup>{2}</sup>, Hanaa Malloul<sup>{2}</sup>, Edward Oujagir<sup>{2}</sup>, Jean-Michel Escoffre<sup>{2}</sup>, Ayache Bouakaz<sup>{1}</sup>  
<sup>{1}</sup>iBrain, Université de Tours, Inserm, France; <sup>{2}</sup>Université de Tours, Inserm, UMR 1253, iBrain, France

11:00 AM

**1120: Chronic Transcranial Focused Ultrasound Enhances Memory in an Alzheimer's Disease Mouse Model**

Xiaowei Huang, Lili Niu, Long Meng, Zhengrong Lin, Wei Zhou, Hairong Zheng  
Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

10:15:00 AM - 11:15:00 AM

**B4L-02: MIS: Clutter Suppression**

**Session Chair(s):** Jeremy Dahl (Stanford University)

10:15 AM

**1066: Near-Field Clutter Reduction in 3D Echocardiography with Preservation of Tissue Speckle**

Marloes Sjoerdsma<sup>{2}</sup>, Sjoerd Bouwmeester<sup>{1}</sup>, Patrick Houthuizen<sup>{1}</sup>, Frans van de Vosse<sup>{2}</sup>, Richard Lopata<sup>{2}</sup>  
<sup>{1}</sup>Catharina Hospital, Netherlands; <sup>{2}</sup>Eindhoven University of Technology, Netherlands

10:30 AM

**1948: A k-Space-Based Approach to Coherence Estimation**

Yang Lou, Jesse Yen  
University of Southern California, United States

10:45 AM

**1578: Prediction of the Correlation of Pulse-Echo Signals from Diffuse Moving Scatterers**

Dongwoon Hyun, Marko Jakovljevic, Jeremy Dahl  
Stanford University, United States

11:00 AM

**1303: Blind Deconvolution-Based Clutter Suppression for Vascularization Imaging**

Duong Hung Pham<sup>{1}</sup>, Adrian Basarab<sup>{1}</sup>, Guillaume Lacoïn<sup>{3}</sup>, Ilyess Zemmoura<sup>{2}</sup>, Jean-Pierre Remeniéras<sup>{2}</sup>, Denis Kouamé<sup>{1}</sup>

{1}IRIT / Université de Toulouse, France; {2}Université de Tours, Inserm, iBrain, France; {3}Université de Tours, Inserm, UMR 1253, iBrain, France

10:15:00 AM - 11:15:00 AM

**B4L-03: MBF: Vector Flow Imaging in the Large Arteries & Heart Cavities**

**Session Chair(s):** Damien Garcia (CREATIS)

10:15 AM

**1036: High-Frequency, Vector-Flow Imaging in the Left Ventricle of FHF2 Deficient Murine Heart**

Jeffrey A. Ketterling{3}, Akshay Shekhar{5}, Orlando Aristizabal{4}, Glenn I. Fishman{2}, Colin K.L. Phoon{1} {1}Hassenfeld Children's Hospital at NYU Langone, United States; {2}Leon H. Charney Division of Cardiology, NYU Langone Health, New York, NY, United States; {3}Lizzi Center for Biomedical Engineering, Riverside Research, United States; {4}New York University School of Medicine, United States; {5}NYU Langone Health / Regeneron, United States

10:30 AM

**1076: Full-Volume three-Component Intraventricular Vector Flow Mapping Using Triplane Doppler Echo**

Florian Vixège{1}, Franck Nicoud{3}, Pierre-Yves Courand{2}, Didier Vray{1}, Damien Garcia{1} {1}Creatis - INSA Lyon, France; {2}Hospices Civils de Lyon, France; {3}Université de Montpellier, France

10:45 AM

**2169: Aortic Volume Flow Estimation Using 4D Vector Flow Imaging**

Morten Wigen, Stefano Fiorentini, Asbjorn Støylen, Lasse Løvsstakken  
Norwegian University of Science and Technology, Norway

11:00 AM

**2353: A Fully Automated Ultrasound Imaging Pipeline for 4D Intraventricular Flow Reconstruction - in Vivo Comparison to Phase-Contrast MRI**

Thomas Grønli{1}, Morten Smedsrud Wigen{1}, Marius Eriksen{2}, Knut Haakon Stensæth{1}, Lasse Løvsstakken{1} {1}Norwegian University of Science and Technology, Norway; {2}St. Olavs Hospital, Norway

10:15:00 AM - 11:15:00 AM

**B4L-04: MTC: Strain & Shear-stress Quantification**

**Session Chair(s):** Mark Palmeri (Duke University)

10:15 AM

**1953: Model-Independent Quantification of Complex Shear Modulus via Speed and Attenuation of Surface Waves**

Bhaskara Rao Chintada, Richard Rau, Orcun Goksel  
ETH Zürich, Switzerland

10:30 AM

**1059: Acoustic Radiation Force-Induced Capillary Waves in Biological Fluids and its Applications**

Hsiao-Chuan Liu{2}, Piotr Kijanka{1}, Matthew Urban{2} {1}AGH University of Science and Technology, Poland; {2}Mayo Clinic, United States

10:45 AM

**1765: Shear Shocks Are Focused in Human Head Phantoms: Shear Wave Imaging and Simulations**

Bharat Tripathi{2}, Sandhya Chandrasekaran{1}, Gianmarco Pinton{2} {1}North Carolina State University, United States; {2}North Carolina State University / University of North Carolina at Chapel Hill, United States

11:00 AM

**2362: Human Fascicle Strain Behavior During Twitch using Ultrafast Ultrasound**

Christoph Leitner{2}, Sergei Vostrikov{1}, Markus Tilp{3}, Pascal Hager{1}, Andrea Cossetini{1}, Luca Benini{1}, Christian Baumgartner{2} {1}ETH Zürich, Switzerland; {2}Graz University of Technology, Austria; {3}University of Graz, Austria

10:15:00 AM - 11:15:00 AM

**B4L-05: ASD: SAW Devices I**

**Session Chair(s):** Natalya Naumenko (National University of Science and Technology MISIS)  
Karl Wagner (Qualcomm)

10:15 AM

**1028: A General P-Matrix Model to Calculate Second-Order Nonlinearity in TC-SAW Devices**

Thomas Forster{2}, Markus Mayer{1}, Vikrant Chauhan{1}, Thomas Ebner{1}, Karl Wagner{1}, Amelie Hagelauer{2} {1}RF360 Europe GmbH, Germany; {2}University of Bayreuth, Germany

10:30 AM

**1163: LT/Quartz Layered SAW Substrate with Suppressed Transverse Mode Generation**

Shogo Inoue, Marc Solal  
Qorvo Inc., United States

10:45 AM

**2275: Fast Simulation Method of Distributed Nonlinearities in Surface Acoustic Wave Resonators**

Marta González-Rodríguez{2}, Carlos Collado{2}, Jordi Mateu{2}, J.M. González-Arbesú{2}, Sebastian Huebner{1}, Robert Aigner{1} {1}Qorvo Inc., United States; {2}Universitat Politècnica de Catalunya, Spain

11:30:00 AM - 1:30:00 PM

**B5P-06: MIM: Poster PM - Novel Imaging Applications I**

**Session Chair(s):** Cameron Hoerig (Riverside Research)  
Mike Averkiou (University of Washington)

11:30 AM

**1456: Fast and High Quality Super-Resolution Ultrasound Micro-Vessel Imaging Using Spatiotemporal Data with Deep Learning**

U-Wai Lok, Joshua Trzasko, Ping Gong, Chengwu Huang, Shanshan Tang, Lulu Yang, Shigao Chen  
Mayo clinic, United States

11:40 AM

**1788: Internal Microbubbles in Kidney Stones and the Doppler Ultrasound Twinkling Artifact**

Eric Rokni, Scott Zinck, Julianna Simon

## Wednesday, September 9

Pennsylvania State University, United States

11:50 AM

**1817: Evidence of Trapped Bubbles on in Situ Human Kidney Stones**

Julianna Simon<sup>{2}</sup>, James Holm<sup>{3}</sup>, Jeffrey Thiel<sup>{1}</sup>, Barbrina Dunmire<sup>{1}</sup>, Bryan Cunitz<sup>{1}</sup>, Michael Bailey<sup>{1}</sup>  
<sup>{1}</sup>University of Washington, United States; <sup>{2}</sup>University of Washington / Pennsylvania State University, United States; <sup>{3}</sup>Virginia Mason Medical Center, United States

12:00 PM

**2298: Added Value of Fractal Dimension and Spatial Vascularity Pattern in Morphometric Analysis of Microvasculature Imaging of Breast Masses Using Contrast-Free Ultrasound**

Redouane Ternifi, Yinong Wang, Mostafa Fatemi, Azra Alizad  
Mayo Clinic, United States

12:10 PM

**1426: Assessment of Early Pancreatic Cancer Response to Targeted Hyaluronan Treatment with Contrast-Enhanced Ultrasound and Photoacoustic Imaging**

Girdhari Rijal, Kenneth Hoyt  
University of Texas at Dallas, United States

12:20 PM

**1503: Quantitative Assessments of Uterine Fibroids Pre and Post Uterine Artery Embolization**

Priscilla Machado, Kathleen Gillmore, Allison Tan, Carin Gonsalves, Flemming Forsberg  
Thomas Jefferson University, United States

12:30 PM

**1972: Visualization of Intracellular Calcium Transport Between Cells Using High Frequency Ultrasound and FRET Live-Cell Imaging**

Sunghoon Rho, Sunho Moon, Gyoyeon Hwang, Jihun Kim, Sangpil Yoon  
University of Notre Dame, United States

12:40 PM

**1521: Quantitative Assessment of Breast Density Using Transmission Ultrasound: Comparison to MRI-Based Breast Density**

Bilal Malik<sup>{1}</sup>, Yang Zhang<sup>{2}</sup>, Jeon-Hor Chen<sup>{2}</sup>, Min-Ying Su<sup>{2}</sup>, James Wiskin<sup>{1}</sup>  
<sup>{1}</sup>QT Ultrasound LLC, United States; <sup>{2}</sup>University of California, Irvine, United States

12:50 PM

**2306: A Measure-Theoretic Perspective of Lesion Detectability**

Dongwoon Hyun<sup>{1}</sup>, Gene Kim<sup>{1}</sup>, Nick Bottenus<sup>{2}</sup>, Jeremy Dahl<sup>{1}</sup>  
<sup>{1}</sup>Stanford University, United States; <sup>{2}</sup>University of Colorado Boulder, United States

01:00 PM

**2325: Ultrasound Imaging of Abscesses Before and During Histotripsy Treatment**

Matthew Bruce, Daniel Leotta, Yak-Nam Wang, Tatiana Khokhlova, Adam Maxwell, Keith Chan, Wayne Monsky, Tom Matula

University of Washington, United States

11:30:00 AM - 1:30:00 PM

**B5P-07: MCA: Poster PM - Ultrasound Localization Microscopy & High Resolution Imaging III**

**Session Chair(s):** Gianmarco Pinton (University of North Carolina)

11:30 AM

**1188: Ultrasound Super-Resolution Microvessel Imaging via Multilevel Decomposition Reconstruction (MDR)**

Jingyi Yin, Jiabin Zhang, Jue Zhang  
Peking University, China

11:40 AM

**1340: Super-Resolution Transcranial Vascular Imaging Confirmed in Microvascular Phantoms and Live Cynomolgus Monkey Based on Low Frequency Pulsed Chirp Transmission**

Yabo Yang, Yuchao Sang, Meiling Liang, Chen Bai, Yujin Zong, Mingxi Wan  
Xi'an Jiaotong University, China

11:50 AM

**1664: Measuring Spatial Resolution in Ultrasound Localization Microscopy**

Vincent Hingot<sup>{2}</sup>, Arthur Chavignon<sup>{2}</sup>, Baptiste Heiles<sup>{1}</sup>, Olivier Couture<sup>{2}</sup>  
<sup>{1}</sup>Delft University of Technology / Maresca Lab, Netherlands; <sup>{2}</sup>Sorbonne Université, CNRS, INSERM, Laboratoire d'Imagerie Biomédicale, France

12:00 PM

**1951: Plane-Wave Imaging Guided Acoustic Vortex Trapping Microbubbles Under Flow Conditions**

Yu-Ling Huang<sup>{1}</sup>, Wei-Chen Lo<sup>{1}</sup>, He Li<sup>{2}</sup>, Wei-Ning Lee<sup>{2}</sup>, Chih-Kuang Yeh<sup>{1}</sup>  
<sup>{1}</sup>National Tsing Hua University, Taiwan; <sup>{2}</sup>University of Hong Kong, Hong Kong

12:10 PM

**1186: Enhanced Shrinking Reconstruction (ESR) for Ultrasound Super-Resolution Imaging with High Microbubble Concentration**

Jingyi Yin, Jiabin Zhang, Jue Zhang  
Peking University, China

12:20 PM

**1400: Effect of Contrast Agent Concentration in Bubble- and Droplet-Based Super-Resolution Imaging Using a Cardiac Phased Array Probe**

Ge Zhang<sup>{1}</sup>, Fan Mo<sup>{1}</sup>, Yiwen Yin<sup>{1}</sup>, Sevan Harput<sup>{3}</sup>, Kirsten Christensen-Jeffries<sup>{2}</sup>, Jiaqi Zhu<sup>{1}</sup>, Ziyang Zhu<sup>{1}</sup>, Bingxue Wang<sup>{1}</sup>, Chee Hau Leow<sup>{1}</sup>, Chris Dunsby<sup>{1}</sup>, Meng-Xing Tang<sup>{1}</sup>  
<sup>{1}</sup>Imperial College London, United Kingdom; <sup>{2}</sup>King's College London, United Kingdom; <sup>{3}</sup>London South Bank University / Imperial College London, United Kingdom

12:30 PM

**1646: Quantitative Microvessel Analysis with 3D Super-Resolution Ultrasound and Velocity Mapping**

Sevan Harput<sup>{3}</sup>, Matthieu Toulemonde<sup>{1}</sup>, Alessandro Ramalli<sup>{4}</sup>, Kirsten Christensen-Jeffries<sup>{2}</sup>, Enrico Boni<sup>{4}</sup>,

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Piero Tortoli{4}, Christopher Dunsby{1}, Meng-Xing Tang{1}  
{1}Imperial College London, United Kingdom; {2}King's College London, United Kingdom; {3}London South Bank University / Imperial College London, United Kingdom; {4}Università degli Studi di Firenze, Italy

12:40 PM

**1656: Super-Resolution Ultrasound Imaging of the Renal Microvasculature in Rats with Diabetes**  
Stinne Byrholdt Søgaard{2}, Sofie Bech Andersen{2}, Iman Taghavi{3}, Carlos Hoyos{1}, Kristoffer Lindskov Hansen{2}, Fredrik Gran{1}, Jørgen Arendt Jensen{3}, Michael Bachmann Nielsen{2}, Charlotte Mehlh Sørensen{4}  
{1}BK Medical, Denmark; {2}Rigshospitalet, Denmark; {3}Technical University of Denmark, Denmark; {4}University of Copenhagen, Denmark

11:30:00 AM - 1:30:00 PM

**B5P-08: MCA: Poster PM - Microbubbles and Contrast Imaging II**  
Session Chair(s): Mike Averkiou (University of Washington)

11:30 AM

**1544: Real-Time Visualization and Acoustic Monitoring of Nanobubbles in Tumour-Affected Vasculature and Their Extravasation**  
Carly Pellow{2}, Eric Abenojar{1}, Agata Exner{1}, Gang Zheng{4}, David Goertz{3}  
{1}Case Western Reserve University, United States; {2}Sunnybrook Research Institute, Canada; {3}Sunnybrook Research Institute / University of Toronto, Canada; {4}University Health Network, Canada

11:40 AM

**1747: Deep Learning Implementation of Super-Resolution Ultrasound Imaging for Tissue Decluttering and Contrast Agent Localization**  
Katherine Brown, Scott Chase Waggener, Arthur David Redfern, Kenneth Hoyt  
University of Texas at Dallas, United States

11:50 AM

**1768: Enhanced Visualization of Intratumoral Microbubbles Using Singular Value Thresholding Combined with Normalized Singular Spectrum Area**  
Elizabeth B Herbst, Sunil Unnikrishnan, Alexander L Klibanov, John A Hossack, F William Mauldin Jr.  
University of Virginia, United States

12:00 PM

**1999: Aberration Correction in Ultrasound Localization Microscopy Using Microbubbles as Single Targets**  
Vincent Perrot, Jonathan Porée, Chloé Bourquin, Jean Provost  
Polytechnique Montréal, Canada

12:10 PM

**1215: Fast High-Resolution Ultrasound Microvessel Imaging with Null Subtraction Imaging-Based Beamforming**

Zhengchang Kou, Matt Lowerison, Pengfei Song, Michael Oelze  
University of Illinois at Urbana-Champaign, United States

12:20 PM

**1423: Three-Dimensional Evaluation of Microvascular Networks Using Contrast-Enhanced Ultrasound and Microbubble Tracking**  
Kenneth Johnson, Ipek Oezdemir, Kenneth Hoyt  
University of Texas at Dallas, United States

12:30 PM

**2039: Ultrasound Measurement of Acoustic Biomolecule Pharmacokinetics Enables Rapid, Noninvasive Assessment of Hepatic Function**  
Bill Ling{1}, Justin Lee{1}, David Maresca{2}, Audrey Lee-Gosselin{1}, Dina Malounda{1}, Mikhail Shapiro{1}  
{1}California Institute of Technology, United States; {2}Delft University of Technology, Netherlands

12:40 PM

**2110: Dynamic Nanobubble-Enhanced Ultrasound Imaging Shows Differential Enhancement in Tumor Periphery and Tumor Core in Murine Model of Prostate Cancer**  
Reshani Perera, Eric Abenojar, Xinning Wang, Gopal Ramamurthy, James Basilion, Agata Exner  
Case Western Reserve University, United States

11:30:00 AM - 1:30:00 PM

**B5P-10: MCA: Poster PM - Bubble Cavitation & Applications II**  
Session Chair(s): Jeffrey Ketterling (Riverside Research)

11:30 AM

**2211: Anti-Cancer Provascular Therapy Using Ultrasound-Stimulated Microbubbles**  
Simon Michon, Francis Rodier, Francois Yu  
Université de Montréal, Canada

11:40 AM

**2126: Ultrasound and Microbubble-Mediated Cancer Treatment with a Clinical Scanner: Results on Safety and Efficacy**  
Sara Keller, Dingjie Suo, Yak-Nam Wang, Heidi Kenerson, Stephanie Totten, Raymond Yeung, Michalakis Averkiou  
University of Washington, United States

11:50 AM

**2129: Gas Volume Matters: Size and Particle Number Density Effects on Ultrasound Signal of Lipid-Shelled Contrast Agents with Matched Perfluoropropane Gas Volume Concentrations**  
Eric Abenojar{1}, Jinle Zhu{1}, Ilya Bederman{1}, Michael C. Kolios{2}, Agata Exner{1}  
{1}Case Western Reserve University, United States; {2}Ryerson University, Canada

12:00 PM

**2140: Exploring the Effects of Nanobubble-Blood Interactions on Acoustic Activity**  
Michaela Cooley{1}, Michael Sun{1}, Eric Abenojar{1}, Michael C. Kolios{2}, Anirban Sen Gupta{1}, Agata Exner{1}

## Wednesday, September 9

{1}Case Western Reserve University, United States;  
{2}Ryerson University, Canada

**12:10 PM**

**2215: Localized Release of Extracellular ATP by Ultrasound and Microbubbles for Enhancing Cancer Immunotherapy**

Falonne Demeze Kenfack<sup>{3}</sup>, Balasubramanian Sellamuthu<sup>{1}</sup>, Andrea Shima<sup>{2}</sup>, Francois Yu<sup>{3}</sup>  
{1}CHUM Research Center, Canada; {2}Polytech Marseille, France; {3}Université de Montréal, Canada

**12:20 PM**

**2285: The Effects of Acoustic Parameters and Microbubble Concentration on the Likelihood of Encapsulated Microbubble Coalescence**

David Le<sup>{2}</sup>, Virginie Papadopoulou<sup>{2}</sup>, Paul Dayton<sup>{1}</sup>  
{1}North Carolina State University / University of North Carolina at Chapel Hill, United States; {2}University of North Carolina at Chapel Hill, United States

**12:30 PM**

**2479: Development of UV Activated Polymer Ultrasound Contrast Agents for Biomedical Applications**

Muskan Pawar, Xili Lu, Hamza Lalami, Taylor Ware, Shashank Sirsi  
University of Texas at Dallas, United States

**11:30:00 AM - 1:30:00 PM**

**B5P-13: MSD: Poster PM - Medical System Design - Needle Applications**

**Session Chair(s):** Christine Demore (Sunnybrook Research Institute)

**12:40 PM**

**1710: Forward-Viewing Ultrasound Imaging with Concentric-Ring Arrays for Registration-Free Needle Intervention**

Ryosuke Tsumura, Haichong K. Zhang  
Worcester Polytechnic Institute, United States

**12:50 PM**

**1724: Reflector-Based Transrectal 3D Ultrasound Imaging System for Transperineal Needle Intervention**

Ryosuke Tsumura, Yichuan Tang, Haichong K. Zhang  
Worcester Polytechnic Institute, United States

**01:00 PM**

**1803: An Ultrasonically Actuated Fine Needle Enhances Biopsy Tissue Yield**

Emanuele Perra<sup>{1}</sup>, Eetu Lamppijärvi<sup>{2}</sup>, Gonçalo Barreto<sup>{3}</sup>, Muhammad Arif<sup>{1}</sup>, Tuomas Puranen<sup>{2}</sup>, Edward Hæggström<sup>{2}</sup>, Kenneth Pritzker<sup>{4}</sup>, Heikki Nieminen<sup>{1}</sup>  
{1}Aalto University, Finland; {2}University of Helsinki, Finland; {3}University of Helsinki and Invalid Foundation, Finland; {4}University of Toronto and Mount Sinai Hospital, Canada

**11:30:00 AM - 1:30:00 PM**

**B5P-11: MCA: Poster PM - Phase Change Contrast Agents**

**Session Chair(s):** Nicholas Bottenus (University of Colorado Boulder)  
Ayache Bouakaz (INSERM)

**11:30 AM**

**1221: Transcranial Imaging of Phase-Change Contrast Agents (PCCAs) Through the Temporal Bone Using Ultrafast Interframe Activation Ultrasound Sequence**

Bowen Jing, Esha Kashyap, Brooks Lindsey  
Georgia Institute of Technology, United States

**11:40 AM**

**1403: Effect of Mechanical Index on Repeated Sparse Activation of Nanodroplets in Vivo**

Ge Zhang<sup>{1}</sup>, Matthieu Toulemonde<sup>{1}</sup>, Kai Riemer<sup>{1}</sup>, Jiaqi Zhu<sup>{1}</sup>, Sevan Harput<sup>{3}</sup>, Kirsten Christensen-Jeffries<sup>{2}</sup>, Bingxue Wang<sup>{1}</sup>, Ziyang Zhu<sup>{1}</sup>, Chee Hau Leow<sup>{1}</sup>, Peter Weinberg<sup>{1}</sup>, Chris Dunsby<sup>{1}</sup>, Meng-Xing Tang<sup>{1}</sup>

{1}Imperial College London, United Kingdom; {2}King's College London, United Kingdom; {3}London South Bank University / Imperial College London, United Kingdom

**11:50 AM**

**1853: 3D Super Localized Flow with Locally and Acoustically Activated Nanodroplets and High Frame Rate Imaging Using a Matrix Array**

Matthieu Toulemonde<sup>{1}</sup>, Sevan Harput<sup>{2}</sup>, Thomas Tiennot<sup>{1}</sup>, Xiaowei Zhou<sup>{1}</sup>, Meng-Xing Tang<sup>{1}</sup>  
{1}Imperial College London, United Kingdom; {2}London South Bank University / Imperial College London, United Kingdom

**12:00 PM**

**1898: Lifetime of Phase-Change Contrast Agents After Activation with High-Frame Rate Ultrasound Imaging**

Mark Burgess, Jeffrey Ketterling  
Lizzi Center for Biomedical Engineering, Riverside Research, United States

**12:10 PM**

**2042: Multiplexed Ultrasound Imaging Using Temporal Responses of Phase Change Contrast Agents**

Austin Van Namen, Sidhartha Jandhyala, Geoffrey Luke  
Dartmouth College, United States

**12:20 PM**

**2145: Optimization of High-Frequency-Ultrasound Imaging and Activation of High Boiling Point Activatable Perfluorocarbon Nanodroplets in a Tissue-Mimicking Phantom**

Trevor Mitcham, Dmitry Nevozhay, Scott Lee, Stephen Lai, Konstantin Sokolov, Richard Bouchard  
University of Texas MD Anderson Cancer Center, United States

**11:30:00 AM - 1:30:00 PM**

**B5P-12: MEL: Poster PM - Viscoelasticity, Anisotropy, and Nonlinearity II**

**Session Chair(s):** James Greenleaf (Mayo Clinic)

## Wednesday, September 9

11:30 AM

**1306: Shear Wave Attenuation Measurements Using Reverberant Shear Wave Elastography (R-SWE)**

Juvenal Ormachea, Kevin J. Parker  
University of Rochester, United States

11:40 AM

**1588: Quantitative Nonlinear Shear Modulus Mapping Using Freehand Scanning**

Soumya Goswami, Rifat Ahmed, Marvin M. Doyley, Stephen A. McAleavey  
University of Rochester, United States

11:50 AM

**1599: A Local Spectral Nonlinear Elasticity Imaging Method: Contrast Enhancement in Heterogeneous Elastograms Based on Viscoelastic Nonlinear Characterizations**

Soumya Goswami, Rifat Ahmed, Marvin M. Doyley, Stephen A. McAleavey  
University of Rochester, United States

12:00 PM

**2078: Strong Elastic Anisotropy in the Cornea: an Ex-Vivo Study with Acoustic Micro-Tapping Based Optical Coherence Elastography**

John Pitre Jr., Mitchell Kirby, David Li, Tueng Shen, Ruikang Wang, Matthew O'Donnell, Ivan Pelivanov  
University of Washington, United States

12:10 PM

**2326: Improved Frequency-Shift Method for Shear Wave Attenuation Computation**

Ladan Yazdani, Manish Bhatt, Guillaume Bosio, Guy Cloutier  
University of Montreal Hospital Research Center, Canada

12:20 PM

**2430: Elastically Anisotropic Phantoms Constructed from 3D-Printed PLA Fibers**

Kristyna Herman<sup>{2}</sup>, Gabriela Torres<sup>{1}</sup>, Keita Yokoyama<sup>{1}</sup>, Caterina Gallippi<sup>{1}</sup>  
<sup>{1}</sup>North Carolina State University / University of North Carolina at Chapel Hill, United States; <sup>{2}</sup>University of North Carolina at Chapel Hill, United States

11:30:00 AM - 1:30:00 PM

**B5P-15: MTC: Poster PM - Attenuation & Sound Speed Imaging Session**

Session Chair(s): Jonathan Mamou (Riverside Research)

12:30 PM

**1285: Attenuation Coefficient Parameter Estimations to Characterize Ex Vivo Carotid Plaque**

Catherine Steffel, Stephanie Wilbrand, Shahriar Salamat, Robert Dempsey, Carol Mitchell, Tomy Varghese  
University of Wisconsin-Madison, United States

12:40 PM

**1301: Nonlinearity Parameter Estimation Based on Quantifying Excess Ultrasonic Attenuation**

Andres Coila, Michael Oelze  
University of Illinois at Urbana-Champaign, United States

12:50 PM

**2113: Validation of Local Sound Speed Estimator in a Rat Model of Non-Alcoholic Fatty Liver Disease**

Rehman Ali, Arsenii Telichko, Huaijun Wang, Jose Vilches-Moure, Sukumar Kumar, Ramasamy Paulmurugan, Jeremy Dahl  
Stanford University, United States

01:00 PM

**2321: Regularized Phantom-Free Construction of Local Attenuation Coefficient Slope Maps for Quantitative Ultrasound Imaging**

Iman Rafati, François Destremes, Guy Cloutier  
University of Montreal Hospital Research Center, Canada

01:10 PM

**2484: Anisotropic Regularization of Ultrasound Pulse-Echo Tomography for Reconstruction of Speed-of-Sound and Tissue Heterogeneity Through Abdominal Layers**

Sergio Sanabria, Jeremy Dahl  
Stanford University, United States

11:30:00 AM - 1:30:00 PM

**B5P-14: MIS: Poster PM - Imaging**

Session Chair(s): Jean Provost (Polytechnique Montreal)

11:30 AM

**1466: Does Ultrasonic Data Format Matter for Deep Neural Networks?**

Felix Jin, Mark Palmeri  
Duke University, United States

11:40 AM

**1471: Improved Ultrasound Micro-Vessel Imaging (UMI) Using Deconvolution with Total Variation Regularization**

U-Wai Lok<sup>{1}</sup>, Joshua Trzasko<sup>{1}</sup>, Chengwu Huang<sup>{1}</sup>, Shanshan Tang<sup>{1}</sup>, Ping Gong<sup>{1}</sup>, Yohan Kim<sup>{1}</sup>, Fabrice Lucien<sup>{1}</sup>, Matthew Lowerison<sup>{2}</sup>, Pengfei Song<sup>{2}</sup>, Shigao Chen<sup>{1}</sup>  
<sup>{1}</sup>Mayo clinic, United States; <sup>{2}</sup>University of Illinois at Urbana-Champaign, United States

11:50 AM

**1711: Optimizing Transducer Acquisition Scheme for Rapid Ultrasound Tomography of Limbs**

Gregory Ely<sup>{1}</sup>, Jon Fincke<sup>{2}</sup>, Xiang Zhang<sup>{1}</sup>, Brian Anthony<sup>{1}</sup>  
<sup>{1}</sup>Massachusetts Institute of Technology, United States; <sup>{2}</sup>Phillips Research North America, United States

12:00 PM

**1880: Compound Barker-Coded Excitation for Increased Signal-to-Noise Ratio and Penetration Depth in Transcranial Ultrasound Imaging**

Emelina Vienneau, Brett Byram  
Vanderbilt University, United States

12:10 PM

**2055: Coded Excitation Framework for Reducing Arbitrary Waveform Encoding Errors with Tri-State Transmit Pulsers**

John Flynn, Lauren Pflugrath, Ron Daigle  
Verasonics, Inc., United States

## Wednesday, September 9

12:20 PM

**2147: Accounting for Domain Shift in Neural Network Ultrasound Beamforming**

Jaime Tierney, Adam Luchies, Christopher Khan, Brett Byram, Matthew Berger  
Vanderbilt University, United States

12:30 PM

**2397: Deconvolution and Improved Visualization of Ocular Structures in UBM Using Deep Learning**

Ahmed Tahseen Minhaz<sup>{1}</sup>, Mahdi Bayat<sup>{1}</sup>, Faruk Orge<sup>{2}</sup>, David L. Wilson<sup>{1}</sup>  
<sup>{1}</sup>Case Western Reserve University, United States;  
<sup>{2}</sup>Rainbow Babies and Children's Hospital, United States

12:40 PM

**2403: Multi-Array Imaging with Gap Compensation for Wide Field-of-View and Improved Resolution**

Josquin Foiret, Xiran Cai, Katherine Ferrara  
Stanford University, United States

12:50 PM

**2000: Sparse Channel Sampling for Ultrasound Localization Microscopy (Sparse-ULM)**

Erwan Hardy, Jonathan Porée, Hatim Belgharbi, Chloé Bourquin, Frédéric Lesage, Jean Provost  
Polytechnique Montréal, Canada

01:00 PM

**2400: Standard Plane Extraction from 3D Ultrasound with 6-DOF Deep Reinforcement Learning Agent**

Baichuan Jiang<sup>{2}</sup>, Keshuai Xu<sup>{2}</sup>, Russell Taylor<sup>{2}</sup>, Ernest Graham<sup>{1}</sup>, Mathias Unberath<sup>{2}</sup>, Emad Boctor<sup>{1}</sup>  
<sup>{1}</sup>Johns Hopkins Medical Institute, United States;  
<sup>{2}</sup>Johns Hopkins University, United States

11:30:00 AM - 1:30:00 PM

**B5P-16: MTN: Poster PM - Theranostics**

**Session Chair(s):** Mario Fabiilli (University of Michigan)

11:30 AM

**1058: Improved Passive Cavitation Mapping Using Cavitation Source Localization: Theory and Experimental Validation**

Arsenii Telichko, Taehwa Lee, Marko Jakovljevic, Dongwoon Hyun, Sayan Chowdhury, Sunitha Bachawal, Carl Herickhoff, Ramasamy Paulmurugan, Jeremy Dahl  
Stanford University, United States

11:40 AM

**1304: XACT Imaging for in Vivo Dosimetry During Radiation Therapy**

Mohamed Eldib<sup>{1}</sup>, Yong Chen<sup>{2}</sup>, Salahuddin Ahmad<sup>{2}</sup>, Liangzhong Xiang<sup>{1}</sup>  
<sup>{1}</sup>University of Oklahoma, United States; <sup>{2}</sup>University of Oklahoma Health Sciences Center, United States

11:50 AM

**1515: Assessment of Chirp-Coded Excitation to Monitor Histotripsy Bubble Clouds**

Emily Wallach<sup>{2}</sup>, Himanshu Shekhar<sup>{1}</sup>, Kenneth Bader<sup>{2}</sup>  
<sup>{1}</sup>Indian Institute of Technology, Gandhinagar, India;  
<sup>{2}</sup>University of Chicago, United States

12:00 PM

**1536: MRI Characterization of Histotripsy Ablation in an in Vivo Murine Brain Tumor Model**

Sang Won Choi, Sarah Duclos, Badih Daou, Rachel Surowiec, Stefanie Galban, Joan Greve, Neeraj Chaudhary, Timohty Hall, Aditya Pandey, Zhen Xu  
University of Michigan, United States

12:10 PM

**1745: Ultrasound Triggered Microbubble Destruction for Disrupting Biofilms in Synovial Fluid**

Flemming Forsberg<sup>{1}</sup>, Dylan Curry<sup>{1}</sup>, Priscilla Machado<sup>{1}</sup>, Maria Stanczak<sup>{1}</sup>, John Eisenbrey<sup>{1}</sup>, Thomas Schaefer<sup>{2}</sup>, Noreen Hickok<sup>{1}</sup>  
<sup>{1}</sup>Thomas Jefferson University, United States;  
<sup>{2}</sup>University of Pennsylvania, United States

12:20 PM

**1750: Ultrasound-Stimulated Microbubble Enhancement of Fractionated Radiation Tumour Treatment**

Azza Al-Mahrouki, Niki Law, Scott McKay, Aaron Cumal, Gregory Czarnota  
Sunnybrook Research Institute, Canada

12:30 PM

**1800: Using a Diagnostic Ultrasound System for Photo-Mediated Ultrasound Therapy**

Yu Qin<sup>{2}</sup>, Yunhao Zhu<sup>{2}</sup>, Yixin Yu<sup>{2}</sup>, Yannis Paulus<sup>{2}</sup>, Xueding Wang<sup>{2}</sup>, Xinmai Yang<sup>{1}</sup>  
<sup>{1}</sup>University of Kansas, United States; <sup>{2}</sup>University of Michigan, United States

12:40 PM

**1911: Autonomous Ultrasound System for Targeted Drug Delivery in Central Nervous System with Sub-Millimeter Targeting Accuracy**

Hohyun Lee, Scott Schoen Jr., Yutong Guo, Chulyong Kim, Costas Arvanitis  
Georgia Institute of Technology, United States

12:50 PM

**1942: Novel Iridium(III) Complex-Loaded Perfluoropropane Nanobubbles for Potential Sonodynamic Therapy**

Pinunta Nittayacharn<sup>{1}</sup>, Eric Abenojar<sup>{1}</sup>, Giuseppe Strangi<sup>{1}</sup>, Massimo La Deda<sup>{3}</sup>, Loredana Ricciardi<sup>{2}</sup>, Agata A Exner<sup>{1}</sup>  
<sup>{1}</sup>Case Western Reserve University, United States;  
<sup>{2}</sup>CNR NANOTEC - Institute of Nanotechnology, Italy;  
<sup>{3}</sup>University of Calabria, Italy

01:00 PM

**2011: High Contrast Ultrasonic CBE Monitoring Approach for Thermal Therapy Using Percutaneous Catheter-Based Ultrasound Applicators: Development and Ex Vivo Evaluations**

Diya Wang<sup>{2}</sup>, E. Clif Burdette<sup>{1}</sup>, Chris J. Diederich<sup>{2}</sup>  
<sup>{1}</sup>Acoustic Medsystems Inc., United States; <sup>{2}</sup>University of California, San Francisco, United States

01:10 PM

**2193: From Targeting to Simulation: Transducer Positioning and Localization for Focused Ultrasound Transcranial Applications**

## Wednesday, September 9

Michelle Sigona<sup>{1}</sup>, Marshal Anthony Phipps<sup>{1}</sup>, Jiro Kusunose<sup>{1}</sup>, Charles Caskey<sup>{2}</sup>  
<sup>{1}</sup>Vanderbilt University, United States; <sup>{2}</sup>Vanderbilt University / Vanderbilt University Medical Center, United States

11:30:00 AM - 1:30:00 PM

**B5P-17: MTH: Poster PM - Blood-Brain Barrier & Brain Applications**

**Session Chair(s):** Hong Chen (Washington University in St. Louis)

11:30 AM

**1045: Combination of BBB Disruption Immune Checkpoint Inhibitor and Pro-Resolution Cocktail as an Efficient Strategy for Glioblastoma Therapy (WITHDRAW)**

Emmanuel De Schlichting<sup>{3}</sup>, Anthony Novell<sup>{1}</sup>, Didier Wion<sup>{3}</sup>, Tanguy Chabrol<sup>{3}</sup>, Benoît Larrat<sup>{2}</sup>, Francois Berger<sup>{3}</sup>  
<sup>{1}</sup>BioMaps, Université Paris Saclay, CNRS, Inserm, CEA, France; <sup>{2}</sup>Neurospin, CEA, Université Paris Saclay, France; <sup>{3}</sup>Université Grenoble Alpes, France

11:40 AM

**1843: Considerations for Precise Sonication of Distal Cortical Targets in the Macaque**

Thomas Manuel<sup>{1}</sup>, Sumeeth Jonathan<sup>{1}</sup>, Marshal Anthony Phipps<sup>{1}</sup>, Charles Caskey<sup>{2}</sup>  
<sup>{1}</sup>Vanderbilt University, United States; <sup>{2}</sup>Vanderbilt University / Vanderbilt University Medical Center, United States

11:50 AM

**1899: First in Vivo Demonstration of Bilateral Blood-Brain Barrier Opening Using Acoustic Holograms in Mice**

Sergio Jiménez-Gambín<sup>{2}</sup>, Antonios N. Pouliopoulos<sup>{1}</sup>, Noé Jiménez<sup>{2}</sup>, José María Benlloch<sup>{2}</sup>, Elisa E. Konofagou<sup>{1}</sup>, Francisco Camarena<sup>{2}</sup>  
<sup>{1}</sup>Columbia University, United States; <sup>{2}</sup>Universitat Politècnica de València, Spain

12:00 PM

**2349: Real-Time Image-Based Refocusing of Transcranial Ultrasound: in Vivo Results**

Parker O'Brien, Collin Smith, Hasan Aldiabat, Dalong Liu, Tim Carlson, Gerard O'Sullivan, Emad Ebbini  
University of Minnesota - Twin Cities, United States

12:10 PM

**2393: Mechanistic Investigation of Hyperthermia-Mediated Drug Delivery in Brain Tumors with Trans-Skull MRI-Guided FUS**

Chulyong Kim<sup>{1}</sup>, Yutong Guo<sup>{1}</sup>, Anastasia Velalopoulou<sup>{5}</sup>, Johannes Leisen<sup>{2}</sup>, Anjan Motamarry<sup>{3}</sup>, Dieter Haemmerich<sup>{4}</sup>, Costas Arvanitis<sup>{1}</sup>  
<sup>{1}</sup>Georgia Institute of Technology, United States; <sup>{2}</sup>Goergia Institute of Technology, United States; <sup>{3}</sup>Massachusetts General Hospital, United States; <sup>{4}</sup>Medical University of South Carolina, United States; <sup>{5}</sup>University of Pennsylvania, United States

12:20 PM

**2420: Targeted Blood Brain Barrier Opening by Focused Ultrasound with Polydispersed Microbubbles**

**Improves Spatial Memory in Wild Type Mice at Long and Short-Term Time Points**

Rebecca Noel, Maria Eleni Karakatsani, Maria Murillo, Alina Kline-Schoder, Robin Ji, Alec Batts, Antonios Pouliopoulos, Elisa Konofagou  
Columbia University, United States

11:30:00 AM - 1:30:00 PM

**B5P-18: MTH: Poster PM - Novel Devices & Methods for Therapy Delivery & Monitoring**

**Session Chair(s):** Bob McGough (Michigan State University)  
Cyril Lafon (INSERM, LabTAU)

11:30 AM

**1124: Laryngoscope Mounted HIFU Transducer for Visually Guided Oral Cavity Therapies**

Ralf Seip<sup>{2}</sup>, Yosef Krespi<sup>{1}</sup>, Ron Hadani<sup>{3}</sup>, Adam Morris<sup>{2}</sup>, Joshua Huff<sup>{2}</sup>, Mark Carol<sup>{2}</sup>  
<sup>{1}</sup>Northwell, United States; <sup>{2}</sup>SonaCare Medical, LLC, United States; <sup>{3}</sup>Valam, United States

11:40 AM

**1129: A 2-D Wearable Array for Awake Ultrasonic Drug Uncaging in Rats**

Tommaso Di Ianni<sup>{2}</sup>, Brenda Yu<sup>{2}</sup>, Muna Aryal<sup>{2}</sup>, Praveen Pallegar<sup>{2}</sup>, Kyle Morrison<sup>{1}</sup>, Raag Airan<sup>{2}</sup>  
<sup>{1}</sup>Sonic Concepts, Inc., United States; <sup>{2}</sup>Stanford University, United States

11:50 AM

**1166: Phase Aberration Effects on Low f-Number, Large Aperture Focused Therapeutic Ultrasound Transducers**

Ellen Yeats, Zhen Xu, Timothy Hall  
University of Michigan, United States

12:00 PM

**1318: Ultrasound-Triggered Release from Novel Polymeric Spinal Device**

Lauren Delaney<sup>{2}</sup>, Selin Isguven<sup>{2}</sup>, Keith Fitzgerald<sup>{2}</sup>, Daniel MacDonald<sup>{1}</sup>, Noreen Hickok<sup>{2}</sup>, Steven Kurtz<sup>{1}</sup>, Flemming Forsberg<sup>{2}</sup>  
<sup>{1}</sup>Drexel University, United States; <sup>{2}</sup>Thomas Jefferson University, United States

12:10 PM

**1349: Development of an Ultrasonic Nonlinear Frequency Compounding Method for Use in Noninvasive Tissue Thermometry**

Tyler Hornsby, Elyas Shaswary, Jahan Tavakkoli  
Ryerson University, Canada

12:20 PM

**2001: Increasing Radiation Force-Induced Displacement at Matched Pressure by Reducing Effective Aperture**

Marshal Anthony Phipps<sup>{1}</sup>, Sumeeth Jonathan<sup>{1}</sup>, Pai-Feng Yang<sup>{2}</sup>, Limin Chen<sup>{2}</sup>, William Grissom<sup>{1}</sup>, Charles Caskey<sup>{2}</sup>  
<sup>{1}</sup>Vanderbilt University, United States; <sup>{2}</sup>Vanderbilt University / Vanderbilt University Medical Center, United States

## Wednesday, September 9

12:30 PM

**2228: Boiling Histotripsy Ablation of the Prostate: Early Results of a Prototype Transrectal Device**

Rishi Sekar, Tatiana Khokhlova, Alex Peek, Vera Khokhlova, Yak-Nam Wang, Stephanie Totten, Wayne Kreider, Yashwanth Kumar, Adam Maxwell, George Schade  
University of Washington, United States

12:40 PM

**2283: Prototype Ultrasound Transducer / System for Intraoperative Image-Guided Brachytherapy: Proof-of-Concept in a Breast Cancer Patient**

Sunil Unnikrishnan, David Brenin, Bruce Libby, Timothy Showalter, John Hossack  
University of Virginia, United States

12:50 PM

**2404: Catheter Tip Ultrasound Mediated Nanodroplet to Microbubble Conversion for Intravascular Therapeutic Applications**

Alex Wright<sup>{1}</sup>, Ross Williams<sup>{1}</sup>, Kullervo Hynynen<sup>{2}</sup>, David Goertz<sup>{2}</sup>  
<sup>{1}</sup>Sunnybrook Research Institute, Canada;  
<sup>{2}</sup>Sunnybrook Research Institute / University of Toronto, Canada

11:30:00 AM - 1:30:00 PM

**B5P-19: MTH: Poster PM - Therapeutic Applications & Targets**

Session Chair(s): Zhen Xu (University of Michigan)

11:30 AM

**1474: Spatially-Directed Cell Migration in Acoustically-Responsive Scaffolds (ARs) via the Controlled Delivery of Basic Fibroblast Growth Factor (bFGF)**

Xiaofang Lu<sup>{1}</sup>, Hai Jin<sup>{1}</sup>, Carole Quesada<sup>{1}</sup>, Leidan Huang<sup>{2}</sup>, Mitra Aliabouzar<sup>{1}</sup>, Oliver Kripfgans<sup>{1}</sup>, J. Brian Fowlkes<sup>{1}</sup>, Renny Franceschi<sup>{1}</sup>, Andrew Putnam<sup>{1}</sup>, Mario Fabilli<sup>{1}</sup>  
<sup>{1}</sup>University of Michigan, United States; <sup>{2}</sup>University of Michigan, United States

11:40 AM

**1517: Dose-Dependent Effects of Ultrasound Therapy on Hepatocellular Carcinoma**

Laith R Sultan, Julia C D'Souza, Mrigendra Karmacharya, Stephen J. Hunt, Angela K Brice, Susan M Schultz, Andrew KW Wood, Chandra M Sehgal  
University of Pennsylvania, United States

11:50 AM

**1550: Controlled Hypoxic Reperfusion Increases Cell Viability Following Simulated Ischemia of HL-1 Cardiomyocytes**

Kevin Haworth<sup>{1}</sup>, Vishnu Undyala<sup>{2}</sup>, Christy Holland<sup>{1}</sup>, Karin Przyklenk<sup>{2}</sup>  
<sup>{1}</sup>University of Cincinnati, United States; <sup>{2}</sup>Wayne State University, United States

12:00 PM **\*Will present at end of session**

**1720: Elucidation of Biological Mechanisms of Clinically Viable Low Frequency (20 kHz) Ultrasound Applicator for Chronic Wounds Therapy**

Olivia Ngo<sup>{1}</sup>, Jessica Niebuhr<sup>{1}</sup>, Karissa Barbarevech<sup>{1}</sup>, Jacob Hyatt<sup>{1}</sup>, Ian Robinson<sup>{1}</sup>, Rose Ann DiMaria-Ghalili<sup>{1}</sup>, Michael Neidrauer<sup>{1}</sup>, Leonid Zubkov<sup>{1}</sup>, Michael Weingarten<sup>{1}</sup>, David Margolis<sup>{2}</sup>, Kara Spiller<sup>{1}</sup>, Peter Lewin<sup>{1}</sup>  
<sup>{1}</sup>Drexel University, United States; <sup>{2}</sup>University of Pennsylvania, United States

12:10 PM

**1771: Transvertebral Ultrasound-Mediated Blood-Spinal Cord Barrier Opening in Pigs**

Stecia-Marie Fletcher<sup>{1}</sup>, Min Choi<sup>{1}</sup>, Natalia Ogrodnik<sup>{1}</sup>, Meaghan O'Reilly<sup>{2}</sup>  
<sup>{1}</sup>Sunnybrook Research Institute, Canada;  
<sup>{2}</sup>Sunnybrook Research Institute / University of Toronto, Canada

12:20 PM

**2086: Histotripsy Treatment of Abscesses**

Tatiana Khokhlova, Yak-Nam Wang, Daniel Leotta, Matthew Bruce, Keith Chan, Wayne Monsky, Adam Maxwell, Tom Matula  
University of Washington, United States

11:30:00 AM - 1:30:00 PM

**B5P-20: MTH: Poster PM - Therapeutic Use of Bubbles, Microbubbles & Nanobubbles**

Session Chair(s): Kendall Waters (Silicon Valley Medical Instruments)

11:30 AM

**1174: Optimization of Microbubble-Mediated Tumor Transfection via Applying Low Frequency Ultrasound**

Nisi Zhang<sup>{1}</sup>, Josquin Foirret<sup>{1}</sup>, Azadeh Kheirloomoom<sup>{1}</sup>, Tali Ilovitsh<sup>{1}</sup>, Yi Feng<sup>{2}</sup>, Spencer Tumbale<sup>{1}</sup>, Marina Raie<sup>{1}</sup>, Bo Wu<sup>{1}</sup>, James Wang<sup>{1}</sup>, Katherine Ferrara<sup>{1}</sup>  
<sup>{1}</sup>Stanford University, United States; <sup>{2}</sup>Stanford University / Xi'an Jiaotong University, United States

11:40 AM

**1519: Temporal Stability of Therapeutic Microbubbles**

Antonios Pouliopoulos, Daniella Jimenez, Alexander Frank, Alexander Robertson, Lin Zhang, Alina Kline Schoder, Vividha Bhaskar, Mitra Harpale, Elizabeth Caso, Elisa Konofagou  
Columbia University, United States

11:50 AM

**1556: Cavitation-Enhanced High-Pressure Pulsed Sonothrombolysis with Perfluorocarbon Nanodroplets Versus Microbubbles in Contracted and Uncontracted Clots**

Jinwook Kim<sup>{4}</sup>, Leela Goel<sup>{1}</sup>, Xiaoning Jiang<sup>{1}</sup>, Zhen Xu<sup>{3}</sup>, Paul Dayton<sup>{2}</sup>  
<sup>{1}</sup>North Carolina State University, United States; <sup>{2}</sup>North Carolina State University / University of North Carolina at Chapel Hill, United States; <sup>{3}</sup>University of Michigan, United States; <sup>{4}</sup>University of North Carolina at Chapel Hill, United States

12:00 PM

**1807: Enhancing Thermal Ablation of High Intensity Focused Ultrasound with Phase Shift Nanodroplets and Multi-Focus Ablation Patterns**

## Wednesday, September 9

Aparna Singh<sup>{3}</sup>, Gloria Nyankima<sup>{1}</sup>, Marshal Anthony Phipps<sup>{3}</sup>, Vandiver Chaplin<sup>{3}</sup>, Paul Dayton<sup>{2}</sup>, Charles Caskey<sup>{4}</sup>

<sup>{1}</sup>North Carolina State University / North Carolina at Chapel Hill, United States; <sup>{2}</sup>North Carolina State University / University of North Carolina at Chapel Hill, United States; <sup>{3}</sup>Vanderbilt University, United States; <sup>{4}</sup>Vanderbilt University / Vanderbilt University Medical Center, United States

**12:10 PM**

### **1808: Nanodroplet Mediated Intravascular Sonothrombolysis of Retracted Clots**

Leela Goel<sup>{1}</sup>, Huaiyu Wu<sup>{1}</sup>, Bohua Zhang<sup>{1}</sup>, Jinwook Kim<sup>{4}</sup>, Paul Dayton<sup>{2}</sup>, Zhen Xu<sup>{3}</sup>, Xiaoning Jiang<sup>{1}</sup>  
<sup>{1}</sup>North Carolina State University, United States; <sup>{2}</sup>North Carolina State University / University of North Carolina at Chapel Hill, United States; <sup>{3}</sup>University of Michigan, United States; <sup>{4}</sup>University of North Carolina at Chapel Hill, United States

**12:20 PM**

### **1856: Improving Antibiotic Efficacy in Methicillin-Resistant Staphylococcus Aureus Biofilms with Ultrasound-Stimulated Phase-Change Contrast Agents and Oxygen Microbubbles**

Phillip Durham<sup>{3}</sup>, Sarah Rowe<sup>{3}</sup>, Lauren Radlinski<sup>{3}</sup>, Ashlyn Sidders<sup>{3}</sup>, Traci Reusser<sup>{2}</sup>, Awaneesh Upadhyay<sup>{2}</sup>, Mark Borden<sup>{2}</sup>, Paul Dayton<sup>{1}</sup>, Brian Conlon<sup>{3}</sup>, Virginie Papadopoulou<sup>{3}</sup>  
<sup>{1}</sup>North Carolina State University / University of North Carolina at Chapel Hill, United States; <sup>{2}</sup>University of Colorado Boulder, United States; <sup>{3}</sup>University of North Carolina at Chapel Hill, United States

**12:30 PM**

### **2328: Ultrasound Stimulated Microbubbles Enhance the Potency and Durability of Anti-PD-L1 Checkpoint Blockade Therapy in an Orthotopic Breast Tumor Model**

Sharshi Bulner<sup>{1}</sup>, William Cruz<sup>{1}</sup>, Alex Wright<sup>{1}</sup>, Robert Kerbel<sup>{1}</sup>, Kullervo Hynynen<sup>{2}</sup>, David Goertz<sup>{2}</sup>  
<sup>{1}</sup>Sunnybrook Research Institute, Canada; <sup>{2}</sup>Sunnybrook Research Institute / University of Toronto, Canada

**11:30:00 AM - 1:30:00 PM**

### **B5P-21: TIS: Poster PM - Electronics & Systems**

**Session Chair(s):** Jeremy Brown (Dalhousie University)

**11:30 AM**

### **1485: MEMS- & Piezo-Free, Sensitive, Wideband, All-Electronic Ultrasound Imaging Arrays**

Tom Robbins<sup>{1}</sup>, Cyril Renaud<sup>{2}</sup>  
<sup>{1}</sup>Pinfold Technologies Ltd., United Kingdom; <sup>{2}</sup>University College London, United Kingdom

**11:40 AM**

### **1651: 384 Channel Modular Ultrasonic CMUT Probe for Rapid Prototyping**

Kasper Fløng Pedersen<sup>{2}</sup>, Mathias Engholm<sup>{2}</sup>, Andreas Spandet Havreland<sup>{2}</sup>, Christopher Beers<sup>{1}</sup>, Lars Moesner<sup>{1}</sup>, Borislav Gueorguiev Tomov<sup>{2}</sup>, Jørgen Arendt Jensen<sup>{2}</sup>, Erik Vilain Thomsen<sup>{2}</sup>

<sup>{1}</sup>BK Medical, United States; <sup>{1}</sup>BK Medical, Denmark; <sup>{2}</sup>Technical University of Denmark, Denmark

**11:50 AM**

### **1901: Active Damping of Air-Backed Ultrasonic Transducers Using Arbitrary Waveform Generators**

Jesse Yen  
University of Southern California, United States

**12:00 PM**

### **1915: On the Efficacy of In-Probe Pre-Amplifiers for Piezoelectric 2D Arrays**

Enrico Boni<sup>{3}</sup>, Fabian Fool<sup>{2}</sup>, Martin Verweij<sup>{1}</sup>, Hendrik Vos<sup>{4}</sup>, Piero Tortoli<sup>{3}</sup>  
<sup>{1}</sup>Delft University of Technology, Netherlands; <sup>{2}</sup>Medical Imaging, ImPhys, Applied Sciences / Delft University of Technology, Netherlands; <sup>{3}</sup>Università degli Studi di Firenze, Italy; <sup>{4}</sup>University Medical Center Rotterdam / Delft University of Technology, Netherlands

**12:10 PM**

### **2431: Open Platform for Accelerating Smart Ultrasound Transducer Probe Development**

Xiaochen Xu, Shabbir Amjhera Wala, Abhishek Vishwa, Jun Shen, Dijeesh K, Shriram Devi, Aatish Chandak, Sanjay Dixit, Elisa Granata, Sandeep Oswal  
Texas Instruments, Italy; Texas Instruments, United States; Texas Instruments, China; Texas Instruments, India

**11:30:00 AM - 1:30:00 PM**

### **B5P-24: TPF: Poster PM - Applications of Piezoelectrics Session**

**Session Chair(s):** Xiaoning Jiang (NC State University)

**12:20 PM**

### **1127: Wearable Wireless Sensor to Characterize Respiratory Behavior**

Ang Chen<sup>{1}</sup>, Andrew Halton<sup>{1}</sup>, Rachel Rhoades<sup>{1}</sup>, Jayden Booth<sup>{1}</sup>, Xinhao Shi<sup>{2}</sup>, Xiangli Bu<sup>{2}</sup>, Ning Wu<sup>{2}</sup>, Junseok Chae<sup>{1}</sup>  
<sup>{1}</sup>Arizona State University, United States; <sup>{2}</sup>Nanjing University of Aeronautics and Astronautics, China

**12:30 PM**

### **1446: Evaluation of PIC 181 and Mn:PIN-PMN-PT Thickness Extensional Rings for Use in Power Ultrasonic Devices for Minimally Invasive Surgery**

Nicola Giuseppe Fenu, Xuan Li, Margaret Lucas, Sandy Cochran  
University of Glasgow, United Kingdom

**12:40 PM**

### **1518: Steering Single-Element Ferroelectric Materials Using Biaxial Driving**

Sagid Delgado<sup>{1}</sup>, Laura Curie<sup>{2}</sup>, Samuel Pichardo<sup>{2}</sup>  
<sup>{1}</sup>Lakehead University, Canada; <sup>{2}</sup>University of Calgary, Canada

**12:50 PM**

### **1834: Progress Towards the Miniaturization of a Harmonic Scalpel for Endoscopic Surgery Using d31/d32 Mode of Mn:PIN-PMN-PT High Performance Piezocrystals**

## Wednesday, September 9

Nicola Giuseppe Fenu<sup>{4}</sup>, Nathan Giles-Donovan<sup>{4}</sup>, Xuan Li<sup>{4}</sup>, Zhu Liang<sup>{2}</sup>, Haosu Luo<sup>{2}</sup>, Chris Stock<sup>{3}</sup>, Shujun Zhang<sup>{1}</sup>, Margaret Lucas<sup>{4}</sup>, Sandy Cochran<sup>{4}</sup>  
<sup>{1}</sup>Australian Institute for Innovative Materials, Australia;  
<sup>{2}</sup>Shanghai Institute of Ceramics, Chinese Academy of Sciences, China; <sup>{3}</sup>University of Edinburgh, United Kingdom; <sup>{4}</sup>University of Glasgow, United Kingdom

**01:00 PM**

**2370: Characterization of Ultrasound Transducers Made by Alternating Current Poled PMN-PT Single Crystals for Non-Destructive Evaluation**

Haotian Wan

North Carolina State University, United States

**11:30:00 AM - 1:30:00 PM**

**B5P-22: TMI: Poster PM - Biomedical Diagnostic & Imaging Transducers**

**Session Chair(s):** Qifa Zhou (University of Southern California)

**11:30 AM**

**1396: Nonlinear Electrical Impedance of the Acoustic Stack in Cardiac Ultrasound Probe**

Thong Huynh<sup>{2}</sup>, Trym Eggen<sup>{1}</sup>, Lars Hoff<sup>{3}</sup>

<sup>{1}</sup>GE Vingmed Ultrasound, Norway; <sup>{2}</sup>University College in Southeastern Norway, Norway; <sup>{3}</sup>University of South-Eastern Norway, Norway

**11:40 AM**

**1583: Lead-Free 2D Ultrasonic Array for Acoustic Radiation Force Optical Coherence Elastography of Retina**

Haochen Kang<sup>{5}</sup>, Robert Wodnicki<sup>{5}</sup>, Yizhe Sun<sup>{5}</sup>, Xuejun Qian<sup>{5}</sup>, Ruimin Chen<sup>{5}</sup>, Yan Li<sup>{4}</sup>, Takayuki Matsuoka<sup>{2}</sup>, Masato Yamazaki<sup>{1}</sup>, Ahmad Safari<sup>{3}</sup>, Zhongping Chen<sup>{4}</sup>, Qifa Zhou<sup>{5}</sup>

<sup>{1}</sup>NGK Spark Plug Co., Ltd., Japan; <sup>{2}</sup>NGK SPARK PLUGS CO, Japan; <sup>{3}</sup>Rutgers University, United States; <sup>{4}</sup>University of California, Irvine, United States; <sup>{5}</sup>University of Southern California, United States

**11:50 AM**

**1713: High-Frequency Endoscopic Linear Arrays for Intraluminal Imaging**

Felipe Roa<sup>{2}</sup>, Jianhua Yin<sup>{1}</sup>, Aaron Boyes<sup>{1}</sup>, Emmanuel Chérin<sup>{1}</sup>, Nidhi Singh<sup>{2}</sup>, Bahar Motlagh<sup>{1}</sup>, Stuart Foster<sup>{3}</sup>, Christine Démoré<sup>{4}</sup>

<sup>{1}</sup>Sunnybrook Research Institute, Canada; <sup>{2}</sup>University of Toronto, Canada; <sup>{3}</sup>University of Toronto, Sunnybrook Health Sciences Centre, Canada; <sup>{4}</sup>University of Toronto, Sunnybrook Research Institute, Canada

**12:00 PM**

**1716: Development of Ultrasound Transducers for Gating the Acquisition of Computed Tomography Coronary Angiography (CTCA)**

Stephan Strassle Rojas<sup>{1}</sup>, Graham Collins<sup>{2}</sup>, Sridhar Tridandapani<sup>{3}</sup>, Brooks Lindsey<sup>{1}</sup>

<sup>{1}</sup>Georgia Institute of Technology, United States; <sup>{2}</sup>Georgia Institute of Technology / Emory University, United States; <sup>{3}</sup>University of Alabama at Birmingham, United States

**12:10 PM**

**1888: Broadband Frequency Emission (cMUT) and Reception (PVDF) for Super Harmonic Imaging**

Igor Campos Vilas Boas<sup>{3}</sup>, Rémi Rouffaud<sup>{3}</sup>, Laurent Colin<sup>{3}</sup>, Frédéric Ossant<sup>{1}</sup>, Franck Levassort<sup>{3}</sup>, Dominique Certon<sup>{2}</sup>

<sup>{1}</sup>INSERM Imaging and Brain, UMR 1253, University of Tours, France; <sup>{2}</sup>Université de Tours / GREMAN UMR 7347, France; <sup>{3}</sup>Université de Tours / GREMAN UMR 7347 / INSA Centre Val de la Loire, France

**12:20 PM**

**1996: Orthogonal Bowtie-Shaped 2D Array for Real-Time 3D Imaging**

Jesse Yen, Robert Wodnicki

University of Southern California, United States

**12:30 PM**

**2088: High Frequency 1.75D Array Using a 3D Printed Pitch-Changing Interposer Backing**

Robert Wodnicki, Haochen Kang, Yizhe Sun, Laiming Jiang, Haotian Lu, Qifa Zhou

University of Southern California, United States

**12:40 PM**

**2332: Transducer Fabrication Using a 355nm Pulsed Picosecond Laser – Rapid Prototyping of 40 MHz Composites, Custom Electrode Patterns, and Circularly Symmetric Curvable Composite Patterns**

Jeffrey Woodacre, Thomas Landry, Jeremy Brown

Dalhousie University, Canada

**12:50 PM**

**2364: Fusion of Ultrasonic Tracking with Inertial Measurement Unit Using Kalman Filter for Cost-Effective 3D Space Localization**

Jiale Hu<sup>{1}</sup>, Howuk Kim<sup>{1}</sup>, Qianqian Cai<sup>{1}</sup>, Chang Peng<sup>{1}</sup>, Mengyue Chen<sup>{1}</sup>, Juan Prieto<sup>{2}</sup>, Alan Rosenbaum<sup>{2}</sup>, Jeffrey Stringer<sup>{2}</sup>, Xiaoning Jiang<sup>{1}</sup>

<sup>{1}</sup>North Carolina State University, United States; <sup>{2}</sup>University of North Carolina at Chapel Hill, United States

**01:00 PM**

**2367: Spatial and Temporal Probe Calibration via Feedback Optimization and Symmetric Acquisition Protocol**

Qianqian Cai<sup>{1}</sup>, Chang Peng<sup>{1}</sup>, Juan Prieto<sup>{2}</sup>, Alan Rosenbaum<sup>{2}</sup>, Jeffrey Stringer<sup>{2}</sup>, Xiaoning Jiang<sup>{1}</sup>

<sup>{1}</sup>North Carolina State University, United States; <sup>{2}</sup>University of North Carolina at Chapel Hill, United States

**11:30:00 AM - 1:30:00 PM**

**B5P-23: TMU: Poster PM - Micromachined Ultrasonic Transducers Session**

**Session Chair(s):** Sanli Ergun (Stanford University)

**11:30 AM**

**1407: Delay Line Separation of CMUT Elements**

Andreas Havreland, Kasper Fløng Pedersen, Mathias Engholm, Ole Hansen, Erik Thomsen

Technical University of Denmark, Denmark

## Wednesday, September 9

11:40 AM

**1462: Modeling and Validation of CMUTs with Mechanically Coupled Plate Actuators**

Marcel Krenkel<sup>{1}</sup>, Nicolas Lange<sup>{1}</sup>, Sandro G. Koch<sup>{1}</sup>, Mario Kupnik<sup>{2}</sup>  
<sup>{1}</sup>Fraunhofer Institute Photonic Microsystems-IPMS, Germany; <sup>{2}</sup>Technische Universität Darmstadt, Germany

11:50 AM

**1635: Electrical Insulation of CMUT Elements Using DREM and Lapping**

Stine Loevholt Grue, Mathias Engholm, Erik Vilain Thomsen  
Technical University of Denmark, Denmark

12:00 PM

**1844: Impact of the Variability of Microfabrication Process Parameters on CMUTs Performance**

Monica La Mura<sup>{3}</sup>, Alvisè Bagolini<sup>{1}</sup>, Patrizia Lamberti<sup>{3}</sup>, Alessandro Savoia<sup>{2}</sup>  
<sup>{1}</sup>Fondazione Bruno Kessler, Italy; <sup>{2}</sup>Roma Tre University, Italy; <sup>{3}</sup>University of Salerno, Italy

12:10 PM

**1852: Wideband Air-Coupled CMUT Arrays for Acoustic Micro-Tapping**

Zachary Coutant<sup>{1}</sup>, Oluwafemi Adelegan<sup>{1}</sup>, Ali Onder Biliroglu<sup>{1}</sup>, Geng-Shi Jeng<sup>{2}</sup>, John Pitre Jr.<sup>{2}</sup>, Mitchell Kirby<sup>{2}</sup>, Feysel Yalcin Yamaner<sup>{1}</sup>, Ivan Pelivanov<sup>{2}</sup>, Matthew O'Donnell<sup>{2}</sup>, Ömer Oralkan<sup>{1}</sup>  
<sup>{1}</sup>North Carolina State University, United States; <sup>{2}</sup>University of Washington, United States

12:20 PM

**1889: Combined Use of Finite Element and Equivalent Circuit Modeling for System-Level Simulation of Integrated Capacitive Micromachined Ultrasonic Transducers (CMUT)**

Alessandro Savoia<sup>{2}</sup>, Giuseppe Scaglione<sup>{2}</sup>, Bruno Haider<sup>{1}</sup>  
<sup>{1}</sup>GE Healthcare, United States; <sup>{2}</sup>Roma Tre University, Italy

12:30 PM

**1960: First Time of Nanoscopic Electrostatic Drives Pushing for Ultrasonic Transmission for Gesture Recognition**

Marco Kircher, Franziska Wall, Marcel Krenkel, Bert Kaiser, Jorge Mario Monsalve Guaracao  
Fraunhofer Institute Photonic Microsystems-IPMS, Germany

12:40 PM

**2013: Ultrasonic Power Transfer Using Capacitive Parametric Ultrasonic Transducers: Experimental Verification and Design Guidelines for Improved Efficiency**

Charles Wei, Sushruta Surappa, F. Levent Degertekin  
Georgia Institute of Technology, United States

12:50 PM

**2051: Improving Transmit and Receive Sensitivity of Thin Film PZT-Based PMUT Arrays for Imaging**

Christopher Cheng, Ajay Dangi, Sumit Agrawal, Sri-Rajasekhar Kothapalli, Susan Trolrier-McKinstry  
Pennsylvania State University, United States

1:00 PM

**2174: Dielectric Characterization of Structural and Passivation Films for Flexible CMUT Microfabrication**

Ivano Lucarini<sup>{2}</sup>, Luca Maiolo<sup>{1}</sup>, Francesco Maita<sup>{1}</sup>, Alessandro Savoia<sup>{2}</sup>  
<sup>{1}</sup>CNR - IMM, Italy; <sup>{2}</sup>Roma Tre University, Italy

1:10 PM

**2197: A Low-Frequency Piezoelectric Micromachined Ultrasonic Transducer Based on Multi-User MEMS Process with Enhanced Output Pressure**

Jenitha Antony Balasingam, Siddharth Swaminathan  
University of Windsor, Canada

1:20 PM

**2447: Forming an Annular Array from 2D CMUT Array Elements by Using a Metal Redistribution Layer**

Oluwafemi Adelegan, Tamzid Ibn Minhaj, Zachary Coutant, Feysel Yalcin Yamaner, Ömer Oralkan  
North Carolina State University, United States

1:30 PM

**2450: Implementing a 32 x 32 2D Capacitive Micromachined Ultrasonic Transducer Array Incorporating Silicon-Through-Glass-Via (Si-TGV) Interconnects**

Oluwafemi Adelegan, Zachary Coutant, Tamzid Ibn Minhaj, Feysel Yalcin Yamaner, Ömer Oralkan  
North Carolina State University, United States

11:30:00 AM - 1:30:00 PM

**B5P-25: TPM: Poster PM - Piezoelectric Transducers Session Chair(s):** Qifa Zhou (University of Southern California)

11:30 AM

**1455: A Novel 3D-Printed (0-3) Piezocomposite Material for Low Frequency Sensing Applications**

Rolan Mansour, Oluwaseun Omoniyi, Andrew Reid, Lin Liang, Richard O'Leary, James Windmill  
University of Strathclyde, United Kingdom

11:40 AM

**1650: Evaluation of Direct Laser Sintered Ti6Al4V for a Prototype Power Ultrasonic Surgical Device**

Rebecca Cleary, Xuan Li, Margaret Lucas  
University of Glasgow, United Kingdom

11:50 AM

**1992: Temperature Stability of Electrode/AIScN Multilayer Systems for PMUT Process Integration**

Kristina Bepalova<sup>{1}</sup>, Glenn Ross<sup>{1}</sup>, Mervi Paulasto-Kröckel<sup>{1}</sup>, Abhilash Thanniyil Sebastian<sup>{2}</sup>, Cyril Baby Karuthedath<sup>{2}</sup>, Stefan Mertin<sup>{2}</sup>, Tuomas Pensala<sup>{2}</sup>  
<sup>{1}</sup>Aalto University, Finland; <sup>{2}</sup>VTT Technical Research Centre of Finland, Finland

12:00 PM

**2159: Combined Dynamic AC and Static DC Poling for Pb(Mg<sub>1/3</sub>Nb<sub>2/3</sub>)O<sub>3</sub>-Pb(In<sub>1/2</sub>Nb<sub>1/2</sub>)O<sub>3</sub>-PbTiO<sub>3</sub> Single Crystals**

Yohachi Yamashita<sup>{1}</sup>, Tomoaki Karaki<sup>{2}</sup>, Yiqin Sun<sup>{2}</sup>, Cong Luo<sup>{2}</sup>, Xiaoning Jiang<sup>{1}</sup>

## Wednesday, September 9

{1}North Carolina State University, United States;  
{2}Toyama Prefectural University, Japan

12:10 PM

### 2184: Characterization of (0-3) Piezocomposite Materials for Transducer Applications

Oluwaseun Omoniyi, Rolan Mansour, Milovan Cardona, Maria Briuglia, Richard O'Leary, James Windmill  
University of Strathclyde, United Kingdom

12:20 PM

### 2255: Design and Fabrication of High-Performance Ultrasound Transducers Based on Textured Pb(Mg<sub>1/3</sub>Nb<sub>2/3</sub>)O<sub>3</sub>-Pb(Zr,Ti)O<sub>3</sub> Ceramics

Yizhe Sun{2}, Laiming Jiang{2}, Ruimin Chen{2}, Yongke Yan{1}, Shashank Priya{1}, Qifa Zhou{2}  
{1}Pennsylvania State University, United States;  
{2}University of Southern California, United States

12:40 PM

### 2383: Bias Sensitive Transparent Electrostrictive Ultrasound Transducers

Mohammad Rahim Sobhani{2}, Chris Ceroici{2}, Kate Latham{1}, Jeremy Brown{1}, Roger Zemp{2}  
{1}Dalhousie University, Canada; {2}University of Alberta, Canada

11:30:00 AM - 1:30:00 PM

### B5P-26: TTT: Poster PM - Biomedical Therapeutic Transducers

Session Chair(s): Charles Emery (Ulthera Inc.)

11:30 AM

### 1057: Application of the Biaxial Driving Method to Focus Ultrasound Using Only Two Electric Signals

Sagid Delgado{1}, Laura Curiel{2}, Samuel Pichardo{2}  
{1}Lakehead University, Canada; {2}University of Calgary, Canada

11:40 AM

### 1157: Evaluation of CMUT for Passive Monitoring of Microbubble-Assisted Ultrasound Therapies

Ambre Dauba{1}, Jordane Goulas{1}, Laurent Colin{4}, Laurène Jourdain{1}, Benoit Larrat{2}, Jean-Luc Gennisson{1}, Dominique Certon{3}, Anthony Novell{1}  
{1}BioMaps, Université Paris Saclay, CNRS, Inserm, CEA, France; {2}Neurospin, CEA, Université Paris Saclay, France; {3}Université de Tours / GREMAN UMR 7347, France; {4}Université de Tours / GREMAN UMR 7347 / INSA Centre Val de la Loire, France

11:50 AM

### 1296: Fabrication and Validation of an Acoustic Reflective Casing for Neurostimulation Studies with Microscopy

Jak Loree-Spacek, Catherine Swytink-Binnema, Zelma Kiss, Samuel Pichardo  
University of Calgary, Canada

12:00 PM

### 1799: Simulation and Construction of a High Power Phased-Array Transducer System for the Treatment of Deep Vein Thrombosis

Maryam Dadgar{2}, Kullervo Hynynen{1}

{1}Sunnybrook Research Institute / University of Toronto, Canada; {2}University of Toronto, Canada

12:10 PM

### 1842: A Model Based Approach to Measure Acoustic Radiation Force of Ultrahigh Frequency Ultrasonic Transducers

Sunho Moon, Sangpil Yoon  
University of Notre Dame, United States

12:20 PM

### 2257: Enlarging HIFU Ablations Created Using a Toroidal Transducer by Depositing the Energy at Distance from the Acoustic Axis with a Minimal Number of Elements

Marine Sanchez{1}, David Melodelima{2}  
{1}INSERM U1032 / LabTAU, France; {2}LabTAU, INSERM, Centre Léon Bérard, Université Lyon 1, Université de Lyon, France

12:30 PM

### 2292: A Tri-Frequency (1 MHz, 5 MHz, 30 MHz) Transducer for Combined Imaging and Therapy

Matthew Mallay, Thomas Landry, Jeffrey Woodacre, Jeremy Brown  
Dalhousie University, Canada

12:40 PM

### 2297: Dual-Frequency Intravascular Thrombolysis with Miniaturized Forward-Looking Transducers

Huaiyu Wu{1}, Bohua Zhang{1}, Leela Goel{1}, Jinwook Kim{4}, Paul Dayton{2}, Zhen Xu{3}, Xiaoning Jiang{1}  
{1}North Carolina State University, United States; {2}North Carolina State University / University of North Carolina at Chapel Hill, United States; {3}University of Michigan, United States; {4}University of North Carolina at Chapel Hill, United States

12:50 PM

### 2303: Fiber Laser Ultrasound Transducers for Intravascular Thrombolysis with Detective Photoacoustic Imaging

Huaiyu Wu{2}, Yuqi Tang{1}, Junjie Yao{1}, Xiaoning Jiang{2}  
{1}Duke University, United States; {2}North Carolina State University, United States

4:15:00 AM – 6:15:00 AM  
Student Paper Finalist Session #2 (Groups 3, 4, & 5)

**Group 3**

**04:15 AM:** 1401  
**Ultrasound full-Waveform Inversion with Accurate Transducer Characterisation**

*Carlos Cueto*  
*Department of Bioengineering*  
*Imperial College London*

**04:25 AM:** 2235  
**An Aluminum Nitride (AlN) Based Elastic Metamaterial with Guided Negative Refraction**

*Yanbo He*  
*Purdue University*  
*Indiana, USA*

**04:35 AM:** 2299  
**Mechanical four-Wave Mixing in GHz phononic Circuit on thin-Film Lithium Niobate on Sapphire**

*Wentao Jiang*  
*Ginzton Laboratory*  
*Stanford University*

**Group 4**

**04:45 AM:** 2275  
**Fast Simulation Method of Distributed Nonlinearities in Surface Acoustic Wave Resonators**

*Marta González-Rodríguez*  
*Universitat Politècnica de Catalunya (UPC)*

**04:55 AM:** 1336  
**High Frequency Solidly Mounted Resonator Using Ln Single Crystal Thin Plate**

*Kohei Matsumoto*  
*Department of Robotics*  
*Tohoku University*

**05:05 AM:** 2056  
**A 14.5 GHz Lithium Niobate Acoustic Filter with Fractional Bandwidth of 2.93%**

*Liuqing Gao*  
*Department of Electrical and Computer Engineering*  
*University of Illinois at Urbana-Champaign*

**Group 5**

**05:15 AM:** 2406  
**A 2D Ultrasonic Transmit Phased Array Based on a 32x32 CMUT Array Flip-Chip Bonded to an ASIC for Neural Stimulation**

*Chunkyun Seok*  
*Department of Electrical and Computer Engineering*  
*NC State University*

**05:25 AM:** 2012  
**Laser Sensor Guided Intravascular Catheter with Ring Type Stack Transducer for Sonothrombolysis**

*Bohua Zhang*  
*Department of Mechanical and Aerospace Engineering*  
*NC State University*

**05:35 AM:**1161  
**High-performance transparent ferroelectric crystals for photoacoustic transducer applications**

*Chaorui Qiu*  
*Electronic Materials Research Laboratory*  
*Xi'an Jiaotong University*

4:15:00 AM - 6:15:00 AM  
**C1P-06: MTH: Poster AM - Therapeutic Applications & Targets**

**Session Chair(s):** Wilko Wilkening (Siemens Medical Solutions)  
Zhen Xu (University of Michigan)

**04:15 AM**  
**1413: Intra-Operative HIFU Treatment at the Hepato-Caval Confluence of the Liver in an in Vivo Porcine Model**

*Sophie Cambronero, Aurélien Dupre, Yao Chen, Michel Rivoire, David Melodelima*  
*LabTAU, INSERM, Centre Léon Bérard, Université Lyon 1, Université de Lyon, France*

**04:25 AM**  
**1617: 3D FDTD Simulation Study of Ultrasound Focusing on the Human Femoral Neck**

*Takashi Misaki<sup>{1}</sup>, Kazuki Miyashita<sup>{1}</sup>, Leslie Bustamante<sup>{1}</sup>, Nobuo Niimi<sup>{3}</sup>, Ko Chiba<sup>{2}</sup>, Mami Matsukawa<sup>{1}</sup>*  
*<sup>{1}</sup>Doshisha University, Japan; <sup>{2}</sup>Nagasaki University, Japan; <sup>{3}</sup>Nippon Sigmax, Japan*

**04:35 AM**  
**1772: Ex Vivo Imaging of Ultrasound-Stimulated Metabolic Activity in Rat Pancreatic Slices**

*Andrew Chen, Aleksandar Jeremic, Vesna Zderic*  
*George Washington University, United States*

**04:45 AM**  
**1832: Histological Evaluation of Histotripsy in Ex Vivo Rat Tendon**

*Molly Smallcomb, Jake Elliott, Sujata Khandare, Meghan Vidt, Julianna Simon*  
*Pennsylvania State University, United States*

**04:55 AM**  
**2194: Therapeutic Ultrasound for Treatment of Corneal Keratitis**

*Bianca Karpinecz, Blake Cellum, Claire Allison, Natalie Edwards, Fadi Nasrallah, Vesna Zderic*  
*George Washington University, United States*

4:15:00 AM - 6:15:00 AM  
**C1P-11: MIS: Poster AM - Interventional Ultrasound**

**Session Chair(s):** Rik Hansen (Radboud University Medical Center)  
Jonathan Mamou (Riverside Research)

**05:05 AM**  
**1149: Three Dimensional Positioning for Ultrasound Beacons Using One Dimensional Array Probes with Elevation Asymmetry**

*Tomohiko Tanaka, Ryo Imai, Hirozumi Takeshima*  
*Hitachi Ltd., Japan*

05:25 AM

**1675: A Dual-Frequency Probe with Coded Excitation for Ultrasound Guided Screw Insertion in Spinal Fusion Surgery**

Chen Yang<sup>{2}</sup>, Peiyang Li<sup>{2}</sup>, Yaoyao Cui<sup>{3}</sup>, Weiwei Shao<sup>{2}</sup>, Ninghao Wang<sup>{2}</sup>, Jun Shen<sup>{1}</sup>  
<sup>{1}</sup>Affiliated Suzhou Hospital of Nanjing Medical University / Suzhou Municipal Hospital, China; <sup>{2}</sup>Chinese Academy of Science, Suzhou Institute of Biomedical Engineering and Technology, China; <sup>{3}</sup>Suzhou Institute of Biomedical Engineering and Technology, Chinese Academy of Sciences, China

05:35 AM

**1907: Real-Time Adaptive Image-Based Refocusing with Mode Selection for Transcranial Therapies**

Parker O'Brien, Collin Smith, Hasan Aldiabat, Dalong Liu, Emad Ebbini  
University of Minnesota - Twin Cities, United States

4:15:00 AM - 6:15:00 AM

**C1P-07: MBB: Poster AM - Enhancing Images Through Novel Beamforming II**

**Session Chair(s):** Denis Kouamé (University of Toulouse III)

04:15 AM

**1237: An R-Space Theorem for Plane Wave Ultrasound Reconstruction**

Hans-Martin Schwab, Frans van de Vosse, Richard Lopata  
Eindhoven University of Technology, Netherlands

04:25 AM

**1652: Reducing Grating Lobe Artifacts by Exploiting Lateral Transducer Motion**

Marvin Heller, Georg Schmitz  
Ruhr University Bochum, Germany

04:35 AM

**2175: On Archimedean-Spiral-Based Imaging**

Adrien Besson<sup>{1}</sup>, Frédéric Wintzenrieth<sup>{1}</sup>, Baptiste Hériard-Dubreuil<sup>{2}</sup>, Claude Cohen-Bacrie<sup>{1}</sup>  
<sup>{1}</sup>E-Scopics SAS, France; <sup>{2}</sup>E-Scopics SAS / École Polytechnique Fédérale de Lausanne, France

04:45 AM

**1063: A Simulation Study on the Second Harmonic Amplitude Generated with Plane Wave and Focused Wave Transmission**

Libertario Demi<sup>{2}</sup>, Francesco Guidi<sup>{1}</sup>, Piero Tortoli<sup>{1}</sup>  
<sup>{1}</sup>Università degli Studi di Firenze, Italy; <sup>{2}</sup>University of Trento, Italy

04:55 AM

**1411: Reducing Dark Region Artifacts in Short-Lag Spatial Coherence (SLSC) Beamforming by Coherence Filtering of the Aperture-Domain Data**

Luzhen Nie<sup>{1}</sup>, Thomas Carpenter<sup>{1}</sup>, Harry Clegg<sup>{1}</sup>, James McLaughlan<sup>{2}</sup>, David Cowell<sup>{1}</sup>, Steven Freear<sup>{1}</sup>  
<sup>{1}</sup>University of Leeds, United Kingdom; <sup>{2}</sup>University of Leeds / Leeds Institute of Medical Research, United Kingdom

05:05 AM

**1511: Improving the Detectability of Highly Coherent Targets in Short-Lag Spatial Coherence Images with Multi-Line Transmission**

Giulia Matrone<sup>{3}</sup>, Muyinatu Lediju Bell<sup>{1}</sup>, Alessandro Ramalli<sup>{2}</sup>  
<sup>{1}</sup>Johns Hopkins University, United States; <sup>{2}</sup>Università degli Studi di Firenze, Italy; <sup>{3}</sup>University of Pavia, Italy

05:15 AM

**1561: Design of Optimum 1D Sparse Arrays for Point-of-Care Ultrasound Imaging – Phantom Study**

Jihyeok Choi<sup>{2}</sup>, Jae Hee Song<sup>{1}</sup>, Jaejin Lee<sup>{2}</sup>, Tai-Kyong Song<sup>{2}</sup>  
<sup>{1}</sup>Queensland Brain Institute, Australia; <sup>{2}</sup>Sogang University, Korea

05:25 AM

**1913: Optimization of Transducer Distribution and Transmit Sequence in Coherent-Multi Transducer Ultrasound (CoMTUS) Imaging**

Laura Peralta<sup>{1}</sup>, Kirsten Christensen-Jeffries<sup>{1}</sup>, Alessandro Ramalli<sup>{2}</sup>, Joseph V Hajnal<sup>{1}</sup>  
<sup>{1}</sup>King's College London, United Kingdom; <sup>{2}</sup>Università degli Studi di Firenze, Italy

05:35 AM

**2351: Transthoracic Cardiac Ultrasound Imaging Using a Flexible Transducer Array: in Silico Feasibility Study**

Ekaterina Zilonova, Sjoerd Nooijens, Marcus Ingram, Jan D'Hooge  
Katholieke Universiteit Leuven, Belgium

4:15:00 AM - 6:15:00 AM

**C1P-08: MBB: Poster AM - Deep Learning in Beamforming**

**Session Chair(s):** Yonina Eldar (Weizmann Institute of Science)

04:15 AM

**1012: Challenge on Ultrasound Beamforming with Deep Learning (CUBDL)**

Muyinatu Bell<sup>{2}</sup>, Jiaqi Huang<sup>{2}</sup>, Dongwoon Hyun<sup>{3}</sup>, Yonina C. Eldar<sup>{4}</sup>, Ruud van Sloun<sup>{1}</sup>, Massimo Mischì<sup>{1}</sup>  
<sup>{1}</sup>Eindhoven University of Technology, Netherlands; <sup>{2}</sup>Johns Hopkins University, United States; <sup>{3}</sup>Stanford University, United States; <sup>{4}</sup>Weizmann Institute of Science, Israel

04:55 AM

**1270: Compressed Convolutional Beamforming for Wireless Ultrasound**

Alon Mamistvalov, Sivan Grotas, Yonina C. Eldar  
Weizmann Institute of Science, Israel

05:05 AM

**1967: Deep Adaptive Beamforming of Subsampled Channel Data**

Naama Kessler<sup>{4}</sup>, Alon Mamistvalov<sup>{4}</sup>, Oded Drori<sup>{4}</sup>, Ben Luijten<sup>{1}</sup>, Shai Tejman Yarden<sup>{3}</sup>, Israel Aharony<sup>{2}</sup>, Ruud van Sloun<sup>{1}</sup>, Yonina C. Eldar<sup>{4}</sup>  
<sup>{1}</sup>Eindhoven University of Technology, Netherlands; <sup>{2}</sup>Haemek Medical Center, Israel; <sup>{3}</sup>Sheba Medical Center, Israel; <sup>{4}</sup>Weizmann Institute of Science, Israel

05:15 AM

**1981: High-Quality 3D Imaging Through Adaptive Beamforming by Deep Learning**

Boudewine Ossenkoppelle{1}, Ben Luijten{2}, Deep Bera{5}, Nico de Jong{4}, Martin Verweij{4}, Ruud van Sloun{3}

{1}Delft University of Technology, Netherlands; {2}Eindhoven University of Technology, Netherlands; {3}Eindhoven University of Technology / Philips Research, Netherlands; {4}Erasmus University Medical Center / Delft University of Technology, Netherlands; {5}Philips Research, India

05:25 AM

**1990: Resolution Improvement with a Fully Convolutional Neural Network Applied to Aligned Per-Channel Data**

Francois Vignon, Jun Seob Shin, F. Can Meral, Iason Apostolakis, Jean-Luc Robert  
Philips Research North America, United States

05:35 AM

**2089: Joint Learning of Sparse Channel Arrays and Model-Based Deep Beamforming Networks**

Iris Huijben{1}, Ben Luijten{1}, Bastiaan Veeling{3}, Frederik de Bruijn{2}, Harold Schmeitz{2}, Massimo Mischì{1}, Ruud van Sloun{1}

{1}Eindhoven University of Technology, Netherlands; {2}Philips Research, Netherlands; {3}University of Amsterdam, Netherlands

05:45 AM

**2190: Image Quality-Based Regularization for Deep Network Ultrasound Beamforming**

Jaime Tierney, Adam Luchies, Matthew Berger, Brett Byram  
Vanderbilt University, United States

05:55 AM

**1374: A Deep Neural Network with Self-Supervised Learning for Ultrafast Ultrasound Imaging as an Inverse Problem**

Jingke Zhang{2}, Congzhi Wang{1}, Qiong He{2}, Jianwen Luo{2}

{1}Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China; {2}Tsinghua University, China

06:00 AM

**2243: Beamforming of Row-Column-Addressed 2D Arrays Based on Dynamic Apodization with Deep Neural Network**

Shi-Hao Li, Pai-Chi Li  
National Taiwan University, Taiwan

4:15:00 AM - 6:15:00 AM

**C1P-10: MBB: Poster AM - High Frame Rate Beamforming**

**Session Chair(s):** Ruud van Sloun (Eindhoven University of Technology)

04:15 AM

**1084: Apodizing Delay and Auto-Correlation Reconstruction Algorithm for High-Frame-Rate Ultrasound Imaging**

Chunqi Li{1}, Harry Clegg{1}, Thomas Carpenter{1}, Luzhen Nie{1}, Steven Freear{1}, David Cowell{1}, James McLaughlan{2}

{1}University of Leeds, United Kingdom; {2}University of Leeds / Leeds Institute of Medical Research, United Kingdom

04:25 AM

**1391: In-Vivo Comparison of Multiline Transmission and Diverging Wave Imaging for High Frame Rate Speckle Tracking Echocardiography**

Marta Orłowska{1}, Stephanie Bézy{1}, Alessandro Ramalli{2}, Valentino Meacci{3}, Jens-Uwe Voigt{1}, Jan D'hooge{1}

{1}Katholieke Universiteit Leuven, Belgium; {2}Katholieke Universiteit Leuven / Università degli Studi di Firenze, Belgium; {3}Università degli Studi di Firenze, Italy

04:35 AM

**1465: High-Frame-Rate Coherence Imaging of the Heart with Ultrasound Diverging Waves**

Giulia Matrone{3}, Edoardo Spairani{3}, Benedetta Matrone{1}, Alessandro Ramalli{2}

{1}Guglielmo da Saliceto Hospital, Italy; {2}Università degli Studi di Firenze, Italy; {3}University of Pavia, Italy

04:45 AM

**1614: Sequence Optimization for High Frame Rate Imaging with a Convex Array**

Nina Ghigo{1}, Alessandro Ramalli{2}, Stefano Ricci{2}, Piero Tortoli{2}, Didier Vray{1}, Hervé Liebgott{1}

{1}Creatis - INSA Lyon, France; {2}Università degli Studi di Firenze, Italy

04:55 AM

**1653: Detecting and Characterizing the Fabella with High Frame-Rate Ultrasound Imaging**

Michael A. Berthaume{3}, Matthieu Toulemonde{1}, Laura Peralta{2}, Kirsten Christensen-Jeffries{2}, Enrico Grisan{3}, Sevan Harput{4}

{1}Imperial College London, United Kingdom; {2}King's College London, United Kingdom; {3}London South Bank University, United Kingdom; {4}London South Bank University / Imperial College London, United Kingdom

05:05 AM

**1424: 3D High Frame Rate Imaging Scheme for Ultrasound Carotid Imaging**

Mehdi Soozande{2}, Moein Mozzaffarzadeh{1}, Fabian Fool{4}, Taehoon Kim{1}, Eunchul Kang{1}, Michiel Pertijs{1}, Martin Verweij{1}, Hendrik Vos{2}, Johan G. Bosch{2}, Nico de Jong{3}

{1}Delft University of Technology, Netherlands; {2}Erasmus University Medical Center, Netherlands; {3}Erasmus University Medical Center / Delft University of Technology, Netherlands; {4}Medical Imaging, ImPhys, Applied Sciences / Delft University of Technology, Netherlands

05:15 AM

**2230: A 3D Motion Compensation Method for High Frame Rate Volumetric Ultrasound Imaging Based on Velocity Vector Estimation: a Simulation Study**

Yinran Chen<sup>{2}</sup>, Xiongbiao Luo<sup>{2}</sup>, Jianwen Luo<sup>{1}</sup>  
<sup>{1}</sup>Tsinghua University, China; <sup>{2}</sup>Xiamen University,  
China

**05:25 AM**

**2241: Feasibility of Fourier-Based Fast 3D Ultrasound Imaging Using Row-Column Addressed 2-D Arrays**  
Shang-Ching Lin, Pai-Chi Li  
National Taiwan University, Taiwan

**4:15:00 AM - 6:15:00 AM**

**C1P-12: MIS: Poster AM - Contrast Agent Signal Processing**

**Session Chair(s):** Chih-Chung Huang (National Cheng Kung University)  
Jonathan Mamou (Riverside Research)

**05:35 AM**

**2080: Nakagami-M Parametric Characterization of in Vivo Microbubble-Enhanced Ultrasound with High Sensitivity and Discriminability: Regulated by RF and VF Processing Techniques**  
Diya Wang<sup>{1}</sup>, Mingxi Wan<sup>{2}</sup>, Chris J. Diederich<sup>{1}</sup>  
<sup>{1}</sup>University of California, San Francisco, United States;  
<sup>{2}</sup>Xi'an Jiaotong University, China

**05:45 AM**

**2142: Beyond Classical Ultrasound Contrast via Deep Neural Networks**  
Hannah Strohm<sup>{1}</sup>, Sven Rothlübbers<sup>{1}</sup>, Klaus Eickel<sup>{3}</sup>, Matthias Günther<sup>{2}</sup>  
<sup>{1}</sup>Fraunhofer Institute Digital Medicine-MEVIS, Germany;  
<sup>{2}</sup>Fraunhofer Institute Digital Medicine-MEVIS / University of Bremen / mediri GmbH, Germany; <sup>{3}</sup>University of Bremen, Germany

**05:55 AM**

**2331: Detection of Hepatocellular Carcinoma by Spatio-Temporal Analysis of Contrast-Enhanced Ultrasound and Machine Learning**  
Simona Turco<sup>{1}</sup>, Amir Pirmoazen<sup>{2}</sup>, Lyschik Andrej<sup>{3}</sup>, Massimo Mischi<sup>{1}</sup>, Aya Kamaya<sup>{2}</sup>, John Eisenbrey<sup>{4}</sup>, Ahmed El Kaffas<sup>{2}</sup>  
<sup>{1}</sup>Eindhoven University of Technology, Netherlands;  
<sup>{2}</sup>Stanford University, United States; <sup>{3}</sup>Thomas Jefferson University Hospital, United States; <sup>{4}</sup>Thomas Jefferson University, United States

**06:05 AM**

**2464: Compounding Deep Convolutional Neural Networks, Contrast-Enhanced Ultrasound Imaging, and Quantitative Parameters for Liver Fibrosis Classification**  
Huang-Chen Lin, Shyh-Hau Wang  
National Cheng Kung University, Taiwan

**4:15:00 AM - 6:15:00 AM**

**C1P-13: MIM: Poster AM - Microbubble Localization Techniques**

**Session Chair(s):** Adrian Basarab (University of Toulouse)

**04:15 AM**

**1434: Comparison of Pulse Sequences Used for Super-Resolution Ultrasound Imaging with Deep Learning**

Katherine Brown, Kenneth Hoyt  
University of Texas at Dallas, United States

**04:25 AM**

**1525: An Anatomically-Realistic Simulation Framework for Ultrasound Localization Microscopy**  
Hatim Belgharbi, Jonathan Porée, Rafat Damseh, Léo Milecki, Patrick Delafontaine-Martel, Frederic Lesage, Jean Provost  
Polytechnique Montréal, Canada

**04:35 AM**

**1532: 2D and 3D Transcranial Brain-Wide Pulsatility Mapping in Vivo with Dynamic Ultrasound Localization Microscopy (DULM)**  
Chloé Bourquin, Jonathan Porée, Frédéric Lesage, Jean Provost  
Polytechnique Montréal, Canada

**04:45 AM**

**1757: Microbubble Tracking with a Non-Linear Motion Model**  
Marion Piepenbrock, Stefanie Dencks, Georg Schmitz  
Ruhr University Bochum, Germany

**04:55 AM**

**1944: Tracking of Microbubbles with a Recurrent Neural Network for Super-Resolution Imaging**  
Daniel Wilmes, Marion Piepenbrock, Georg Schmitz, Stefanie Dencks  
Ruhr University Bochum, Germany

**05:05 AM**

**2149: qULM-DL: Quantitative Ultrasound Localization Microscopy via Deep Learning**  
Tianyang Zhou<sup>{1}</sup>, Xin Liu<sup>{1}</sup>, Yi Yang<sup>{2}</sup>, Qiong He<sup>{2}</sup>, Jianwen Luo<sup>{2}</sup>  
<sup>{1}</sup>Shanghai University, China; <sup>{2}</sup>Tsinghua University, China

4:15:00 AM - 6:15:00 AM

**C1P-27: MTC: Poster AM - Tissue Characterization: the Role of Phantoms**

**Session Chair(s):** Tadashi Yamaguchi (Chiba University)

05:15 AM

**1078: Ultrasound Scattering from Cell Pellet Biophantoms Can Provide Insight Into the Cellular Structure Involved in Scattering**

Pauline Muleki-Seya<sup>{1}</sup>, William D. O'Brien Jr.<sup>{2}</sup>  
<sup>{1}</sup>Creatis - INSA Lyon, France; <sup>{2}</sup>University of Illinois at Urbana-Champaign, United States

05:25 AM

**1504: Breast Tissue Mimicking Phantoms for Combined Microwave and Ultrasound Imaging**

Siyun Li, Elise Fear, Luara Curiel  
University of Calgary, Canada

05:35 AM

**1828: Effect of Freezing and Fixation on Quantitative Ultrasound Parameters in Phantoms of Brain and Brain Tumour**

Hannah Thomson<sup>{2}</sup>, Shufan Yang<sup>{2}</sup>, Thomas Stritch<sup>{1}</sup>, Mitch Baldwin<sup>{1}</sup>, Sandy Cochran<sup>{2}</sup>  
<sup>{1}</sup>Stryker Medical Devices, Ireland; <sup>{1}</sup>Stryker Medical Devices, United States; <sup>{2}</sup>University of Glasgow, United Kingdom

05:45 AM

**1865: Evaluation of Frequency Dependency of Speed of Sound in Homogeneous Phantoms and Diverse Rat Livers**

Mai Ino, Kazuma Noguchi, Kenji Yoshida, Tadashi Yamaguchi  
Chiba University, Japan

05:55 AM

**2221: Differential Ultrasound Neuromodulatory Responses of Rat Primary Cortical Neurons (PCN) with Oxygen Deprivation in Vitro**

Hyunwoo Song<sup>{2}</sup>, Soumyajit Ray<sup>{2}</sup>, Jeeun Kang<sup>{1}</sup>, Maria Shishikura<sup>{2}</sup>, Maged Harraz<sup>{2}</sup>, Emad Boctor<sup>{1}</sup>  
<sup>{1}</sup>Johns Hopkins Medical Institute, United States; <sup>{2}</sup>Johns Hopkins University, United States

4:15:00 AM - 6:15:00 AM

**C1P-14: MIM: Poster AM - Image Reconstruction Techniques**

**Session Chair(s):** Wei-Ning Lee (University of Hong Kong)

04:15 AM

**1428: Estimation of Fetal Position and Orientation Based on Skeletal Distribution with Robotic Ultrasonography**

Yuuki Shida, Ryosuke Tsumura, Takabumi Watanabe, Fuji Kohei, Gen Yamano, Hiroyasu Iwata  
Waseda University, Japan

04:25 AM

**1690: Rapid Prototyping to Image the Human Brain with 3D Full-Waveform Inversion**

Javier Cudeiro Blanco, Carlos Cueto Mondejar, Tom Robins, Oscar Bates, George Stronge, Oscar Calderon Agudo, Meng-Xing Tang, Mike Warner, Lluís Guasch  
Imperial College London, United Kingdom

04:35 AM

**1919: Coherent-Multi Transducer Ultrasound Imaging: First in-Vivo Results**

Laura Peralta<sup>{1}</sup>, Veronika A Zimmer<sup>{1}</sup>, Kirsten Christensen-Jeffries<sup>{1}</sup>, Alessandro Ramalli<sup>{2}</sup>, Emily Skelton<sup>{1}</sup>, Jacqueline Matthew<sup>{1}</sup>, John M Simpson<sup>{1}</sup>, Joseph V Hajnal<sup>{1}</sup>  
<sup>{1}</sup>King's College London, United Kingdom; <sup>{2}</sup>Università degli Studi di Firenze, Italy

04:45 AM

**1920: Prototype for Simultaneous Matching and Reading of X-Ray and Ultrasound Breast Images**

Madeleine Hertel<sup>{4}</sup>, Michael Golatta<sup>{5}</sup>, Gijs Hendriks<sup>{3}</sup>, Marija Juskic<sup>{5}</sup>, Steffen Kappler<sup>{4}</sup>, Chris de Korte<sup>{3}</sup>, Qiuting Li<sup>{1}</sup>, Chang Liu<sup>{1}</sup>, Andreas Maier<sup>{1}</sup>, Ralf Nanke<sup>{4}</sup>, Georg Rose<sup>{2}</sup>, Benedikt Schäffgen<sup>{5}</sup>, Marcus Radicke<sup>{4}</sup>  
<sup>{1}</sup>Friedrich-Alexander-University Erlangen-Nuremberg, Germany; <sup>{2}</sup>Otto-von-Guericke University, Magdeburg, Germany; <sup>{3}</sup>Radboud University Medical Center, Netherlands; <sup>{4}</sup>Siemens Healthcare GmbH, Germany; <sup>{5}</sup>University Hospital Heidelberg, Germany

04:55 AM

**1979: Quantitative Evaluation of Automated Robot-Assisted Volumetric Breast Ultrasound**

Anton Nikolaev<sup>{1}</sup>, Leon de Jong<sup>{1}</sup>, Vincent Groenhuis<sup>{3}</sup>, Marcel Welleweerd<sup>{3}</sup>, Gert Weijers<sup>{1}</sup>, Françoise Siepel<sup>{3}</sup>, Stefano Stramigioli<sup>{3}</sup>, Hendrik H.G. Hansen<sup>{1}</sup>, Chris de Korte<sup>{2}</sup>  
<sup>{1}</sup>Medical UltraSound Imaging Center / Radboud University Medical Center, Netherlands; <sup>{2}</sup>Radboud University Medical Center, Netherlands; <sup>{3}</sup>University of Twente, Netherlands

4:15:00 AM - 6:15:00 AM

**C1P-15: MIM: Poster AM - Signal Processing Techniques in Medical Imaging**

**Session Chair(s):** Jianwen Luo (Tsinghua University)

05:05 AM

**1659: The Impact of Grating Lobe Clutter on Plane Wave DCE-US Parametric Imaging**

Elahe Moghimirad, Jeffrey Bamber, Emma Harris  
Institute of Cancer Research, United Kingdom

05:15 AM

**1689: Alleviating Comet Tail Artifact Using Nakagami Images Based on Logarithmic Compression for Monitoring of Microwave Ablation**

Xin Jia, Shan Wu, Xuewei Wang, Gang Niu, Mingxi Wan, Siyuan Zhang  
Xi'an Jiaotong University, China

05:25 AM

**1923: Calibrated Anatomically Realistic Model of Aberration, Reverberation, and Coherence: Experiments and Simulations**

Francisco Santibanez<sup>{2}</sup>, Gianmarco Pinton<sup>{1}</sup>

{1}North Carolina State University / University of North Carolina at Chapel Hill, United States; {2}University of North Carolina at Chapel Hill, United States

05:35 AM

**2046: A Hydrogel / Oil-in-Polymer Composite Phantom for Modeling Clutter and Aberration**

Stephen McAleavey  
University of Rochester, United States

05:45 AM

**2284: 3D Matrix Approach for Aberration Correction in Random Scattering Media**

Flavien Bureau{2}, William Lambert{3}, Mathias Fink{4}, Alexandre Aubry{1}  
{1}ESPCI Paris, PSL University, CNRS, Institut Langevin, France; {2}Institut Langevin, France; {3}Institut Langevin / SuperSonic Imagine, France; {4}Institut Langevin, ESPCI Paris, CNRS UMR 7587, PSL University, France

05:55 AM

**2466: Transcranial Ultrasound Computed Tomography Using Acoustoelastic Full-Waveform Inversion**

Christian Boehm, Patrick Marty, Andreas Fichtner  
ETH Zürich, Switzerland

4:15:00 AM - 6:15:00 AM

**C1P-16: MIM: Poster AM - 3D Volumetric Imaging**  
Session Chair(s): Yoshifumi Saijo (Tohoku University)

04:15 AM

**1205: 3D Tethered Ultrasound Capsule Endoscopy (3D-TUCE): an in Vivo Primate Study**

Yaocai Huang{1}, Zhiqiang Zhang{1}, Suzi Liang{1}, Ning Lv{1}, Peitian Mu{1}, Rong Liu{1}, Ge Yang{1}, Hairong Zheng{1}, Sandy Cochran{2}, Weibao Qiu{1}  
{1}Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China; {2}University of Glasgow, United Kingdom

04:25 AM

**1381: A Mechanical Rotating 3D Ultrasound Probe for Imaging Primate Cerebral Blood Flow**

Yijing Dong{2}, Shengguang Li{1}, Rong Liu{2}, Ge Yang{2}, Tao Zhang{1}, Hairong Zheng{2}, Weibao Qiu{2}  
{1}Institute of Psychology, Chinese Academy of Sciences, China; {2}Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

04:35 AM

**2091: Synthesis of Ultrasound-Compatible Linear Heart Tube Phantom Using Water-Soluble 3D Printed Model for 3D Ultrasound Flow Velocimetry**

Bowen Jing{2}, Martin Tomov{1}, Amanda Wijntjes{2}, Sai Bhamidipati{3}, Reza Avazmohammadi{3}, Holly Bauser-Heaton{1}, Vahid Serpooshan{1}, Brooks Lindsey{2}  
{1}Emory University, United States; {2}Georgia Institute of Technology, United States; {3}Texas A&M University, United States

04:45 AM

**2290: Automatic 3D+t Ultrasound-Based Segmentation and Elastometry of Abdominal Aortic Aneurysms**

Esther Maas{2}, Hans-Martin Schwab{2}, Joerik de Ruijter{2}, Emiel van Disseldorp{2}, Frans van de Vosse{2}, Marc van Sambeek{1}, Richard Lopata{2}  
{1}Catharina Hospital, Netherlands; {2}Eindhoven University of Technology, Netherlands

04:55 AM

**2360: Quantitative Comparison of 3D Freehand Ultrasound and MRI Images of the Neonatal Brain**

Martin Blanchard{2}, Matthieu Martin{2}, Philippe Quélin{1}, Philippe Delachartre{2}  
{1}CH Avignon, France; {2}Creatis - INSA Lyon, France

05:05 AM

**2407: Initial Evaluation of a 2.5 MHz 64x16 2D Array for Deep Imaging with a Real Time 1024 Channel System (WITHDRAW)**

Josquin Foiret{1}, Xiran Cai{1}, Douglas Stephens{2}, Katherine Ferrara{1}  
{1}Stanford University, United States; {2}University of California, Davis, United States

4:15:00 AM - 6:15:00 AM

**C1P-23: MEL: Poster AM - Elastography Acquisition Methods I**

Session Chair(s): Hassan Rivaz (Concordia University)

05:15 AM

**1347: Low Frequency Vibrator Induced Transcranial Shear Wave Imaging**

Fan Wang, Meng Han, Jianjun Yu, Hongmei Zhang, Mingxi Wan  
Xi'an Jiaotong University, China

05:25 AM

**1621: Validation of 3D Strain Imaging Using Plane Wave Imaging on a 32x32 Matrix Array**

Stein Fekkes, Anne Saris, Jan Menssen, Hendrik Hansen, Chris de Korte  
Radboud University Medical Center, Netherlands

05:35 AM

**2339: Generating Push-Pulses for Shear Wave Elastography on a Portable Ultrasound Research Platform**

Damian Cacko, Mateusz Walczak, Beata Witek, Marcin Lewandowski  
us4us Ltd., Poland

05:45 AM

**2002: Single-Transducer Shear Wave Elasticity Measurements for Millimeter-Sized Biomaterials**

Pei-Yu Chao, Wei-Wen Liu, Pai-Chi Li  
National Taiwan University, Taiwan

05:55 AM

**2227: High Frequency Ultrasound Shear Elastography for Hand Tendon Rehabilitation: a New Fitting Approach Based on Sigmoid Function**

Pei-Yu Chen, Hsin Huang, Wei-Yu Tsai, Chih-Chung Huang  
National Cheng Kung University, Taiwan

4:15:00 AM - 6:15:00 AM

C1P-17: MIM: Poster AM - Machine Learning

Applications I

Session Chair(s): Nobuki Kudo (Hokkaido University)

Mingxi Wan (Xi'an Jiaotong University)

04:15 AM

**1015: Estimation of Ultrasound Echogenicity Map from B-Mode Images Using Convolutional Neural Network**

Ryan Jui-En Yang, Che-Chou Shen, Ri-Cheng Lin  
National Taiwan University of Science and Technology, Taiwan

04:25 AM

**1345: Attentively Learning Residuals for Coherent Plane Wave RF Data Reconstruction via Generative Adversarial Networks**

Junling Gao, Qin Zou, Lei Xu, Mingxi Wan  
Xi'an Jiaotong University, China

04:35 AM

**1678: Complex Convolutional Neural Networks for Fast Diverging Wave Imaging**

Jingfeng Lu<sup>{2}</sup>, Fabien Millioz<sup>{1}</sup>, Damien Garcia<sup>{1}</sup>, Sebastien Salles<sup>{1}</sup>, Wanyu Liu<sup>{2}</sup>, Denis Friboulet<sup>{1}</sup>  
<sup>{1}</sup>Creatis - INSA Lyon, France; <sup>{2}</sup>METISLab / Harbin Institute of Technology, China

04:45 AM

**1082: Deep Learning for Hetero-Homo Conversion in Channel-Domain RF for Phase Aberration Correction in USCT**

Tatsuki Koike, Yoshiaki Watanabe, Naoki Tomii, Takashi Azuma, Shu Takagi  
University of Tokyo, Japan

04:55 AM

**1365: Image Resolution Improvement During Zooming in Ultrasound Image Using Deep Learning Technique**

Jeong Seok Kim  
GE Ultrasound Korea, Korea

05:05 AM

**1376: Automated Prediction of Duchenne Muscular Dystrophy from Convolutional Neural Network on B-Mode and Nakagami Imaging**

Shi-Hong Liu<sup>{3}</sup>, Ai-Ho Liao<sup>{3}</sup>, Po-Hsiang Tsui<sup>{1}</sup>, Ho-Chiao Chuang<sup>{2}</sup>  
<sup>{1}</sup>Chang Gung University, Taiwan; <sup>{2}</sup>National Taipei University of Technology, Taiwan; <sup>{3}</sup>National Taiwan University of Science and Technology, Taiwan

05:15 AM

**1533: Fake Learning: New Deep Learning Training Method Without Annotations for Segmentation of Rotator Cuff Tear in Ultrasound Images**

Kyungsu Lee<sup>{2}</sup>, Jun-Young Kim<sup>{1}</sup>, Moonhwan Lee<sup>{2}</sup>, Chang Hyuk Choi<sup>{1}</sup>, Jaeyoun Hwang<sup>{2}</sup>  
<sup>{1}</sup>Daegu Catholic University, Korea; <sup>{2}</sup>Daegu Gyeongbuk Institute of Science and Technology, Korea

05:25 AM

**1878: Ai Assisted Feedback System for Transmit Parameter Optimization in Cardiac Ultrasound**

Pavan Annangi, Hariharan Ravishankar, Rohan Patil, Svein Arne Aase, Tore Bjaastad, Erik Steen  
GE Healthcare, India

05:35 AM

**2461: Two Stages Deep Learning Approach of Carotid Intima-Media Thickness from Ultrasound Images**

Kunkyu Lee, Miran Lee, Tai-Kyong Song  
Sogang University, Korea

4:15:00 AM - 6:15:00 AM

C1P-18: MIM: Poster AM - Novel Imaging Applications II

Session Chair(s): Lori Bridal (CNRS at Sorbonne University)

04:15 AM

**1737: Intravascular Ultrasound to Automatically Obtain Local Wall Thickness and Full Geometry of the Abdominal Aorta**

Floor Fasen<sup>{2}</sup>, Marc van Sambeek<sup>{1}</sup>, Frans van de Vosse<sup>{2}</sup>, Richard Lopata<sup>{2}</sup>  
<sup>{1}</sup>Catharina Hospital, Netherlands; <sup>{2}</sup>Eindhoven University of Technology, Netherlands

04:25 AM

**1905: A Duplex Pipeline for the Generation of Realistic Echocardiographic Sequences with Doppler Imaging**

Yunyun Sun, Khuram Faraz, Thomas Grenier, Patrick Clarysse, Damien Garcia, Olivier Bernard  
Creatis - INSA Lyon, France

04:35 AM

**2372: Automatic Ultrasound Assessment of Placenta Previa During the Third Trimester for Rural Areas**

Ana Cecilia Saavedra<sup>{2}</sup>, Junior Arroyo<sup>{2}</sup>, Lorena Tamayo<sup>{1}</sup>, Miguel Egoavil<sup>{1}</sup>, Berta Ramos<sup>{2}</sup>, Benjamin Castaneda<sup>{2}</sup>  
<sup>{1}</sup>Medical Innovation & Technology, Peru; <sup>{2}</sup>Pontificia Universidad Católica del Perú, Peru

04:45 AM

**1726: The Magnetic Force Generation in Magnetomotive Ultrasound Imaging**

Tim C. Kranemann<sup>{2}</sup>, Maria Evertsson<sup>{1}</sup>, Georg Schmitz<sup>{2}</sup>  
<sup>{1}</sup>Lund University, Sweden; <sup>{2}</sup>Ruhr University Bochum, Germany

04:55 AM

**1826: Extending Imaging Range in Magnetomotive Ultrasound with Tailored Magnetic Nanoparticles**

Maria Evertsson<sup>{1}</sup>, Sandra Sjöstrand<sup>{1}</sup>, Tim C. Kranemann<sup>{4}</sup>, Arefeh Mousavi<sup>{3}</sup>, Ingrid Svensson<sup>{1}</sup>, Magnus Cinthio<sup>{1}</sup>, Tomas Jansson<sup>{2}</sup>  
<sup>{1}</sup>Lund University, Sweden; <sup>{2}</sup>Lund University and Region Skåne, Sweden; <sup>{3}</sup>NanoEcho AB, Sweden; <sup>{4}</sup>Ruhr University Bochum, Germany

05:05 AM

**1887: Single Artery Perfusion Imaging Using Focus-Flash Contrast-Enhanced Ultrasound**

Jiabin Zhang, Jian An, Feihong Dong, Di Wang, Feng Feng, Jingyi Yin, Shuo Huang, Wenyu Guo, Jue Zhang  
Peking University, China

05:15 AM

**1943: Magnetomotive Ultrasound Elastography for Simultaneous Localization of Magnetic Nanoparticles and Quantification of Local Tissue Elasticity: Feasibility Study**

Yu-Hsiang Tsai, Meng-Lin Li  
National Tsing Hua University, Taiwan

05:25 AM

**1526: In Vivo and Simultaneously Acquired Endoluminal Ultrasound Biomicroscopic and Colonoscopic Images of Inflamed Mouse Colon and Wall Thickness Measurement**

Rodrigo Oliveira, Carine Martins, Anderson Cunha, Rossana Solleti, Helena Borges, João Machado  
Universidade Federal do Rio de Janeiro, Brazil

4:15:00 AM - 6:15:00 AM

**C1P-19: MCA: Poster AM - Ultrasound Localization Microscopy & High Resolution Imaging II**  
Session Chair(s): Ayache Bouakaz (INSERM)

04:15 AM

**1137: Singular Value Decomposition and 2D Cross-Correlation Based Localization of Gas Vesicles for Super-Resolution Ultrasound Imaging**

Jihun Kim, Gyoyeon Hwang, Sunghoon Rho, Sangpil Yoon  
University of Notre Dame, United States

04:25 AM

**1425: Three-Dimensional Super-Resolution Ultrasound Imaging of Chicken Embryos - a Validation Framework for Analysis of Microvascular Morphology**

Ipek Oezdemir, Kara Peak, Shelby Mohr-Allen, Victor Varner, Kenneth Hoyt  
University of Texas at Dallas, United States

04:35 AM

**1514: Towards Contrast Agent-Free Super-Resolution Ultrasound Imaging Using Coded Excitation Technique**

Qiyang Chen<sup>{1}</sup>, Brittney Rush<sup>{1}</sup>, Sean Stocker<sup>{1}</sup>, Roderick Tan<sup>{1}</sup>, Kang Kim<sup>{2}</sup>  
<sup>{1}</sup>University of Pittsburgh, United States; <sup>{2}</sup>University of Pittsburgh / University of Pittsburgh Medical Center, United States

04:45 AM

**1524: Super-Resolution Ultrasound Imaging Using Combined Microbubble Centroid Localization and Deconvolution Algorithm for Human Kidney Imaging**

Qiyang Chen<sup>{1}</sup>, Michael George<sup>{1}</sup>, Roderick Tan<sup>{1}</sup>, Kang Kim<sup>{2}</sup>  
<sup>{1}</sup>University of Pittsburgh, United States; <sup>{2}</sup>University of Pittsburgh / University of Pittsburgh Medical Center, United States

04:55 AM

**2125: In-Human Acoustic Angiography Using a 288-Element Dual-Frequency Array: a Pilot Study in the Peripheral Vasculature, Neck, and Breast**

Isabel Newsome<sup>{2}</sup>, Thomas Kierski<sup>{4}</sup>, Guofeng Pang<sup>{1}</sup>, Jianhua Yin<sup>{3}</sup>, Jing Yang<sup>{3}</sup>, Emmanuel Chérin<sup>{3}</sup>, Stuart

Foster<sup>{5}</sup>, Claudia Carnevale<sup>{1}</sup>, Christine Démoré<sup>{6}</sup>, Yueh Lee<sup>{4}</sup>, Paul Dayton<sup>{2}</sup>  
<sup>{1}</sup>FUJIFILM VisualSonics, Inc., Canada; <sup>{2}</sup>North Carolina State University / University of North Carolina at Chapel Hill, United States; <sup>{3}</sup>Sunnybrook Research Institute, Canada; <sup>{4}</sup>University of North Carolina at Chapel Hill, United States; <sup>{5}</sup>University of Toronto, Sunnybrook Health Sciences Centre, Canada; <sup>{6}</sup>University of Toronto, Sunnybrook Research Institute, Canada

05:05 AM

**2300: Super-Resolution Ultrasound with Morphological Image Reconstruction and Local Projection for Microvascular Characterization**

Scott Schoen Jr<sup>{1}</sup>, Zhigen Zhao<sup>{1}</sup>, Chengwu Huang<sup>{2}</sup>, Shigao Chen<sup>{2}</sup>, Costas Arvanitis<sup>{1}</sup>  
<sup>{1}</sup>Georgia Institute of Technology, United States; <sup>{2}</sup>Mayo Clinic, United States

05:15 AM

**2440: Super-Resolution Mapping of Molecularly Targeted Ultrasound Contrast Bound in Vivo Using Superharmonic Imaging**

Thomas Kierski<sup>{2}</sup>, Rachel White<sup>{1}</sup>, James Tsuruta<sup>{2}</sup>, Isabel Newsome<sup>{1}</sup>, Gianmarco Pinton<sup>{1}</sup>, Stuart Foster<sup>{3}</sup>, Christine Démoré<sup>{4}</sup>, Paul Dayton<sup>{1}</sup>  
<sup>{1}</sup>North Carolina State University / University of North Carolina at Chapel Hill, United States; <sup>{2}</sup>University of North Carolina at Chapel Hill, United States; <sup>{3}</sup>University of Toronto, Sunnybrook Health Sciences Centre, Canada; <sup>{4}</sup>University of Toronto, Sunnybrook Research Institute, Canada

05:25 AM

**2443: Aberration Correction for Ultrasound Localization Microscopy with Deep Convolutional Neural Networks Trained by Fullwave Simulations**

Thomas Kierski<sup>{2}</sup>, Paul Dayton<sup>{1}</sup>, Gianmarco Pinton<sup>{1}</sup>  
<sup>{1}</sup>North Carolina State University / University of North Carolina at Chapel Hill, United States; <sup>{2}</sup>University of North Carolina at Chapel Hill, United States

4:15:00 AM - 6:15:00 AM

**C1P-20: MCA: Poster AM - Microbubbles and Contrast Imaging I**  
Session Chair(s): Klazina Kooiman (Thoraxcenter, Erasmus MC)

Note: Wait until 4:25 to begin.

04:25 AM

**1160: Arterial Labeling Ultrasound Subtraction Angiography**

Jian An, Jiabin Zhang, Feihong Dong, Feng Feng, Jue Zhang  
Peking University, China

04:35 AM

**1269: Dual-Mode Contrast-Enhanced Ultrasound and Optoacoustic Imaging with Spherical Matrix Arrays - Towards Simultaneous 3D Mapping of Microvasculature, Blood Flow and Oxygenation**

Justine Robin<sup>{2}</sup>, Ali Özbek<sup>{2}</sup>, Daniel Razansky<sup>{1}</sup>  
<sup>{1}</sup>ETH Zürich / Universität Zürich, Switzerland; <sup>{2}</sup>ETH Zürich / University of Zurich, Switzerland

04:45 AM

**1316: Contrast-Enhanced Ultrasound of Skeletal Muscle Perfusion to Provide Insights Into Left Ventricular Assist Device Therapy Response**

Lauren Delaney, Kathleen Fitzgerald, Maria Stanczak, Priscilla Machado, Gordon Reeves, Flemming Forsberg  
Thomas Jefferson University, United States

04:55 AM

**1505: Improved Microbubble (MB) Localisation Using Particle Detecting Algorithm: Evaluation of Algorithm Performance for Different Beamforming Methods**

Vasiliki Voulgaridou<sup>{2}</sup>, Barbara Nicolas<sup>{1}</sup>, Steven McDougall, Lachlan Arthur<sup>{2}</sup>, Evangelos Kanoulas<sup>{2}</sup>, Weiping Lu<sup>{2}</sup>, Konstantinos Diamantis<sup>{4}</sup>, Jørgen Arendt Jensen<sup>{3}</sup>, Vassilis Sboros<sup>{2}</sup>  
<sup>{1}</sup>Creatis - INSA Lyon, France; <sup>{2}</sup>Heriot Watt University, United Kingdom; <sup>{3}</sup>Technical University of Denmark, Denmark; <sup>{4}</sup>University of Edinburgh, United Kingdom

05:05 AM

**1520: In-vitro and in-silico Porous Phantoms for Investigating the Relationship Between Microvascular Architecture and Ultrasound-Contrast-Agent Kinetics**

Peiran Chen<sup>{2}</sup>, Simona Turco<sup>{2}</sup>, Ruud van Sloun<sup>{2}</sup>, Andreas Pollet<sup>{2}</sup>, Jaap Den Toonder<sup>{2}</sup>, Hessel Wijkstra<sup>{1}</sup>, Massimo Mischi<sup>{2}</sup>  
<sup>{1}</sup>Amsterdam University Medical Centers, Netherlands; <sup>{2}</sup>Eindhoven University of Technology, Netherlands

05:15 AM

**1703: Simulation of Superharmonic Microbubble and Tissue Responses for Informed Design of Dual-Frequency Transducers for Acoustic Angiography**

Isabel Newsome, Gianmarco Pinton, Paul Dayton  
North Carolina State University / University of North Carolina at Chapel Hill, United States

05:25 AM

**1848: Ligand Distribution Determines Microbubble Targeting Efficiency**

Simone A.G. Langeveld<sup>{1}</sup>, Ines Beekers<sup>{1}</sup>, Bram Meijlink<sup>{1}</sup>, Antonius F.W. van der Steen<sup>{1}</sup>, Nico de Jong<sup>{2}</sup>, Klazina Kooiman<sup>{1}</sup>  
<sup>{1}</sup>Erasmus University Medical Center, Netherlands; <sup>{2}</sup>Erasmus University Medical Center / Delft University of Technology, Netherlands

05:35 AM

**2330: Estimation of Parametric Maps by Pharmacokinetic Analysis to Visualize Prolonged Retention of PSMA-Targeted Nanobubbles in Prostate Cancer**

Chuan Chen<sup>{2}</sup>, Simona Turco<sup>{2}</sup>, Reshani Perera<sup>{1}</sup>, Agata A. Exner<sup>{1}</sup>, Massimo Mischi<sup>{2}</sup>  
<sup>{1}</sup>Case Western Reserve University, United States; <sup>{2}</sup>Eindhoven University of Technology, Netherlands

4:15:00 AM - 6:15:00 AM

**C1P-21: MCA: Poster AM - Bubble Cavitation & Applications I**

**Session Chair(s):** Mingxi Wan (Xi'an Jiaotong University)

04:15 AM

**1224: High Frequency Array-Based Nanobubble Nonlinear Imaging**

Carly Pellow<sup>{2}</sup>, Emmanuel Chérin<sup>{2}</sup>, Eric Abenojar<sup>{1}</sup>, Agata Exner<sup>{1}</sup>, Gang Zheng<sup>{4}</sup>, Christine Démoré<sup>{5}</sup>, David Goertz<sup>{3}</sup>  
<sup>{1}</sup>Case Western Reserve University, United States; <sup>{2}</sup>Sunnybrook Research Institute, Canada; <sup>{3}</sup>Sunnybrook Research Institute / University of Toronto, Canada; <sup>{4}</sup>University Health Network, Canada; <sup>{5}</sup>University of Toronto, Sunnybrook Research Institute, Canada

04:25 AM

**1248: Impact of SonoVue Suspension Time on the Subharmonic Response and Intracranial Blood Pressure Estimation in Vitro**

Xiaoyang Qiao<sup>{2}</sup>, Yu Wen<sup>{2}</sup>, Jianjun Yu<sup>{2}</sup>, Shanshan Xu<sup>{2}</sup>, Ayache Bouakaz<sup>{1}</sup>, Mingxi Wan<sup>{2}</sup>  
<sup>{1}</sup>iBrain, Université de Tours, Inserm, France; <sup>{2}</sup>Xi'an Jiaotong University, China

04:35 AM

**1742: Using SonoVue™ as Sensors to Detect 10-50 mmHg Overpressure Under a Dynamic Flow Condition in Vitro**

Gang Xu<sup>{2}</sup>, Fei Li<sup>{2}</sup>, Rong Liu<sup>{2}</sup>, Wei Zhou<sup>{2}</sup>, Min Su<sup>{2}</sup>, Yilei Mao<sup>{1}</sup>  
<sup>{1}</sup>Peking Union Medical College Hospital / Chinese Academy of Medical Sciences, China; <sup>{2}</sup>Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

04:45 AM

**1822: Estimating Central Cardiac Pressures Noninvasively in Patients Using Ultrasound Contrast Agents**

Cara Esposito<sup>{3}</sup>, Maureen McDonald<sup>{2}</sup>, Priscilla Machado<sup>{2}</sup>, Michael Savage<sup>{2}</sup>, David Fischman<sup>{2}</sup>, Praveen Mehrotra<sup>{2}</sup>, Ira Cohen<sup>{2}</sup>, Nicholas Ruggiero<sup>{2}</sup>, Paul Walinsky<sup>{2}</sup>, Kristopher Dickie<sup>{1}</sup>, Marguerite Davis<sup>{2}</sup>, Flemming Forsberg<sup>{2}</sup>, Jaydev Dave<sup>{2}</sup>  
<sup>{1}</sup>Clarius, Canada; <sup>{2}</sup>Thomas Jefferson University, United States; <sup>{3}</sup>Thomas Jefferson University / Drexel University, United States

04:55 AM

**2120: Ultrasound-Activated Microbubbles Stimulate Degradation of Fibrin-Based Biofilms**

Kirby R. Lattwein<sup>{1}</sup>, Margot E. Starrenburg<sup>{1}</sup>, Joop J.P. Kouijzer<sup>{1}</sup>, Simone A.G. Langeveld<sup>{1}</sup>, Mariël Leon-Grooters<sup>{1}</sup>, Antonius F.W. van der Steen<sup>{1}</sup>, Nico de Jong<sup>{2}</sup>, Moniek P.M. de Maat<sup>{1}</sup>, Willem J.B. van Wamel<sup>{1}</sup>, Klazina Kooiman<sup>{1}</sup>  
<sup>{1}</sup>Erasmus University Medical Center, Netherlands; <sup>{2}</sup>Erasmus University Medical Center / Delft University of Technology, Netherlands

05:05 AM

**2291: A Multiplexed Microfluidic and Microscopy Study of ATP Release Following Microbubble and Ultrasound Therapy**

Joseph Goldgewicht<sup>{2}</sup>, Ju Jing Tan<sup>{2}</sup>, Ryszard Grygorczyk<sup>{2}</sup>, Thomas Gervais<sup>{1}</sup>, Francois Yu<sup>{2}</sup>  
<sup>{1}</sup>École Polytechnique de Montréal, Canada; <sup>{2}</sup>Université de Montréal, Canada

05:15 AM

**1591: Analysis of Translational Motion of Microbubbles in a Simulated Lymph Channel Under Exposure of 15-MHz Focused Ultrasound**

Kenji Yoshida, Masaaki Omura, Tadashi Yamaguchi  
Chiba University, Japan

4:15:00 AM - 6:15:00 AM

**C1P-25: MSD: Poster AM - Medical System Design - Volumetric 2D/3D Imaging**

**Session Chair(s):** Hendrik Vos (Erasmus Medical Centre)

05:25 AM

**1143: Single-Element Ultrasound Imaging System Based on a Mirror Scanning**

Seongwook Choi, Jin Young Kim, Hae Gyun Lim, Jin Woo Baik, Hyung Ham Kim, Chulhong Kim  
Pohang University of Science and Technology, Korea

05:35 AM

**1612: Micro-Machined Ultrasonic Transducers Are Coming to Market: Why Now?**

Marjorie Villien, Jerome Mouly, William Watkins  
Yole Développement, France

05:45 AM

**2136: Design of a Sparse Ellipsoidal Array for Volumetric Ultrasound Imaging of the Prostate**

Sjoerd Nooijens<sup>{2}</sup>, Alessandro Ramalli<sup>{3}</sup>, Marcus Ingram<sup>{2}</sup>, Marc Fournelle<sup>{1}</sup>, Alexander Bertrand<sup>{2}</sup>, Jan D'hooge<sup>{2}</sup>

<sup>{1}</sup>Fraunhofer Institute Biomedical Engineering-IBMT, Germany; <sup>{2}</sup>Katholieke Universiteit Leuven, United Kingdom; <sup>{2}</sup>Katholieke Universiteit Leuven, Belgium; <sup>{2}</sup>Katholieke Universiteit Leuven, Netherlands; <sup>{3}</sup>Università degli Studi di Firenze, Italy

05:55 AM

**2246: Real-Time 3D Ultrasound Research Platform for a 1024-Element Matrix-Array**

Marcin Lewandowski, Mateusz Walczak, Beata Witek, Damian Cacko, Piotr Jarosik  
us4us Ltd., Poland

4:15:00 AM - 6:15:00 AM

**C1P-22: MBB: Poster AM - Adaptive Beamforming Methods I**

**Session Chair(s):** Giulia Matrone (University of Pavia)  
Alessandro Ramalli (University of Florence)

04:15 AM

**1083: Estimation of Covariance Matrix in Minimum Variance Beamforming**

Hideyuki Hasegawa, Ryo Nagaoka  
University of Toyama, Japan

04:25 AM

**1209: Mutual Coherence for the Enhancement of Minimum Variance Beamforming**

Jing Liu<sup>{2}</sup>, Chongchong Guo<sup>{2}</sup>, Bo Yang<sup>{2}</sup>, Wei Fan<sup>{2}</sup>, Weibao Qiu<sup>{1}</sup>

<sup>{1}</sup>Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China; <sup>{2}</sup>Shenzhen Mindray Bio-Medical Electronics Co., Ltd, China

04:35 AM

**2111: Optimization of Frequency and Plane-Wave Compounding by Minimum Variance Beamforming**

Ryoya Kozai<sup>{3}</sup>, Norio Tagawa<sup>{3}</sup>, Masasumi Yoshizawa<sup>{2}</sup>, Takasuke Irie<sup>{1}</sup>  
<sup>{1}</sup>Microsonic Co., Ltd., Japan; <sup>{2}</sup>Tokyo Metropolitan College of Industrial Technology, Japan; <sup>{3}</sup>Tokyo Metropolitan University, Japan

04:45 AM

**2157: Estimation of Optimal Mean Sound Speed Maps for Reducing Beamforming Errors**

Haine Lee, Jaejin Lee, Sua Bae, Tai-Kyong Song  
Sogang University, Korea

04:55 AM

**2166: A Weighted Non-Linear Beamformer for Synthetic Aperture Ultrasound Imaging**

Anudeep Vayyeti, Arun Thittai  
Indian Institute of Technology Madras, India

05:05 AM

**1610: Effect of Skull Bone on Transcranial Doppler Measurements**

Itsuki Michimoto<sup>{1}</sup>, Keita Yano<sup>{1}</sup>, Yasuyo Kobayashi<sup>{2}</sup>, Kozue Saito<sup>{2}</sup>, Mami Matsukawa<sup>{1}</sup>  
<sup>{1}</sup>Doshisha University, Japan; <sup>{2}</sup>Nara Medical University, Japan

05:15 AM

**1975: Resolution Measured as Separability Compared to Full Width Half Maximum for Adaptive Beamformers**

Ole Marius Hoel Rindal<sup>{1}</sup>, Alfonso Rodriguez-Molares<sup>{2}</sup>, Andreas Austeng<sup>{1}</sup>  
<sup>{1}</sup>University of Oslo, Norway; <sup>{2}</sup>University of Vigo, Spain

05:25 AM

**2090: Comparison of Autofocus Metrics for Self-Shape Estimation of Flexible Ultrasonic Transducer Arrays**

Daniel Barbosa, Marcus Ingram, Ekaterina Zilonova, Jan D'Hooge  
Katholieke Universiteit Leuven, Belgium

05:35 AM

**2273: Covariance mean-to-standard-Deviation Factor for Ultrasound Imaging**

Yuanguo Wang, Chichao Zheng, Hu Peng  
Hefei University of Technology, China

4:15:00 AM - 6:15:00 AM

**C1P-24: MSD: Poster AM - Medical System Design - Application Specific**

**Session Chair(s):** Stefano Ricci (University Firenze)

04:15 AM

**1150: Transdermal Delivery of Large Nanoparticles via Ultrasonic Irradiation in Low-Frequency Range**

Yuta Kurashina, Risa Asano, Makoto Matsui, Takahiro Nomoto, Kentaro Nakamura, Nobuhiro Nishiyama, Yoshitaka Kitamoto  
Tokyo Institute of Technology, Japan

04:25 AM

**1228: A Distal Rotary-Linear Micromotor for Intravascular Ultrasound (IVUS) Imaging**

## Thursday, September 10

Boquan Wang, Xiaoni Li, Liyuan He, Teng Cao, Chunling Zhu, Dawei Wu  
Nanjing University of Aeronautics and Astronautics, China

**04:35 AM**

**2173: Wearable Ultrasound Doppler System for Monitoring of Hemodynamic Change in Patients with Cardiovascular Diseases**

Miji Kim<sup>{1}</sup>, Kyungmin Kim<sup>{2}</sup>, Yeonseong Park<sup>{1}</sup>, Hae Gyun Lim<sup>{2}</sup>, Hyung Ham Kim<sup>{2}</sup>, Changhan Yoon<sup>{1}</sup>  
<sup>{1}</sup>Inje University, Korea; <sup>{2}</sup>Pohang University of Science and Technology, Korea

**04:45 AM**

**2478: Intelligent Wearable Bladder Monitoring Device with an Inertial Measurement Unit for Robust Measurement of Bladder Volume**

Moon Hwan Lee, Jae Youn Hwang  
Daegu Gyeongbuk Institute of Science and Technology, Korea

**4:15:00 AM - 6:15:00 AM**

**C1P-26: MSD: Poster AM - Medical System Design - Real-Time Imaging**

**Session Chair(s):** Enrico Boni (Università degli Studi di Firenze)

**04:55 AM**

**1906: Real-Time System for High Frame Rate Vector Flow Imaging**

Stefano Rossi, Federico Acerbi, Alessandro Dallai, Francesco Guidi, Valentino Meacci, Alessandro Ramalli, Piero Tortoli  
Università degli Studi di Firenze, Italy

**05:05 AM**

**1935: Continuous-Time High-Pass Filtering for Real-Time Hfr Color Flow Imaging**

Francesco Guidi, Alessandro Dallai, Piero Tortoli  
Università degli Studi di Firenze, Italy

**05:15 AM**

**1974: Integrated 1024 Channel Ultrasound Beamformer for Ultrasound Research**

Holger Hewener, Christoph Risser, Selina Barry-Hummel, Heinrich Fonfara, Marc Fournelle, Steffen Tretbar  
Fraunhofer Institute Biomedical Engineering-IBMT, Germany

**05:25 AM**

**2096: Portable Low-Cost 32-Channel Ultrasound Research System**

Marc Fournelle, Tobias Grün, Daniel Speicher, Steffen Weber, Steffen Tretbar  
Fraunhofer Institute Biomedical Engineering-IBMT, Germany

**4:15:00 AM - 6:15:00 AM**

**C1P-29: NPA: Poster AM - Photoacoustics**

**Session Chair(s):** Francois Varray (Creatis)

**04:15 AM**

**1233: Photoacoustic Tomography System Using a Ring-Array Sensor for Early Detection of Inflammatory Arthritis in a Human Finger**

Misaki Nishiyama, Takeshi Namita, Kengo Kondo, Makoto Yamakawa, Tsuyoshi Shiina  
Kyoto University, Japan

**04:25 AM**

**1479: Seeing Inside and Through the Murine Skull with Hybrid Ultrasound-Optoacoustic Microscopy**

Hector Estrada, Johannes Rebling, Urs Hofmann, Daniel Razansky  
ETH Zürich / Universität Zürich, Switzerland

**04:35 AM**

**1676: Investigation of Cavitation Bubble Influence on Frequency Spectrum of Fiber Optic Probe Hydrophone Output**

Kou Kimura, Sou Takeuchi, Yoshikazu Koike  
Shibaura Institute of Technology, Japan

**04:45 AM**

**2263: Fake Finger Screening Based on Photoacoustic Characterization**

Gyu Sang Cho, Min Gyu Joo, Hyoung Won Baac  
Sungkyunkwan University, Korea

**04:55 AM**

**2268: Beamforming for Large Area Scan in Photoacoustic Microscopy**

Alejandro Cebreco<sup>{1}</sup>, Juan José García-Garrigos<sup>{1}</sup>, Andreu Descals<sup>{1}</sup>, Noé Jiménez<sup>{2}</sup>, José María Benlloch<sup>{2}</sup>, Francisco Camarena<sup>{2}</sup>  
<sup>{1}</sup>CSIC – Universitat Politècnica de València, Spain; <sup>{2}</sup>Universitat Politècnica de València, Spain

**4:15:00 AM - 6:15:00 AM**

**C1P-30: NPC: Poster AM - Industrial Ultrasound**  
**Session Chair(s):** Kui Yao (A STAR)

**05:05 AM**

**1577: Remote Elemental Analysis System Using Sonoluminescence in Aqueous Solution**

Sardini Nisa Sailellah<sup>{1}</sup>, Hideharu Takahashi<sup>{2}</sup>, Hiroshige Kikura<sup>{2}</sup>  
<sup>{1}</sup>Tokyo Institute of Technology, Japan; <sup>{2}</sup>Tokyo Institute of Technology / Laboratory for Advanced Nuclear Energy, Japan

**4:15:00 AM - 6:15:00 AM**

**C1P-28: MTN: Poster AM - Theranostics**  
**Session Chair(s):** W. Apoutou N'NJIN (LAB TAU)  
Ralf Seip (SonaCare Medical, LLC)

**04:15 AM**

**1175: Enhanced Sonodynamic Therapy on Hepatocellular Carcinoma by Using Sub-10nm Phthalocyanine-Conjugated Mesoporous Silica Nanoparticles**

Nisi Zhang<sup>{1}</sup>, Yunxue Xu<sup>{1}</sup>, Yiming Zhou<sup>{1}</sup>, Hong Chen<sup>{1}</sup>, Xiaolong Liang<sup>{2}</sup>, Zhifei Dai<sup>{1}</sup>  
<sup>{1}</sup>Peking University, China; <sup>{2}</sup>Peking University Third Hospital, China

**04:25 AM**

**1350: New Focused Ultrasound Protocol to Enhance the Blood-Brain Barrier/Blood-Tumor Barrier**

**Permeability and Doxorubicin Delivery Into the Rat Brain**

Byeongjin Jung, Hyungkyu Huh, Eun-Hee Lee, Juyoung Park  
Daegu Gyeongbuk Medical Innovation Foundation, Korea

**04:35 AM**

**1548: Detection and Monitoring of Microwave Ablation by Ultrasound Imaging Based on Convolutional Neural Network (CNN)**

Shan Wu<sup>{2}</sup>, Zhiwei Cui<sup>{2}</sup>, Tianqi Xu<sup>{2}</sup>, Dapeng Li<sup>{2}</sup>, Xin Jia<sup>{2}</sup>, Wang Hua<sup>{1}</sup>, Mingxi Wan<sup>{2}</sup>, Siyuan Zhang<sup>{2}</sup>  
<sup>{1}</sup>Second Affiliated Hospital of Xi'an Jiaotong University, China; <sup>{2}</sup>Xi'an Jiaotong University, China

**04:45 AM**

**1574: Enhanced Hemispherical-Array Passive Acoustic Mapping Utilizing Dual Apodization with Cross-Correlation**

Shukuan Lu, Yan Zhao, Renyan Li, Diya Wang, Xianbo Yu, Bo Zhang, Mingxi Wan  
Xi'an Jiaotong University, China

**04:55 AM**

**1938: Real-Time Monitoring of High Intensity Focused Ultrasound for Blood Brain Barrier Opening**

Simon Blais<sup>{1}</sup>, Jonathan Porée<sup>{1}</sup>, Gerardo Ramos<sup>{2}</sup>, Samuel Desmarais<sup>{1}</sup>, Abbas Sadikot<sup>{2}</sup>, Jean Provost<sup>{1}</sup>  
<sup>{1}</sup>École Polytechnique Montréal, Canada; <sup>{2}</sup>Montreal Neurological Institute, Canada

**05:05 AM**

**2010: Experimental Investigation of Relationship Between Coagulation Size and Estimated Distribution of HIFU Heat Source from Displacement Distribution by Acoustic Radiation Force Imaging**

Hiroki Yabata, Shin-Ichiro Umemura, Shin Yoshizawa  
Tohoku University, Japan

**05:15 AM**

**2023: Improving Spatial Resolution of Cavitation Dose Mapping for High Intensity Focused Ultrasound (HIFU) Therapy by Combining Ultrafast Interframe Cavitation Image and Passive Acoustic Mapping**

Bowen Jing, Brooks Lindsey  
Georgia Institute of Technology, United States

**05:25 AM**

**2063: Oxygen Microbubble Circulation Kinetics Affected by Anesthetic Carrier Gas**

Phillip Durham<sup>{3}</sup>, Virginie Papadopoulou<sup>{3}</sup>, Traci Reusser<sup>{2}</sup>, Awaneesh Upadhyay<sup>{2}</sup>, Mark Borden<sup>{2}</sup>, Paul Dayton<sup>{1}</sup>  
<sup>{1}</sup>North Carolina State University / University of North Carolina at Chapel Hill, United States; <sup>{2}</sup>University of Colorado Boulder, United States; <sup>{3}</sup>University of North Carolina at Chapel Hill, United States

**05:35 AM**

**2195: Focused Ultrasound-Enhanced Delivery of Radiolabeled Agents to Diffuse Intrinsic Pontine Glioma**

Dezhuang Ye<sup>{1}</sup>, Xiaohui Zhang<sup>{2}</sup>, Yimei Yue<sup>{1}</sup>, Lihua Yang<sup>{2}</sup>, Yuanchuan Tai<sup>{2}</sup>, Joshua B. Rubin<sup>{2}</sup>, Yongjian Liu<sup>{2}</sup>, Hong Chen<sup>{1}</sup>

<sup>{1}</sup>Washington University in St. Louis, United States;  
<sup>{2}</sup>Washington University School of Medicine, United States

**05:45 AM**

**2308: Combined Transcranial Blood-Brain Barrier Opening, Targeting and Monitoring in Both Small and Large Animals in Vivo Using an Imaging Array**

Robin Ji, Mark Burgess, Elisa Konofagou  
Columbia University, United States

**05:55 AM**

**2319: Accuracy Assessment of Transcranial Power Cavitation Imaging for BBB Opening**

Alec Batts, Elisa Konofagou  
Columbia University, United States

**4:15:00 AM - 6:15:00 AM**

**C1P-31: TPM: Poster AM - Piezoelectric Transducers Session Chair(s):** Weibao Qiu (Shenzhen Institutes of Advanced Technology)

**04:15 AM**

**1046: Self-Healing: a New Skill Unlocked for Ultrasound Transducer**

Jiapu Li, Jun Ou-Yang, Xiaofei Yang, Benpeng Zhu  
Huazhong University of Science and Technology, China

**04:25 AM**

**1126: Characterization of Ultrasound Transducers Exposed to 1000 Bar Pressure**

Per Kristian Bolstad<sup>{3}</sup>, Tung Manh<sup>{3}</sup>, Nils Midtseter<sup>{1}</sup>, Martijn Frijlink<sup>{2}</sup>, Lars Hoff<sup>{3}</sup>  
<sup>{1}</sup>BTC Archer, Norway; <sup>{2}</sup>InPhase Solutions AS, Norway; <sup>{3}</sup>University of South-Eastern Norway, Norway

**04:35 AM**

**1145: High-Performance, Lead-Free, Low-Temperature Process Ultrasonic Transducers**

Hiroaki Akatsuka, Makiko Kobayashi  
Kumamoto University, Japan

**04:45 AM**

**1146: Low-K PZT Film for Commercial Use**

Mario Kiuchi<sup>{1}</sup>, Ryoma Miyake<sup>{1}</sup>, Shinya Yoshida<sup>{2}</sup>, Shuji Tanaka<sup>{2}</sup>, Tsuyoshi Takemoto<sup>{1}</sup>, Yukitaka Yamaguchi<sup>{1}</sup>, Kenji Komaki<sup>{1}</sup>  
<sup>{1}</sup>Sumitomo Precision Products Co., Ltd., Japan; <sup>{2}</sup>Tohoku University, Japan

**04:55 AM**

**1372: Airborne Ultrasonic Emission Based on Asymmetric Vibration**

Yuki Ninomiya, Takaaki Kamigaki, Hiroyuki Shinoda  
University of Tokyo, Japan

**05:05 AM**

**1639: Crystal Structure of Al and Sc Doped Ca<sub>3</sub>TaGa<sub>3</sub>Si<sub>2</sub>O<sub>14</sub> Piezoelectric Single Crystals**

Yuui Yokota, Yuji Ohashi, Masao Yoshino, Akihiro Yamaji, Satoshi Toyoda, Hiroki Sato, Shunsuke Kurosawa, Kei Kamada, Akira Yoshikawa  
Tohoku University, Japan

05:15 AM

**2053: Lead-Free Piezoelectric Composite with Configurable Material Properties by Interdigital Pair-Bonding**

Kyungmin Kim, Jinhee Yoo, Hae Gyun Lim, Mina Lee, Sung-Min Park, Hyung Ham Kim  
Pohang University of Science and Technology, Korea

4:15:00 AM - 6:15:00 AM

**C1P-32: TMS: Poster AM - Transducer Modeling & Simulation**

**Session Chair(s):** Stefan Rupitch (Friedrich-Alexander University)

04:15 AM

**1394: Enhanced KLM Model for Single-Fibre Piezocomposite Transducers**

Martin Angerer<sup>{2}</sup>, M. Zapf<sup>{2}</sup>, S. E. Gebhardt<sup>{1}</sup>, H. Neubert<sup>{1}</sup>, N. V. Rüter<sup>{1}</sup>  
<sup>{1}</sup>Fraunhofer Institute Ceramic Technologies and Systems-IKTS, Germany; <sup>{2}</sup>Karlsruhe Institute of Technology, Germany

04:25 AM

**1568: Analysis of an Underwater Conformal Array Transducer by the Equivalent Circuit Method**

Seonghun Pyo<sup>{1}</sup>, Youngsub Lim<sup>{2}</sup>, Yongrae Roh<sup>{1}</sup>  
<sup>{1}</sup>Kyungpook National University, Korea; <sup>{2}</sup>LIG Nex1 Co. Ltd., Korea

04:35 AM

**1681: Nonlinear Dynamics Modeling of the Vibrating Single-Element Transducer for 3D Ultrasound Image Reconstruction Using Recurrent Neural Network**

Liyuan He, Xiaoni Li, Weicen Chen, Boquan Wang, Ying Yang, Dawei Wu  
Nanjing University of Aeronautics and Astronautics, China

04:45 AM

**1988: Comparison of Lumped and Finite Element Models for Electro-Mechanical Characteristics of Miniaturized Piezoelectric Ultrasound Transducers**

Pouriya Torkinejad Ziarati, Levent Beker  
Koç University, Turkey

04:55 AM

**2032: Modelling of Laser-Generated Focused Ultrasound Transducers for Interventional Therapeutic Applications**

Esra Aytac Kiperçil, Adrien Desjardins, Bradley Treeby, Erwin Alles  
University College London, United Kingdom

05:05 AM

**2172: Design of a Dual Frequency Probe for Photoacoustic Imaging of the Carotid Artery**

Reza Pakdaman Zangabad<sup>{3}</sup>, Hendrik J. Vos<sup>{1}</sup>, Nico de Jong<sup>{2}</sup>, Antonius F.W. van der Steen<sup>{1}</sup>, Gijs van Soest<sup>{1}</sup>  
<sup>{1}</sup>Erasmus University Medical Center, Netherlands; <sup>{2}</sup>Erasmus University Medical Center / Delft University of Technology, Netherlands; <sup>{3}</sup>Erasmus University Medical Center / University Medical Center Rotterdam, Netherlands

05:15 AM

**2264: Properties Comparison of Three HF (50 MHz) Single-Element Transducer Radiation Patterns with Different Focusing Principles**

Sean Toffessi Siewe<sup>{2}</sup>, Samuel Callé<sup>{2}</sup>, Aline Banquart<sup>{1}</sup>, Frédéric Ossant<sup>{1}</sup>, Jean-Marc Grégoire<sup>{1}</sup>, Franck Levassort<sup>{3}</sup>  
<sup>{1}</sup>INSERM Imaging and Brain, UMR 1253, University of Tours, France; <sup>{2}</sup>Université de Tours / GREMAN UMR 7347, France; <sup>{3}</sup>Université de Tours / GREMAN UMR 7347 / INSA Centre Val de la Loire, France

4:15:00 AM - 6:15:00 AM

**C1P-33: TMU: Poster AM - Micromachined Ultrasonic Transducers PART 1**

**Session Chair(s):** Alessandro Savoia (Università degli Studi Roma Tre)

04:15 AM

**1032: Flexible Piezoelectric Micro Ultrasonic Transducer Based on a Laser Processed Substrate**

Wei Liu<sup>{1}</sup>, Chunling Zhu<sup>{1}</sup>, Dawei Wu<sup>{1}</sup>, Ting Yu<sup>{2}</sup>  
<sup>{1}</sup>Nanjing University of Aeronautics and Astronautics, China; <sup>{2}</sup>Suzhou Institute of Nano-Tech and Nano-Bionics (SINANO), China

04:25 AM

**1238: Development of PZT-Based High Frequency (18 MHz) 2D PMUT Array with Waveguide**

Xu-Bo Wang<sup>{1}</sup>, Le-Ming He<sup>{1}</sup>, Wen-Juan Liu<sup>{1}</sup>, Shu-Ren Song<sup>{1}</sup>, Wei-Jiang Xu<sup>{3}</sup>, Qian Cheng<sup>{2}</sup>, Antoine Riaud<sup>{1}</sup>, Jun-Yan Ren<sup>{1}</sup>, Jia Zhou<sup>{1}</sup>  
<sup>{1}</sup>State Key Laboratory of ASIC and System / Fudan University, China; <sup>{2}</sup>Tongji University, China; <sup>{3}</sup>Université Polytechnique Hauts-de-France, CNRS, University of Lille, France

04:35 AM

**1297: Pull-in Analysis of CMUT Elements**

Mathias Engholm, Andreas Spandet Havreland, Jørgen Arendt Jensen, Iman Taghavi, Erik Vilain Thomsen  
Technical University of Denmark, Denmark

04:45 AM

**1307: A Two-Port Multiple Moving Membrane Capacitive Micromachined Ultrasonic Transducer with Reduced Effective Height and Enhanced Sensitivity**

Rima Butrus<sup>{2}</sup>, Haleh Nazemi<sup>{2}</sup>, Muhammad Umair Nathani<sup>{2}</sup>, Rohit Karmarkar<sup>{2}</sup>, Douglas Buchanan<sup>{1}</sup>, Arezoo Emadi<sup>{2}</sup>  
<sup>{1}</sup>University of Manitoba, Canada; <sup>{2}</sup>University of Windsor, Canada

04:55 AM

**1389: A Compact Monolithic CMUT Receiver Front-End in a TiN-C CMOS-MEMS Platform**

Tzu-Hsuan Hsu, Anurag Zope, Ming-Huang Li, Sheng-Shian Li  
National Tsing Hua University, Taiwan

05:05 AM

**1393: Investigating a CMUT's Ability to Achieve Nonlinear Contrast Enhancement**

Sigrid Husebø Øygaard, Martin Lind Ommen, Mikkel Schou, Mathias Engholm, Søren Elmin Diederichsen, Erik Thomsen, Matthias Bo Stuart, Jørgen Arendt Jensen  
Technical University of Denmark, Denmark

05:15 AM

**1399: Fabricating High-Frequency Ultrasonic Array Transducers with Ultra-Low Performance Loss Based on Laser Techniques**

Zhihong Lei, Yongjian Xie, Yan Chen, Maodan Yuan, Lvming Zeng, Xuanrong Ji, Dawei Wu  
Guangdong University of Technology, China

4:15:00 AM - 6:15:00 AM

**C1P-33: TMU: Poster AM - Micromachined Ultrasonic Transducers PART 2**

Session Chair(s): Jinwook Kim (UNC Chapel Hill)

04:15 AM

**1545: A New CMUT Structure Fabricated on Glass Substrate for High Reliability**

Seungmok Lee, Masashi Hasegawa, Takeshi Nizuka  
Kyocera Corporation, Japan

04:25 AM

**1572: Supersensitive Ultrasound Probes for Medical Imaging by Piezoelectric MEMS with Complemented Transmitting and Receiving Transducers**

Kenji Suzuki<sup>{1}</sup>, Yuta Nakayama<sup>{1}</sup>, Naoki Shimizu<sup>{1}</sup>, Takashi Mizuno<sup>{1}</sup>, Yoshio Mita<sup>{3}</sup>, Takeshi Yoshimura<sup>{2}</sup>  
<sup>{1}</sup>Konica Minolta, Inc, Japan; <sup>{2}</sup>Osaka Prefecture University, Japan; <sup>{3}</sup>University of Tokyo, Japan

04:35 AM

**1603: Wafer-Scale Fabrication of Nanometer Silicon Posts for Capacitive Micromachined Ultrasonic Transducers with Substrate-Embedded Springs**

Hae Youn Kim<sup>{2}</sup>, Dong-Hyun Kang<sup>{2}</sup>, Jinsik Kim<sup>{1}</sup>, Butrus T. Khuri-Yakub<sup>{3}</sup>, Byung Chul Lee<sup>{2}</sup>  
<sup>{1}</sup>Dongguk University, Korea; <sup>{2}</sup>Korea Institute of Science and Technology, Korea; <sup>{3}</sup>Stanford University, United States

04:45 AM

**1721: Significant Enhancement in Operational Bandwidth of ZnO PMUTs Due to the Simultaneous Existence of Softening and Hardening Nonlinearity**

Randhir Kumar, Sudhanshu Tiwari, Rudra Pratap  
Indian Institute of Science, India

04:55 AM

**1821: Development of Micromachined Piezoelectric Near Ultrasound Transducers for Data-Over-Sound Applications**

Harshvardhan Gupta, Bibhas Nayak, Anuj Ashok, Kasutav Roy, Antony Jeyaseelan, Rudra Pratap  
Indian Institute of Science, India

05:05 AM

**2210: A Single Cell PMUT as a Bio-Fluid Density Sensor**

Kaustav Roy, Avinandan Mandal, Anuj Ashok, Harshvardhan Gupta, Rudra Pratap  
Indian Institute of Science, India

05:15 AM

**1208: CMUT as a Sealed Gap Capacitive Microphone**  
Hayrettin Köymen<sup>{1}</sup>, Abdullah Atalar<sup>{1}</sup>, Itir Köymen<sup>{2}</sup>, Akif Sinan Taşdelen<sup>{1}</sup>, Mehmet Yilmaz<sup>{1}</sup>  
<sup>{1}</sup>Bilkent University, Turkey; <sup>{2}</sup>TOBB University, Turkey

6:30:00 AM - 8:00:00 AM

**C2L-01: MIM: Machine Learning Approaches & Applications**

Session Chair(s): Jan D'hooge (Catholic University of Leuven)

Kang Kim (University of Pittsburgh)

06:30 AM

**1075: Inverse Problems in Computational Ultrasound Imaging and Related Applications: from Model-Based to Machine Learning Approaches**

Adrian Basarab  
IRIT / Université de Toulouse, France

07:00 AM

**1317: GPU-Based Implementation of Real-Time Ultrasound Molecular Imaging with a Neural Network Microbubble Detector**

Dongwoon Hyun, Rakesh Bam, Jeremy Dahl  
Stanford University, United States

07:15 AM

**1522: A Deep Learning Framework for Spatiotemporal Ultrasound Localization Microscopy**

Jonathan Porée, Léo Milecki, Hatim Belgharbi, Chloé Bourquin, Frédéric Lesage, Jean Provost  
Polytechnique Montréal, Canada; Polytechnique Montréal, France

07:30 AM

**1494: Dynamic Myocardial Ultrasound Localization Angiography**

Philippe Cormier, Jonathan Porée, Chloé Bourquin, Jean Provost  
Polytechnique Montréal, Canada

07:45 AM

**2041: Coherence-Based Beamforming Improves the Diagnostic Certainty of Breast Ultrasound Exams**

Alycen Wiacek<sup>{2}</sup>, Eniola Oluyemi<sup>{1}</sup>, Kelly Myers<sup>{1}</sup>, Lisa Mullen<sup>{1}</sup>, Muyinatu A. Lediju Bell<sup>{2}</sup>  
<sup>{1}</sup>Johns Hopkins Medical Institute, United States; <sup>{2}</sup>Johns Hopkins University, United States

6:30:00 AM - 8:00:00 AM

**C2L-02: MCA: Contrast Agents: Techniques & Applications**

Session Chair(s): Kathy Ferrara (Stanford University)

06:30 AM

**1784: Membrane Perforation by Oscillating Microbubbles: Pores or Tunnels?**

Ines Beekers<sup>{1}</sup>, Bram Meijlink<sup>{1}</sup>, Simone A.G. Langeveld<sup>{1}</sup>, Antonius F. W. van der Steen<sup>{1}</sup>, Nico de Jong<sup>{2}</sup>, Martin D. Verweij<sup>{2}</sup>, Klazina Kooiman<sup>{1}</sup>  
<sup>{1}</sup>Erasmus University Medical Center, Netherlands; <sup>{2}</sup>Erasmus University Medical Center / Delft University of Technology, Netherlands

06:45 AM

**2069: Genetically Encoded Acoustic Biosensors for Ultrasonic Imaging of Intracellular Enzyme Activity**

Anupama Lakshmanan, Zhiyang Jin, Suchita P. Nety, Daniel P. Sawyer, Audrey Lee-Gosselin, Dina Malounda, Mikhail G. Shapiro

California Institute of Technology, United States

07:00 AM

**1625: Whole Organ Microvasculature Imaging in Vivo for Anatomical and Haemodynamic Characterization of the Rat's Brain**

Baptiste Heiles<sup>{1}</sup>, Arthur Chavignon<sup>{6}</sup>, Antoine Bergel<sup>{4}</sup>, Vincent Hingot<sup>{6}</sup>, L. Rahal<sup>{2}</sup>, P. Lopez<sup>{3}</sup>, Hicham Serroune<sup>{4}</sup>, Mickaël Tanter<sup>{5}</sup>, Olivier Couture<sup>{6}</sup>  
<sup>{1}</sup>Delft University of Technology / Maresca Lab, Netherlands; <sup>{2}</sup>ESPCI Paris, PSL Research University, France; <sup>{3}</sup>ESPCI Paris, PSL Research University / Institut Cochin INSERM, France; <sup>{4}</sup>Institute Physics for Medicine, CNRS, INSERM, ESPCI Paris, PSL Research University, France; <sup>{5}</sup>Physics for Medicine Paris, INSERM U1273, ESPCI Paris, PSL University, CNRS FRE 2031, France; <sup>{6}</sup>Sorbonne Université, CNRS, INSERM, Laboratoire d'Imagerie Biomédicale, France

07:15 AM

**1723: Cardiac Device-Related Biofilm Treatment Under Flow Using Vancomycin-Targeted Microbubbles**

Joop J.P. Kouijzer<sup>{1}</sup>, Kirby R. Lattwein<sup>{1}</sup>, Inés Beekers<sup>{1}</sup>, Mariël Leon-Grooters<sup>{1}</sup>, Simone A.G. Langeveld<sup>{1}</sup>, Nico de Jong<sup>{2}</sup>, Antonius F.W. van der Steen<sup>{1}</sup>, Alexander L. Klibanov<sup>{3}</sup>, Willem J.B. van Wamel<sup>{1}</sup>, Klazina Kooiman<sup>{1}</sup>  
<sup>{1}</sup>Erasmus University Medical Center, Netherlands; <sup>{2}</sup>Erasmus University Medical Center / Delft University of Technology, Netherlands; <sup>{3}</sup>University of Virginia, United States

07:30 AM

**1805: Deep Learning-Based Microbubble Localization for Fast Ultrasound Localization Microscopy**

Xi Chen, Matthew Lowerison, Zhijie Dong, Nathiya Chandra Sekaran, Daniel Llano, Pengfei Song  
University of Illinois at Urbana-Champaign, United States

07:45 AM

**1876: Ultrasound Imaging of Perfluorobutane Nanodroplet Vaporization Induced by Proton Irradiation: Towards a Novel Approach for Proton Range Verification and Dosimetry**

Sophie Heymans<sup>{2}</sup>, Bram Carlier<sup>{2}</sup>, Yosra Toumia<sup>{3}</sup>, Sjoerd Nooijens<sup>{2}</sup>, Marcus Ingram<sup>{2}</sup>, Gaio Paradossi<sup>{3}</sup>, Emiliano d'Agostino<sup>{1}</sup>, Uwe Himmelreich<sup>{2}</sup>, Jan D'hooge<sup>{2}</sup>, Edmond Sterpin<sup>{2}</sup>, Koen Van Den Abeele<sup>{2}</sup>  
<sup>{1}</sup>DoseVue, Belgium; <sup>{2}</sup>Katholieke Universiteit Leuven, Belgium; <sup>{3}</sup>University of Rome Tor Vergata, Italy

6:30:00 AM - 8:00:00 AM

**C2L-03: TPF: Airborne Ultrasound Transducers**

**Session Chair(s):** Tomás Gómez Álvarez-Arena (Spanish National Research Council (CSIC))  
Stefan Rupitch (Friedrich-Alexander University)

06:30 AM

**1111: Air-Coupled Transducer Arrays: Imaging and Other Applications**

Mario Kupnik  
Technische Universität Darmstadt, Germany

07:00 AM

**1065: Modeling of Dual-Backplate Based Airborne CMUTs with Enhanced Bandwidth**

Sebastian Anzinger<sup>{2}</sup>, Alessandra Fusco<sup>{1}</sup>, David Tumpold<sup>{1}</sup>, Christian Bretthauer<sup>{1}</sup>, Alfons Dehé<sup>{2}</sup>  
<sup>{1}</sup>Infineon Technologies AG, Germany; <sup>{2}</sup>University of Freiburg, Germany

07:15 AM

**1495: Polymer-Based Piezoelectric Ultrasound Transducer Arrays on Glass Demonstrating Mid-Air Applications**

Christopher Chare<sup>{2}</sup>, Pieter Gijsenbergh<sup>{1}</sup>, Yongbin Jeong<sup>{2}</sup>, Jan Genoe<sup>{2}</sup>, Paul Heremans<sup>{2}</sup>, David Cheyns<sup>{1}</sup>, Kris Myny<sup>{1}</sup>  
<sup>{1}</sup>imec, Belgium; <sup>{2}</sup>imec / Katholieke Universiteit Leuven, Belgium

07:30 AM

**1980: Piezoelectric Micromachined Ultrasonic Transducers (pMUT) with Free Boundary**

Sedat Pala, Liwei Lin  
University of California, Berkeley, United States

07:45 AM

**1558: Thin-Film Lithium Niobate Based Piezoelectric Micromachined Ultrasound Transducers**

Ruo Chen Lu, Michael Breen, Ahmed Hassanien, Yansong Yang, Songbin Gong  
University of Illinois at Urbana-Champaign, United States

6:30:00 AM - 8:00:00 AM

**C2L-04: NSP Deep Learning, Imaging & Communications**

**Session Chair(s):** Jafar Saniie (Illinois Institute of Technology)  
Yufeng Lu (Bradley University)

06:30 AM

**2009: Fast Ultrasonic Imaging Using End-To-End Deep Learning**

Georgios Pilikos<sup>{2}</sup>, Lars Horchens<sup>{1}</sup>, Kees Joost Batenburg<sup>{3}</sup>, Tristan van Leeuwen<sup>{5}</sup>, Felix Lucka<sup>{4}</sup>  
<sup>{1}</sup>Applus E&I Technology Centre, Netherlands; <sup>{2}</sup>Centrum Wiskunde & Informatica, Netherlands; <sup>{3}</sup>Centrum Wiskunde & Informatica / Leiden University, Netherlands; <sup>{4}</sup>Centrum Wiskunde & Informatica / University College London, Netherlands; <sup>{5}</sup>Utrecht University, Netherlands

06:45 AM

**1280: A New Classifier for Ultrasonic NDE Applications Based on an Ensemble of LSTM and Vae Deep Learning Networks**

Michael Marino, Erdal Oruklu  
Illinois Institute of Technology, United States

07:00 AM

**1179: High Resolution Image Reconstruction from Full-Matrix Capture Data Using Minimum Mean Square**

**Error Deconvolution of the Spatio-Temporal System Transfer Function**

Johan Carlson, Robert Olsson, Marcus Hedlund  
Lulea University of Technology, Sweden

07:15 AM

**1135: Generalized Matched Filter for Clutter Suppression in Cast Austenitic Stainless Steel Welds**

Myles Dunlap<sup>{1}</sup>, Steven Kay<sup>{2}</sup>, Thomas Stafford<sup>{1}</sup>  
<sup>{1}</sup>Electric Power Research Institute, Inc., United States;  
<sup>{2}</sup>Signal Processing Systems, United States

07:30 AM

**1554: Software Defined Ultrasonic Communication System Based on Time-Reversal Signal Processing**

Xin Huang, Jafar Saniie  
Illinois Institute of Technology, United States

07:45 AM

**1142: Ultrasonic Communication Through a Metallic Barrier: Transmission Modeling and Crosstalk Minimization**

Christopher Sugino<sup>{1}</sup>, Romain Gerbe<sup>{1}</sup>, Charles Reinke<sup>{2}</sup>, Massimo Ruzzene<sup>{3}</sup>, Alper Erturk<sup>{1}</sup>, Ihab El-Kady<sup>{2}</sup>  
<sup>{1}</sup>Georgia Institute of Technology, United States;  
<sup>{2}</sup>Sandia National Laboratories, United States;  
<sup>{3}</sup>University of Colorado Boulder, United States

6:30:00 AM - 8:00:00 AM

**C2L-05: AMA: Materials & Applications**

Session Chair(s): Ausrine BartasYTE (University of Franche-Comté)  
Jyrki Kaitila (N/A)

06:30 AM

**1668: The Best Reciprocal Resonators Make the Best Non-Reciprocal Systems**

Sunil Bhawe  
Purdue University, United States

07:00 AM

**1472: Static Strain Modelling, Calibration, and Measurements for High-Temperature Wireless SAW Resonator Operation**

Syeda Fizzah Jilani<sup>{2}</sup>, David Leff<sup>{2}</sup>, Anin Maskay<sup>{1}</sup>, Robert Lad<sup>{2}</sup>, Mauricio Pereira Da Cunha<sup>{2}</sup>  
<sup>{1}</sup>Environetix Technologies Corporation, United States;  
<sup>{2}</sup>University of Maine, United States

07:15 AM

**2486: Experimental and Theoretical Investigation of  $kt^2$  and Mechanical Quality Factor ( $Q_m$ ) in YbAlN Films Asing DFT**

Naoya Iwata<sup>{2}</sup>, Sarina Kinoshita<sup>{1}</sup>, Junjun Jia<sup>{1}</sup>, Takahiko Yanagitani<sup>{3}</sup>  
<sup>{1}</sup>Waseda University, China; <sup>{1}</sup>Waseda University, Japan; <sup>{2}</sup>Waseda University / ZAIKEN, Japan;  
<sup>{3}</sup>Waseda University / ZAIKEN / JST-PRESTO, Japan

07:30 AM

**2020: Smart Cut™ Piezo on Insulator (POI) Substrates for High Performances SAW Components**

Eric Butaud<sup>{5}</sup>, Brice Tavel<sup>{5}</sup>, Sylvain Ballandras<sup>{3}</sup>, Marie Bousquet<sup>{4}</sup>, Alexis Drouin<sup>{5}</sup>, Christophe Didier<sup>{5}</sup>, Vincent Barec<sup>{5}</sup>, Isabelle Huyet<sup>{5}</sup>, Thierry Laroche<sup>{3}</sup>,

Emilie Courjon<sup>{3}</sup>, F. Bernard<sup>{2}</sup>, Isabelle Bertrand<sup>{5}</sup>, Aymen Ghorbel<sup>{5}</sup>, Alexandre <sup>{1}</sup>CEA Leti, France; <sup>{2}</sup>Frecn|sys, France; <sup>{3}</sup>Frecn|sys / SOITEC, France; <sup>{4}</sup>Grenoble Alpes Université, CEA-Leti, France; <sup>{5}</sup>Soitec SA, France

07:45 AM

**1047: FBAR-Based Frequency Divider Oscillator for Lock-in Amplifier Free Atomic Stabilization Loop**

Motoaki Hara<sup>{1}</sup>, Yuichiro Yano<sup>{1}</sup>, Shinsuke Hara<sup>{1}</sup>, Akifumi Kasamatsu<sup>{1}</sup>, Tetsuya Ido<sup>{1}</sup>, Hiroyuki Ito<sup>{2}</sup>  
<sup>{1}</sup>National Institute of Information and Communications Technology, Japan; <sup>{2}</sup>Tokyo Institute of Technology, Japan

8:30:00 AM - 10:00:00 AM

**C3L-01: Clinical Session**

Session Chair(s): Ton van der Steen (Erasmus Medical Centre)  
Jeffrey Ketterling (Riverside Research)

08:30 AM

**2502: The Clinical Assessment of Intracardiac Flow. New Tools Provide New Insight**

Javier Bermejo  
Hospital General Universitario Gregorio Marañón, Spain

09:00 AM

**1991: Recent Advances in the Application of Focused Ultrasound for the Treatment of Pancreatic Cancer**

Joo Ha Hwang  
Stanford University, United States

09:30 AM

**1088: Noninvasive Ultrasonic Drug Uncaging for Brain Applications**

Raag Airan  
Stanford University, United States

8:30:00 AM - 10:00:00 AM

**C3L-02: MCA: Ultrasound Localization Microscopy & High Resolution Imaging I**

Session Chair(s): Olivier Couture (CNRS at Sorbonne University)

08:30 AM

**1091: Towards Real-Time Super-Resolution Ultrasound**

Meng-Xing Tang  
Imperial College London, United Kingdom

09:00 AM

**1941: In Vivo Abdominal Super-Resolution Ultrasound Microvessel Imaging with a Curved Array Transducer**

Chengwu Huang, Shanshan Tang, Ping Gong, U-Wai Lok, Lulu Yang, Kate Knoll, Duane Meixner, Shannon Sheedy, John Knudsen, Shigao Chen  
Mayo Clinic, United States

09:15 AM

**1213: 3D Transcranial Ultrasound Localization Microscopy in Rat with a Multiplexed Matrix Probe**

Arthur Chavignon<sup>{2}</sup>, Baptiste Heiles<sup>{1}</sup>, Vincent Hingot<sup>{2}</sup>, Olivier Couture<sup>{2}</sup>

{1}Delft University of Technology / Maresca Lab,  
Netherlands; {2}Sorbonne Université, CNRS, INSERM,  
Laboratoire d'Imagerie Biomédicale, France

09:30 AM

**2289: A Combined Super-Resolution Ultrasound  
Molecular Imaging Technique Applied to Tumor  
Microvasculature**

Feifei Zhao, Sunil Unnikrishnan, Elizabeth B. Herbst,  
Alexander L. Klibanov, F. William Mauldin Jr., John A.  
Hossack  
University of Virginia, United States

09:45 AM

**1178: Super-Resolution Ultrasound in Peripheral  
Nerve Blood Flow Imaging**

Jiabin Zhang{2}, Yaqiong Zhu{1}, Nan Li{1}, Feihong  
Dong{2}, Jingyi Yin{2}, Yuexiang Wang{1}, Yukun Luo{1},  
Jue Zhang{2}  
{1}Chinese People's Liberation Army General Hospital,  
China; {2}Peking University, China

8:30:00 AM - 10:00:00 AM

**C3L-03: TPM: Transducers: From Underwater to  
Wearables**

Session Chair(s): Valsala Kurusingal (Thales Australia)  
Xiaoning Jiang (NC State University)

08:30 AM

**1110: A Review of Single Crystal Underwater  
Transducers (WITHDRAW)**

Harold Robinson  
Naval Undersea Warfare Center Division Newport, United  
States

09:00 AM

**2027: Ultrasonic Biometric Authentication System  
with Contact Gesture Sensing**

Jessica Liu Strohmman, Yipeng Lu, Hrishikesh  
Panchawagh  
Qualcomm Technologies, Inc., United States

09:15 AM

**2012: Laser Sensor Guided Intravascular Catheter  
with Ring Type Stack Transducer for  
Sonothrombolysis**

Bohua Zhang, Huaiyu Wu, Leela Goel, Xiaoning Jiang  
North Carolina State University, United States

09:30 AM

**1161: High-Performance Transparent Ferroelectric  
Crystals for Photoacoustic Transducer Applications**

Chaorui Qiu{3}, Bo Wang{1}, Nan Zhang{3}, Shujun  
Zhang{2}, Jinfeng Liu{3}, Thomas R. ShROUT{1}, Long-Qing  
Chen{1}, Zhuo Xu{3}, Fei Li{3}  
{1}Pennsylvania State University, United States;  
{2}University of Wollongong, Australia; {3}Xi'an Jiaotong  
University, China

09:45 AM

**1569: Wearable Transparent PVDF Transducer for  
Photoacoustic Imager in Body Sensor Network**

Ya-Han Liu, Fu-Sung Lin, Li-Xiang Chen, Hsin-Yi Su, You-  
Chi Hsu, Soma Pal, Yeong-Her Wang, Chih-Hsien Huang  
National Cheng Kung University, Taiwan

8:30:00 AM - 10:00:00 AM

**C3L-04: SPS: Special Session on Wearable Ultrasound  
Session Chair(s): Vincent Laude (FEMTO-ST / CNRS)**

Jeffrey Ketterling (Riverside Research)

08:30 AM

**1096: Sonomyography: a New Application of Wearable  
Ultrasound in Rehabilitation Engineering**

Siddhartha Sikdar  
George Mason University, United States

09:00 AM

**1103: Piezoelectrics in Wearable Applications**

Sebastjan Glinsek  
Luxembourg Institute of Science and Technology,  
Luxembourg

09:30 AM

**Panel**

Siddhartha Sikdar (Invited Speaker), George Mason  
University  
Sebastjan Glinsek (Invited Speaker), Luxembourg Institute  
of Science and Technology  
Susan Trollier-McKinstry, Penn State University  
Steve Stoffels, Pulsify Medical

8:30:00 AM - 10:00:00 AM

**C3L-05: PMI: Modelling & Inversion - In Memoriam  
Robert K. Thalhammer**

Session Chair(s): Kimmo Kokkonen (Qualcomm)  
Margaret Lucas (University of Glasgow)

08:30 AM

**1105: Model Based Imaging and Material Property  
Mapping Based on Ultrasonic Array Data**

Anthony Mulholland  
University of Bristol, United Kingdom

08:45 AM

**1667: A Frequency-Hopping Technique for Solving the  
Cycle-Skipping Problem Encountered with Acoustic  
Full-Waveform Inversion**

Ulas Taskin, Koen W. A. van Dongen  
Delft University of Technology, Netherlands

09:00 AM

**1401: Ultrasound Full-Waveform Inversion with  
Accurate Transducer Characterisation**

Carlos Cueto, Javier Cudeiro, Lluís Guasch, Òscar  
Calderón Agudo, Michael Warner, Meng-Xing Tang  
Imperial College London, United Kingdom

09:15 AM

**1846: Modeling Frequency Dependent Ultrasound  
Attenuation in Cortical Bone: Solving Direct and  
Inverse Problems**

Rebekah White{1}, Omid Yousefian{1}, Yasamin  
Karbalaieisadegh{1}, Maryline Talmant{2}, Quentin  
Grimal{2}, Marie Muller{1}  
{1}North Carolina State University, United States;  
{2}Sorbonne Université, France

09:30 AM

**2505: In Memoriam Robert K. Thalhammer I**

John Larson

Broadcom, United States

09:35 AM

2510: In Memoriam Robert K. Thalhammer II

Mohamed Abd Allah

Qualcomm, United States

10:15:00 AM - 11:15:00 AM

C4L-01: MTH: Clinical Studies

Session Chair(s): Elisa Konofagou (Columbia University)

10:15 AM

1002: Echo-Focusing in Transcranial MR-Guided Focused Ultrasound Thalamotomy for Essential Tremor: a Feasibility Study

Ryan Jones<sup>{2}</sup>, Yuexi Huang<sup>{2}</sup>, Ying Meng<sup>{1}</sup>, Nadia Scantlebury<sup>{1}</sup>, Michael Schwartz<sup>{1}</sup>, Nir Lipsman<sup>{2}</sup>, Kullervo Hynynen<sup>{3}</sup>

<sup>{1}</sup>Sunnybrook Health Sciences Centre, Canada;

<sup>{2}</sup>Sunnybrook Research Institute, Canada;

<sup>{3}</sup>Sunnybrook Research Institute / University of Toronto, Canada

10:30 AM

1122: Non-Invasive Focused Ultrasound Therapy of Calcified Aortic Stenosis: First-In-Man Study

Mathieu Pernot<sup>{4}</sup>, Mathieu Cyril Rémond<sup>{2}</sup>, Robin Penot<sup>{2}</sup>, Daniel Suarez<sup>{2}</sup>, Guillaume Goudot<sup>{3}</sup>, Wojciech Kwiecinski<sup>{2}</sup>, Michael Vion<sup>{2}</sup>, Fabienne Betting<sup>{2}</sup>, Aurélien Corbel<sup>{2}</sup>, Ana Fouquier<sup>{2}</sup>, Eric Noël<sup>{2}</sup>, Zahir Larabi<sup>{2}</sup>, Alexander Ijsselmuiden<sup>{1}</sup>  
<sup>{1}</sup>Amphia Hospital, Netherlands; <sup>{2}</sup>Cardiawave SA, France; <sup>{3}</sup>Hopital Européen Georges Pompidou, France; <sup>{4}</sup>Physics for Medicine Paris, INSERM U1273, ESPCI Paris, PSL University, CNRS FRE 2031, France

10:45 AM

1131: FUS-Induced Median Nerve Stimulation Alters Thermal Pain Sensation in Humans

Stephen Lee, Hermes Kamimura, Elisa Konofagou  
Columbia University, United States

11:00 AM

1097: Clinical Phase I/Phase II Study Using LoFU in Addition to Stem Cells in Patients with Peripheral Arterial Disease

Narendra Sanghvi<sup>{3}</sup>, Mark Carol<sup>{3}</sup>, Roy Carlson<sup>{3}</sup>, Ralf Seip<sup>{3}</sup>, Joseph Frank<sup>{2}</sup>, Wilson Wong<sup>{1}</sup>, Bruce Murphy<sup>{1}</sup>

<sup>{1}</sup>Arkansas Heart Hospital, United States; <sup>{2}</sup>National Institute of Health, United States; <sup>{3}</sup>SonaCare Medical, LLC, United States

10:15:00 AM - 11:15:00 AM

C4L-02: MIS: Vascular Imaging & Microscopy

Session Chair(s): Thomas Deffieux (INSERM)

10:15 AM

1493: Deep Learning Models for Fast Ultrasound Localization Microscopy

Jihwan Youn<sup>{3}</sup>, Ben Luijten<sup>{1}</sup>, Matthias Bo Stuart<sup>{3}</sup>, Yonina C. Eldar<sup>{4}</sup>, Ruud van Sloun<sup>{2}</sup>, Jørgen Arendt Jensen<sup>{3}</sup>

<sup>{1}</sup>Eindhoven University of Technology, Netherlands;

<sup>{2}</sup>Eindhoven University of Technology / Philips Research,

Netherlands; <sup>{3}</sup>Technical University of Denmark, Denmark; <sup>{4}</sup>Weizmann Institute of Science, Israel

10:30 AM

2074: XDoppler Imaging: a New Strategy for Ultrafast Volumetric Flow Imaging Using a Row-Column Approach

Jack Sauvage<sup>{3}</sup>, Adrien Bertolo<sup>{2}</sup>, Oscar Demeulenaere<sup>{2}</sup>, Baptiste Heiles<sup>{1}</sup>, Mickaël Tanter<sup>{3}</sup>, Mathieu Pernot<sup>{3}</sup>, Thomas Deffieux<sup>{4}</sup>  
<sup>{1}</sup>Delft University of Technology, Netherlands; <sup>{2}</sup>Physics for Medicine Paris, France; <sup>{3}</sup>Physics for Medicine Paris, INSERM U1273, ESPCI Paris, PSL University, CNRS FRE 2031, France; <sup>{4}</sup>Physics for Medicine Paris, Inserm, ESPCI Paris, CNRS, PSL University, France

10:45 AM

2183: Vector Doppler Imaging of Small Vessels Using Directionally Filtered Power Doppler Images

Bastian Generowicz<sup>{2}</sup>, Luuk Verhoef<sup>{2}</sup>, Frits Mastik<sup>{2}</sup>, Stephanie Dijkhuizen<sup>{2}</sup>, Nikki van Dorp<sup>{2}</sup>, Jason Voorneveld<sup>{2}</sup>, Johan G. Bosch<sup>{2}</sup>, Karishma Kumar<sup>{1}</sup>, Geert Leus<sup>{1}</sup>, Chris de Zeeuw<sup>{2}</sup>, Sebastiaan Koekkoek<sup>{2}</sup>, Pieter Kruizinga<sup>{2}</sup>  
<sup>{1}</sup>Delft University of Technology, Netherlands; <sup>{2}</sup>Erasmus University Medical Center, Netherlands

11:00 AM

2252: Vascular Ultrasound Super-Resolution Without Contrast Agents

Avinoam Bar-Zion<sup>{1}</sup>, Oren Solomon<sup>{2}</sup>, Joseph Wekseblatt<sup>{1}</sup>, David Maresca<sup>{1}</sup>, Mikhail G. Shapiro<sup>{1}</sup>, Yonina C. Eldar<sup>{3}</sup>  
<sup>{1}</sup>California Institute of Technology, United States; <sup>{2}</sup>Technion, Israel; <sup>{3}</sup>Weizmann Institute of Science, Israel

10:15:00 AM - 11:15:00 AM

C4L-03: MEL: Cardiac Elastography

Session Chair(s): Shigao Chen (Mayo Clinic)  
Elisa Konofagou (Columbia University)

10:15 AM

2076: 3D-Rendered Electromechanical Wave Imaging to Quantify and Inform Cardiac Resynchronization Therapy Response Within 24 Hours of Device Implantation

Lea Melki, Daniel Wang, Christopher Grubb, Rachel Weber, Angelo Biviano, Elaine Wan, Hasan Garan, Elisa Konofagou  
Columbia University, United States

10:30 AM

1744: High-Frame-Rate Imaging of Cardiac Tissue-Flow Interaction: Towards the Origin of the Atrial Kick Wave

Sébastien Salles<sup>{3}</sup>, Solveig Fadnes<sup>{2}</sup>, Siri Ann Nyrnes<sup>{1}</sup>, Lasse Løvstakken<sup>{2}</sup>  
<sup>{1}</sup>Ålesund Hospital / St. Olavs University Hospital, Norway; <sup>{2}</sup>Norwegian University of Science and Technology, Norway; <sup>{3}</sup>Sorbonne Université / Norwegian University of Science and Technology, France

10:45 AM

**1762: Determinants of the Propagation Velocity of Natural Shear Waves in Cardiac Shear Wave Elastography**

*Stéphanie Bézy, Aniela Petrescu, Marta Cvijic, Marta Orlowska, Pedro Santos, Annegret E Werner, Jürgen Duchenne, Jens-Uwe Voigt, Jan D'Hooge*  
Katholieke Universiteit Leuven, Belgium

11:00 AM

**1278: Transthoracic Cardiac Shear Wave Elastography During Hemodynamic Alterations and Infarct**

*Annette Caenen{4}, Lana B.H. Keijzer{1}, Stéphanie Bézy{5}, Jürgen Duchenne{5}, Marta Orlowska{5}, Antonius F. W. van der Steen{1}, Nico de Jong{2}, Patrick Segers{3}, Johan G. Bosch{1}, Jens-Uwe Voigt{5}, Jan D'Hooge{5}, Hendrik J. Vos{1}*  
{1}Erasmus University Medical Center, Netherlands;  
{2}Erasmus University Medical Center / Delft University of Technology, Netherlands; {3}Ghent University, Belgium;  
{4}Ghent University / IBItech-bioMMeda, Belgium;  
{5}Katholieke Universiteit Leuven, Belgium

10:15:00 AM - 11:15:00 AM

**C4L-04: MBF: Wall Shear Stress**

**Session Chair(s):** Piero Tortoli (University of Florence)

10:15 AM

**1870: Combined ARFI Variance of Acceleration (VoA), Vector Flow, and Wall Shear Stress Estimation for Assessing Atherosclerotic Risk: Ex-Vivo Human Cadaveric Results**

*Keerthi Anand{1}, Jonathon Homeister{2}, Jennifer Ashley Ezzel{1}, Gabriela Torres{1}, Caterina Gallippi{1}*  
{1}North Carolina State University / University of North Carolina at Chapel Hill, United States; {2}University of North Carolina at Chapel Hill, United States

10:30 AM

**1871: Adaptive Wall Shear Stress Imaging Coupled with Pulse Wave Imaging: a Feasibility Study in Phantoms, Fsi Simulations and Atherosclerotic Swine in Vivo**

*Grigorios Marios Karageorgos, Nirvedh Meshram, Pierre Nauleau, Changhee Lee, Rachel Weber, Salah Mahmoudi, Paul Kemper, Elisa Konofagou*  
Columbia University, United States

10:45 AM

**2352: 4D Flow and Wall Shear Stress Using Volumetric Ultrasound Image Velocimetry**

*Kai Riemer, Matthieu Toulemonde, Ethan M. Rowland, Chee Hau Leow, Meng-Xing Tang, Peter D. Weinberg*  
Imperial College London, United Kingdom

10:15:00 AM - 11:15:00 AM

**C4L-05: PGP: General Physical Acoustics I**

**Session Chair(s):** Yun Jing (North Carolina State University)

10:15 AM

**1448: Wavefront Control with Acoustic Metamaterials: Concepts and Applications**

*Steven Cummer*  
Duke University, United States

10:45 AM

**1421: Acoustic Hologram for Ultrasonic Transducer with Optimized Focus and Reception**

*Zhaoxi Li{2}, Danfeng Wang{1}, Chunlong Fei{2}, Zeyu Chen{1}, Runcong Wu{2}, Jun Chen{2}, Di Li{2}, Dongdong Chen{2}, Yintang Yang{2}*  
{1}Central South University, China; {2}Xidian University, China

11:30:00 AM - 1:30:00 PM

**C5P-06: ABD: Poster PM - BAW Devices III**

**Session Chair(s):** Paul Bradley (Broadcom)  
Ventsislav Yantchev (Chalmers University of Technology)

11:30 AM

**1872: Energy Spectrum Analysis for Optimal Design of Ultra-High Frequency (UHF) Piezoelectric Resonators Leveraging 3D FEA Domain Decomposition Method with Cloud HPC**

*Gergely Simon, Mihir S. Patel, Andrew Tweedie, Gerald Harvey*  
OnScale Inc., United States

11:40 AM

**2274: An Equivalent Model for Lateral Modes on the H2 Response of Bulk Acoustic Wave Resonators**

*Carlos Udaondo, Carlos Collado, Jordi Mateu, David Garcia-Pastor*  
Universitat Politècnica de Catalunya, Spain

11:50 AM

**1398: In-Plane Oriented Stacks of c-AlScN/Mo (110) for BAW Resonators Grown by Magnetron Sputter Epitaxy**

*Balasubramanian Sundarapandian{1}, Maximilian Kesse{1}, Agne Zukauskaitė{1}, Lutz Kirste{2}, Cheng Sun{3}, Oliver Ambacher{2}*  
{1}Fraunhofer Institute Applied Solid State Physics-IAF, Germany; {2}Fraunhofer Institute Applied Solid State Physics-IAF / University of Freiburg, Germany; {3}INATECH-University of Freiburg, Germany

12:00 PM

**1877: Machine Learning Enabled FBAR Digital Twin for Rapid Optimization**

*Gergely Simon, Andrew Tweedie, Mihir S. Patel, Gerald Harvey*  
OnScale Inc., United States

12:10 PM

**2396: High-Frequency BAW Resonators Based on 33°Y-LiNbO3 Films Grown by DLI-CVD**

*Mihaela Ivan{3}, Vincent Astié{3}, Sondes Boujnah{3}, Lilia Arapan{2}, Samuel Margueron{3}, Jean-Manuel Decams{1}, Ausrine Bartasyte{4}*  
{1}Annealsys, France; {2}FEMTO-ST Institute, France; {3}University of Bourgogne Franche-Comté, France; {4}University of Bourgogne Franche-Comté / FEMTO-ST Institute, France

11:30:00 AM - 1:30:00 PM

**C5P-07: AMR: Poster PM - MEMS Resonators III**

**Session Chair(s):** Sunil Bhawe (Purdue University)  
Songbin Gong (University of Illinois at Urbana Champaign)

12:20 PM

**1379: On the Efficiency of Excitation of High Coupling Plate Acoustic Modes**

*Ventsislav Yantchev, Patrick Turner, Robert Hammond Resonant Inc., Bulgaria; Resonant Inc., United States*

12:30 PM

**2141: 167-MHz AIN Capacitive-Piezoelectric Oscillator**

*Qianyi Xie, Clark Nguyen University of California, Berkeley, United States*

12:40 PM

**2286: Suppression of Spurious Modes in Lithium Niobate A1 Resonators Using Dispersion Matching**

*Yansong Yang, Liuqing Gao, Luo Chen Lu, Songbin Gong University of Illinois at Urbana-Champaign, United States*

12:50 PM

**2336: A Comparative Study on the Performance of Aluminum Nitride Thickness- and Quasi-Thickness Extensional Mode Resonators**

*Xuanyi Zhao, Cristian Cassella Northeastern University, United States*

01:00 PM

**1250: Design Guidelines for Acoustic Wave Ladder Filters Starting in Shunt Resonator**

*Eloi Guerrero, Patricia Silveira, Jordi Verdú, Pedro de Paco Universitat Autònoma de Barcelona, Spain*

11:30:00 AM - 1:30:00 PM

**C5P-08: ASA: Poster PM - Sensors & New Applications II**

**Session Chair(s):** Hagen Schmidt (Leibniz Institute for Solid State & Materials Research Dresden) Sergei Zhgoon (National Research University MPEI)

11:30 AM

**1546: Slow Waves in Metamaterial Two-Dimensional-Resonant-Rods (2DRRs) Delay Lines**

*Xuanyi Zhao, Cristian Cassella Northeastern University, United States*

11:40 AM

**1637: Flexible Frequency Plan Acoustic Star-Junction Multiplexer Based on Minimum Susceptance Networks**

*Patricia Silveira, Jordi Verdú, Pedro de Paco Universitat Autònoma de Barcelona, Spain*

11:50 AM

**2162: New Approach of Interdigitated Transducers Engineering for High-Temperature SAW Sensors**

*Arthur De Sousa Lopes Moreira{1}, Lilia Arapan{1}, Ausrine Bartasyte{2} {1}FEMTO-ST Institute, France; {2}University of Bourgogne Franche-Comté / FEMTO-ST Institute, France*

12:00 PM

**1017: Phase Noise Transfer in High-Q Quartz Phononic Frequency Combs**

*Walter Wall, Randall Kubena HRL Laboratories, LLC, United States*

11:30:00 AM - 1:30:00 PM

**C5P-10: ASD: Poster PM - SAW Devices III**

**Session Chair(s):** Shogo Inoue (Qorvo) Michio Kadota (Tohoku University)

12:10 PM

**2073: Non-Polar a-plane AlScN(11 $\bar{2}$ 0) Thin Film Based SAW Resonators with Significantly Improved Electromechanical Coupling Coefficient**

*Anli Ding{1}, Niclas Feil{3}, Rachid Driad{1}, Yuan Lu{1}, Lutz Kirste{1}, Tim Christoph{1}, Maximilian Kessel{1}, Oliver Ambacher{2}, Agne Žukauskaitė{1} {1}Fraunhofer Institute Applied Solid State Physics-IAF, Germany; {2}Fraunhofer Institute Applied Solid State Physics-IAF / University of Freiburg, Germany; {3}University of Freiburg, Germany*

12:20 PM

**2260: Nonlinear Performance on Acoustic Transversal Filters**

*Rafael Perea-Robles{2}, Jordi Mateu{2}, Carlos Collado{2}, Robert Aigner{1} {1}Qorvo Inc., United States; {2}Universitat Politècnica de Catalunya, Spain*

12:30 PM

**2347: Interfacial Omnidirectional Spiral Surface Acoustic Wave Confinement for Contact-Free Particle/Cell Manipulation**

*Naiqing Zhang, Cécile Floer, James Friend University of California, San Diego, United States*

12:40 PM

**2485: Well-Free Cell Agglomeration and On-Demand Spheroid Forming Using Guided Surface Acoustic Waves Through a Couplant Layer**

*Jiyang Mei{4}, Aditya Vasan{4}, Uri Magaram{3}, Kenjiro Takemura{1}, Sreekanth Chalasani{2}, James Friend{4} {1}Keio University, Japan; {2}Salk Institute for Biological Studies, United States; {3}Salk Institute for Biological Studies / University of California San Diego, United States; {4}University of California, San Diego, United States*

12:50 PM

**1266: Towards Scalable Full-Device Simulation for Surface Acoustic Wave Devices**

*Yu-Po Wong{1}, Luyan Qiu{1}, Naoto Matsuoka{2}, Ken-Ya Hashimoto{1} {1}Chiba University, Japan; {2}Nihon Dempa Kogyo Co., Ltd., Japan*

01:00 PM

**1390: Resonance Properties of Leaky SAW Harmonics on Bonded Dissimilar-Material Structures**

*Shiori Asakawa{1}, Masashi Suzuki{1}, Shoji Kakio{1}, Ami Tezuka{2}, Jun Mizuno{2} {1}University of Yamanashi, Japan; {2}Waseda University, Japan*

01:10 PM

**1210: Peculiarities of Wireless Interrogation of SAW-Resonator Vibration Sensor by RF Pulse-Signal**

*Andrey Merkulov{1}, Alexander Shvetsov{1}, Baptiste Paulmier{2}, Sergei Zhgoon{1}, Sami Hage-Ali{2}, Omar Elmazria{2}*

*{1}National Research University MPEI, Russia; {2}Université de Lorraine / CNRS, France*

**11:30:00 AM - 1:30:00 PM**

**C5P-11: PPN: Poster PM - Phononics**

**Session Chair(s):** Vincent Laude (FEMTO-ST / CNRS)

**11:30 AM**

**1459: Valley-Locked Waveguiding of Ultrasonic Waves in Topological Square-Lattice Crystal**

*Nicolas Laforge{3}, Mehul Makwana{2}, Richard Craster{2}, Sébastien Guenneau{2}, Vincent Laude{1}, Muamer Kadic{4}*  
*{1}Centre National de la Recherche Scientifique, France; {2}Imperial College London, United Kingdom; {3}Université Bourgogne Franche-Comté, France; {4}Université de Franche-Comté, France*

**11:40 AM**

**1815: Experimental Evidence of Mass Sensitivity for Love Wave Interacting with Phononic Pillars**

*Jérémy Bonhomme{1}, Mourad Oudich{1}, Jean-François Bryche{2}, Mohammed Lamine F. Bellaredj{1}, Pedro Alberto Segura Chavez{1}, Paul G. Charrette{2}, Frédéric Sarry{1}*  
*{1}Université de Lorraine, France; {2}Université de Sherbrooke, Canada*

**11:50 AM**

**2235: An Aluminum Nitride (AlN) Based Elastic Metamaterial with Guided Negative Refraction**

*Yanbo He, Dana Weinstein*  
*Purdue University, United States*

**12:00 PM**

**2299: Mechanical Four-Wave Mixing in GHz Phononic Circuit on Thin-Film Lithium Niobate on Sapphire**

*Wentao Jiang, Felix Mayor, Christopher Sarabalis, Timothy McKenna, Jason Herrmann, Jeremy Witmer, Amir Safavi-Naeini*  
*Stanford University, United States*

**12:10 PM**

**2470: 3C-SiC Phononic Waveguide for Manipulating Mechanical Wave Propagation**

*Jaesung Lee{2}, Yanan Wang{2}, Wenshao Zhu{1}, Philip Feng{2}*  
*{1}Case Western Reserve University, United States; {2}University of Florida, United States*

**11:30:00 AM - 1:30:00 PM**

**C5P-12: NDE: Poster PM - Non-Destructive Evaluation**

**Session Chair(s):** Robert Addison (Rockwell Science Center)

**11:30 AM**

**1139: Ultrasonic Simulator for Manual Ultrasonic Testing**

*Myles Dunlap{2}, Terrill Massey{1}, Mark Dennis{1}*  
*{1}Electric Power Research Institute, United States; {2}Electric Power Research Institute, Inc., United States*

**11:40 AM**

**1816: Performance Evaluation of High Temperature Ultrasonic Communication System**

*Xin Huang{2}, Jafar Saniie{2}, Sasan Bakhtiari{1}, Alexander Heifetz{1}*

*{1}Argonne National Laboratory, United States; {2}Illinois Institute of Technology, United States*

**11:50 AM**

**2411: The Study of the Acoustic Emission from Gas Bubble Dynamics: a Signature of CO2 Leakage**

*Hung Doan, Vamshi Chillara, Cristian Pantea*  
*Los Alamos National Laboratory, United States*

**11:30:00 AM - 1:30:00 PM**

**C5P-13: NAI: Poster PM - Acoustic Imaging & Microscopy**

**Session Chair(s):** Edward Haeggstrom (University of Helsinki)

**12:00 PM**

**1976: Axisymmetric Lenses for Ultrasound Microscopy Using Model-Based Reconstruction**

*Michael Brown{3}, Pim van der Meulen{1}, Geert Leus{1}, Pieter Kruizinga{2}*  
*{1}Delft University of Technology, Netherlands; {2}Erasmus University Medical Center, Netherlands; {3}University College London, Netherlands*

**12:10 PM**

**2376: Characterization of Microbubble Localization Accuracy in the Presence of Phase Aberration and Reverberation Clutter**

*Jake McCall{1}, Thomas Kierski{2}, Paul Dayton{1}, Gianmarco Pinton{1}*  
*{1}North Carolina State University / University of North Carolina at Chapel Hill, United States; {2}University of North Carolina at Chapel Hill, United States*

**11:30:00 AM - 1:30:00 PM**

**C5P-14: NAS: Poster PM - Acoustic Sensors I**

**Session Chair(s):** Walter Arnold (Fraunhofer Institute for NDT)

**12:20 PM**

**1050: Network of SAW Sensors with Hyperbolically Frequency-Modulated Reflecting Gratings**

*Dmitrij Smirnov{1}, Victor Plessky{2}, Rimantas Miskinis{1}, Emilis Urba{1}, Soumya Yandrapalli{2}*  
*{1}Fisher-Titus Medical Center, Lithuania; {2}GVR Trade SA / Resonant Inc, Switzerland*

**12:30 PM**

**1324: Optimization of Wireless Coupling to SAW Sensors**

*David Greve{1}, Jagannath Devkota{2}, Paul Ohodnicki{3}*  
*{1}DWGreve Consulting, United States; {2}National Energy Technology Laboratory, United States; {3}University of Pittsburgh, United States*

**12:40 PM**

**1473: Wireless Interrogation of High Temperature Surface Acoustic Wave Dynamic Strain Sensor**

*David Leff{2}, Anin Maskay{1}, Mauricio Pereira Da Cunha{2}*  
*{1}Environetix Technologies Corporation, United States; {2}University of Maine, United States*

12:50 PM

**1969: Surface Acoustic Wave (SAW) Sensors for Temperature and Strain Measurements**

Yang Yan, Yudong Wang, Dorinamaria Carka, Fang Li  
New York Institute of Technology, United States

01:00 PM

**1998: Large Area Multi-Functional Ultrasound Sensor: Fingerprint, Force Touch, Stylus Tracking**

Changting Xu, Yipeng Lu, Jessica Liu Strohmann,  
Hrishikesh Panchawagh  
Qualcomm Technologies, Inc., United States

11:30:00 AM - 1:30:00 PM

**C5P-15: NMC: Poster PM - Material and Defect Characterization**

**Session Chair(s):** Walter Arnold (Fraunhofer Institute for NDT)

11:30 AM

**1775: Ultrasonic Detection of Crack Defects in Pipe Samples with a 132-Channel Test Scanner in Gas**

Petter Norli<sup>{1}</sup>, Emilie Vallée<sup>{1}</sup>, Magne Aanes<sup>{1}</sup>, Fabrice Prieur<sup>{2}</sup>, Tore Grüner Bjåstad<sup>{2}</sup>, Øyvind Standal<sup>{2}</sup>, Ole Martin Brende<sup>{2}</sup>, Martijn Frijlink<sup>{2}</sup>  
<sup>{1}</sup>Halfwave AS, Norway; <sup>{2}</sup>InPhase Solutions AS, Norway

11:40 AM

**1929: Frequency Dependent Ultrasound Absorption in Solid Disks Determined by Means of Radiation Force Based Power Measurements**

Tina Fuhrmann, Konrad Mehle, Klaus V. Jenderka  
University of Applied Sciences Merseburg, Germany

11:50 AM

**2168: A Dictionary Learning Approach for Processing Multimodal Vibrational Data in High-Frequency Aluminum Nitride (AlN) Piezoelectric Nanomembrane Resonators**

Harsha Tetali, Xuqian Zheng, Philip Feng, Joel Harley  
University of Florida, United States

11:30:00 AM - 1:30:00 PM

**C5P-16: NAS: Poster PM - Acoustic Sensors II**

**Session Chair(s):** Anthony Gachagan (University of Strathclyde, Glasgow)

12:00 PM

**1862: Acoustic Frequency Comb Generation in a Parametrically Excited Capacitive Micromachined Ultrasonic Transducer (CMUT) for Precise Distance Measurement**

Sushruta Surappa, F. Levent Degertekin  
Georgia Institute of Technology, United States

12:10 PM

**2021: Heart Rate Monitoring Using Ultrasonic Biometric Sensors**

Soon Joon Yoon<sup>{2}</sup>, Changting Xu<sup>{2}</sup>, Jessica Liu Strohmann<sup>{2}</sup>, Hrishikesh Panchawagh<sup>{2}</sup>, Kostadin Djordjev<sup>{1}</sup>  
<sup>{1}</sup>Qualcomm, United States; <sup>{2}</sup>Qualcomm Technologies, Inc., United States

12:20 PM

**2294: Optimal Cut of Quartz Crystal/FeGaB for RF MEMS Magnetic Sensors**

Xiangnan Pang, Yook-Kong Yong  
Rutgers University, United States

12:30 PM

**2295: Ultrasonic Measurements of Temperature Distribution in Extreme Environments: Results of Power Plant Testing**

Mason John, Kenneth Walton, Mikhail Skliar  
University of Utah, United States

12:40 PM

**2435: Relationship Between Lateral Field Excited AT-Cut Quartz Crystal Microbalance Operation and Acoustic Plate Modes**

Jequil Hartz, Nuri Emanetoglu, John Vetelino  
University of Maine, United States

11:30:00 AM - 1:30:00 PM

**C5P-17: NSP: Poster PM - Ultrasonic Communication**

**Session Chair(s):** Jafar Saniie (Illinois Institute of Technology)

11:30 AM

**2064: Ultrasonic Communication in Solid Channels Using Adaptive OFDM**

Boyang Wang<sup>{2}</sup>, Jafar Saniie<sup>{2}</sup>, Sasan Bakhtiari<sup>{1}</sup>, Alexander Heifetz<sup>{1}</sup>  
<sup>{1}</sup>Argonne National Laboratory, United States; <sup>{2}</sup>Illinois Institute of Technology, United States

11:30:00 AM - 1:30:00 PM

**C5P-18: NTD: Poster PM - Transducers - NDE & Industrial**

**Session Chair(s):** Jafar Saniie (Illinois Institute of Tech.)

11:40 AM

**1451: Understanding and Improving the Lift-Off Performance of Electromagnetic Acoustic Transducers**

Lunci Xiang, Claire Thring, Steve Dixon, Rachel Edwards  
University of Warwick, United Kingdom

11:50 AM

**1460: Protection Layer for Air-Coupled Waveguide Ultrasonic Phased Arrays**

Matthias Rutsch, Gianni Allevalo, Jan Hinrichs, Mario Kupnik  
Technische Universität Darmstadt, Germany

12:00 PM

**1706: Novel, High Temperature, Low Frequency, Thin Film, NDT Ultrasound Transducers**

Claire Thring, Fergus Band, Daniel Irving, Kevin McAughey, David Hughes  
Novosound, United Kingdom

11:30:00 AM - 1:30:00 PM

**C5P-19: NPA: Poster PM - Photoacoustics**

**Session Chair(s):** Nick Bottenus (University of Colorado Boulder)

12:10 PM

**1171: Functionalized Chain-Like Cluster Gold Nanoparticles for in Vivo Tracking of Transplanted Progenitor Cells Using Multimodal Photoacoustic Microscopy and Optical Coherence Tomography**  
*Xueding Wang{2}, Van Phuc Nguyen{2}, Tianye Zhu{2}, Wen Fan{2}, Wei Qian{1}, Yanxiu Li{2}, Wei Zhang{2}, Jessica Henry{2}, Bing Liu{1}, Yannis Paulus{2}*  
{1}IMRA America Inc, United States; {2}University of Michigan, United States

**12:20 PM**  
**1538: Co-Axial Three-Dimensional Photoacoustic Imaging Based on Double-Reflector and Modified Elevational Synthetic Aperture Focusing**  
*Yichuan Tang, Ryosuke Tsumura, Haichong K. Zhang*  
Worcester Polytechnic Institute, United States

**12:30 PM**  
**1769: Singular Value Decomposition in Photoacoustics: Noise Reduction and Separation of Stationary Tissue and Blood Signals**  
*Roy van Hees, Min Wu, Frans van de Vosse, Richard Lopata, Marcel Rutten*  
Eindhoven University of Technology, Netherlands

**12:40 PM**  
**2049: Optimizing Photoacoustic Assessment of Absolute Optical Absorption Coefficient Using a Genetic Algorithm**  
*João Uliana, Theo Pavan*  
University of São Paulo, Brazil

**12:50 PM**  
**2097: Volumetric Optoacoustic Imaging Using a T-Shaped Array – a Simulation Study**  
*Marc Fournelle, Wolfgang Bost*  
Fraunhofer Institute Biomedical Engineering-IBMT, Germany

**11:30:00 AM - 1:30:00 PM**  
**C5P-20: NSH: Poster PM - Structural Health Monitoring**  
Session Chair(s): Joel Harley (University of Florida)

**11:30 AM**  
**1019: Ultrasonic Investigation System for the Integrity Verification of the Threads Used to Bolt Lids on Casks for Nuclear Spent Fuel**  
*Francois Littmann{1}, Lorenzo Capineri{2}, Lorenzo Rettori{2}*  
{1}Joint Research Centre, Italy; {2}Università degli studi di Firenze, Italy

**11:40 AM**  
**1364: Dry-Coupled Airborne Ultrasonic Inspection Using Coded Excitation**  
*Dayi Zhang, Robert Watson, Jianlin Cao, Taiyi Zhao, Gordon Dobie, Charles Macleod, Gareth Pierce*  
University of Strathclyde, United Kingdom

**11:50 AM**  
**1386: Clamp-On Narrow-Band Passive Ultrasonic Isolators for Enabling Non-Invasive Detection of Obstructions Within Steel Pipeline**  
*Philip Stephanou*

*Atlas Sensors LLC, United States*

**12:00 PM**  
**1136: Ultrasonic Simulation of Cast Austenitic Stainless Steel with OnScale Computer-Aided Engineering Tools**  
*Myles Dunlap{1}, Jeff Dobson{2}, George Connolly{1}*  
{1}Electric Power Research Institute, Inc., United States; {2}OnScale Inc., United States

**11:30:00 AM - 1:30:00 PM**  
**C5P-21: NWP: Poster PM - Wave Propagation**  
Session Chair(s): James Blackshire (Air Force Research Laboratory)

**12:10 PM**  
**1140: Ultrasound Beam Characterization Through Real Time Visualization with Schlieren Imaging**  
*Myles Dunlap{2}, Jacob Beach{1}, Terrill Massey{1}*  
{1}Electric Power Research Institute, United States; {2}Electric Power Research Institute, Inc., United States

**12:20 PM**  
**1648: Contactless Acoustic Power Transmission Through Air/Skin Interface: a Feasibility Study**  
*Yosra Dammak{2}, Dominique Certon{1}, Francois Vander Meulen{1}, Thien Hoang{2}, Guillaume Ferin{2}, Bogdan Rosinski{2}, Samuel Callé{1}*  
{1}Université de Tours / GREMAN UMR 7347, France; {2}Vermon SA, France

**11:30:00 AM - 1:30:00 PM**  
**C5P-22: NAF: Poster PM - Acoustic Microfluidics**  
Session Chair(s): James Friend (University of California, San Diego)

**12:30 PM**  
**1936: Two-Stage Ultrasonic Atomization of Liquid Using a New Sprinkle Approach**  
*Balasubramanian Nallannan{1}, Henri Siljanen{2}, Heikki Nieminen{1}*  
{1}Aalto University, Finland; {2}University of Eastern Finland, Finland

**12:40 PM**  
**2301: Enabling Fast Charging Lithium Ion Batteries with Surface Acoustic Wave Devices**  
*An Huang, Haodong Liu, Amihai Horesh, Ping Liu, James Friend*  
University of California, San Diego, United States

**12:50 PM**  
**2375: Controllable Fluid Manipulation via MHz-Order Surface Acoustic Waves at the Nanoscale**  
*Naiqing Zhang{2}, Amihai Horesh{2}, Ofer Manor{1}, James Friend{2}*  
{1}Technion - Israel Institute of Technology, Israel; {2}University of California, San Diego, United States

Thursday, September 10

11:30:00 AM - 1:30:00 PM

**C5P-23: NPC: Poster PM - Industrial Ultrasound**

**Session Chair(s):** Erdal Oruklu, Illinois Institute of Technology

01:00 PM

**2220: 3D-Printing Piezoelectric Ultrasonic Device for Energy Harvesting**

*Yushun Zeng, Laiming Jiang, Yizhe Sun, Runze Li, Yong Chen, Qifa Zhou*

*University of Southern California, United States*

## Friday, September 11

**4:15:00 AM - 6:15:00 AM**

**D1P-06: ABD: Poster AM - BAW Devices II**

**Session Chair(s):** Robert Aigner (Qorvo)  
Masanori Ueda (TAIYO YUDEN)

**04:15 AM**

**2493: Zig-Zag ScAlN Multilayer SMR for High Power BAW Filter Application Such as RF Base Station**

Yusuke Sato<sup>{1}</sup>, Takahiko Yanagitani<sup>{2}</sup>  
<sup>{1}</sup>Waseda University, Japan; <sup>{2}</sup>Waseda University / ZAIKEN / JST-PRESTO, Japan

**04:25 AM**

**1380: Dual-Mode Ultra-Compact FBAR-Multiferroic Antennas**

Yi Yuan<sup>{1}</sup>, Wenjie Chen<sup>{2}</sup>, Chongling Sun<sup>{1}</sup>, Yungui Ma<sup>{2}</sup>, Wei Pang<sup>{1}</sup>, Qingrui Yang<sup>{1}</sup>  
<sup>{1}</sup>Tianjin University, China; <sup>{2}</sup>Zhejiang University, China

**04:35 AM**

**2019: Self-Standing FBAR Transformer Based on Shear Mode Zig-Zag ScAlN Multilayer for Rectenna Application**

Sarina Kinoshita<sup>{1}</sup>, Takahiko Yanagitani<sup>{2}</sup>  
<sup>{1}</sup>Waseda University, Japan; <sup>{2}</sup>Waseda University / ZAIKEN / JST-PRESTO, Japan

**04:45 AM**

**1636: Potentialities of LiTaO<sub>3</sub> for Bulk Acoustic Wave Filters**

Marie Bousquet, Pierre Perreau, Gael Castellan, Michael Bertucchi, Catherine Maeder-Pachurka, Fanny Delaguillaumie, Alice Joulie, Gregory Enyedi, Bastien Sailler, Denis Mariolle, Patrice Gergaud, Anne-Marie Papon, François-Xavier Darras, Frederic Mazen, P Grenoble Alpes Université, CEA-Leti, France

**4:15:00 AM - 6:15:00 AM**

**D1P-07: AME: Poster AM- Materials & Evaluation**

**Session Chair(s):** Mauricio Pereira da Cunha (University of Maine)  
Ken-ya Hashimoto (Chiba University)

**04:55 AM**

**1553: Effects of Post-Annealing on Texture Evolution of Sputtered ScAlN Films**

Minghua Li, Bangtao Chen, Jielin Xie, Yao Zhu  
Agency for Science, Technology and Research, Singapore

**05:05 AM**

**1759: Acoustic Attenuation in CTGS Single Crystals Up to Microwave Frequencies**

Andrei Sotnikov<sup>{3}</sup>, Boris Sorokin<sup>{4}</sup>, Manfred Weihnacht<sup>{2}</sup>, Yuriy Suhak<sup>{1}</sup>, Holger Fritze<sup>{1}</sup>, Hagen Schmidt<sup>{3}</sup>  
<sup>{1}</sup>Clausthal University of Technology, Germany; <sup>{2}</sup>innoXacs, Germany; <sup>{3}</sup>Leibniz IFW Dresden, Germany; <sup>{4}</sup>Technological Institute for Superhard and Novel Carbon Materials, Russia

**05:15 AM**

**2047: Extraction of  $kt^2$  of Piezoelectric Film/Substrate Structure by Conversion Loss Derived by Electromagnetic Signal Including No Acoustic Losses**  
Ryota Tatsumi<sup>{1}</sup>, Takahiko Yanagitani<sup>{2}</sup>

<sup>{1}</sup>Waseda University, Japan; <sup>{2}</sup>Waseda University / ZAIKEN / JST-PRESTO, Japan

**05:25 AM**

**2214: Investigation on the Impact of Scandium-Doping on the  $kt^2$  of ScxAl<sub>1-x</sub>N Cross-Sectional Lamé Mode Resonators**

Gabriel Giribaldi, Luca Colombo, Fabio Bersano, Cristian Cassella, Matteo Rinaldi  
Northeastern University, United States

**05:35 AM**

**2270: Equivalent Circuit Modeling of Beta Gallium Oxide ( $\beta$ -Ga<sub>2</sub>O<sub>3</sub>) Vibrating Channel Transistors**

Xu-Qian Zheng, Philip Feng  
University of Florida, United States

**05:45 AM**

**1845: Determining Elastic Constants of AlScN Films on Silicon Substrates by Laser Ultrasonics**

Olga Rogall<sup>{4}</sup>, Niclas Feil<sup>{7}</sup>, Anli Ding<sup>{1}</sup>, Elena Mayer<sup>{4}</sup>, Pavel Pupyrev<sup>{5}</sup>, Alexey Lomonosov<sup>{6}</sup>, Agnė Žukauskaitė<sup>{1}</sup>, Oliver Ambacher<sup>{2}</sup>, Andreas Mayer<sup>{3}</sup>  
<sup>{1}</sup>Fraunhofer Institute Applied Solid State Physics-IAF, Germany; <sup>{2}</sup>Fraunhofer Institute Applied Solid State Physics-IAF / University of Freiburg, Germany; <sup>{3}</sup>Hs Offenburg - University Of Applied Sciences, Germany; <sup>{4}</sup>Offenburg University of Applied Sciences, Germany; <sup>{5}</sup>Prokhorov General Physics Institute, Russia; <sup>{6}</sup>Prokhorov General Physics Institute, Moscow, Russia; <sup>{7}</sup>University of Freiburg, Germany

**4:15:00 AM - 6:15:00 AM**

**D1P-08: AMR: Poster AM - MEMS Resonators II**

**Session Chair(s):** Jan Kuypers (Blickfeld)  
Matteo Rinaldi (Northeastern University)

**04:15 AM**

**1064: Simulation of Nonlinear Mechanical Effects in kHz and MHz Range Resonators with Finite Element Method and Harmonic Balance**

Ville Kaajakari<sup>{1}</sup>, Wakana Hirota<sup>{2}</sup>, Keiichi Umeda<sup>{2}</sup>  
<sup>{1}</sup>Murata Electronics Oy, Finland; <sup>{2}</sup>Murata Manufacturing Co., Ltd., Japan

**04:25 AM**

**1731: Evaluation of the Impact of Abnormal Grains on the Performances of ScAlN-Based Laterally Coupled Alternating Thickness (LCAT) Mode Resonators and Lamb Wave Resonators**

Chen Liu, Bangtao Chen, Nan Wang, Yao Zhu  
Agency for Science, Technology and Research, Singapore

**04:35 AM**

**2018: Investigation of Damping and Ladder Filter Synthesis for 3 GHz 20% Scandium-Doped Aluminum Nitride Cross-Sectional Lamé Mode Resonators**

Zachary Schaffer, Gianluca Piazza  
Carnegie Mellon University, United States

**04:45 AM**

**2342: Capacitive MEMS Microphone with Low-Stress Ultra-Thin Vibrating Membrane**

Lixiang Wu<sup>{2}</sup>, Quansheng Sun<sup>{1}</sup>, Junli Wang<sup>{3}</sup>, Gaofeng Wang<sup>{1}</sup>

## Friday, September 11

{1}Hangzhou Dianzi University, China; {2}Silicon Austria Labs, Austria; {3}Wuhan University, China

**04:55 AM**

**1227: AlN/6H-SiC Hybrid-Coupled Resonators**

Kangfu Liu, Junrui Liang, Tao Wu  
ShanghaiTech University, China

**05:05 AM**

**1622: Effect of Thickness Ratio of Double Layered Thickness-Shear Resonator on Temperature Characteristics of Resonance Frequency**

Yusuke Owada, Yuji Ohashi, Masaya Omote, Yuui Yokota, Shunsuke Kurosawa, Kei Kamada, Hiroki Sato, Satoshi Toyoda, Masao Yoshino, Akihiro Yamaji, Akira Yoshikawa  
Tohoku University, Japan

**4:15:00 AM - 6:15:00 AM**

**D1P-10: ASA: Poster AM - Sensors & New Applications I**

**Session Chair(s):** Tao Han (Shanghai Jiao Tong University)  
Omar Elmazria (Université de Lorraine)

**05:15 AM**

**1508: A Piezo-Capacitive High-Frequency Resonant Accelerometer**

Hakhamanesh Mansoorzare, Ankesh Todi, Sina Moradian, Reza Abdolvand  
University of Central Florida, United States

**05:25 AM**

**1949: Inductor-Less Compensation of the Antiresonance in Piezoelectric Resonator**

Michele Pirro, Luca Colombo, Giuseppe Michetti, Yao Yu, Cristian Cassella, Matteo Rinaldi  
Northeastern University, United States

**05:35 AM**

**2234: A High-Performance Antenna-Plexer for Mobile Devices**

Adrián Contreras-Lizárraga, Wei Ouyang, Weikang Zhang, Jason McGann, Fumiya Matsukura, Tabito Tanaka, Mingdong Li, Jun Tsutsumi, Alberto Canabal Qorvo Inc., United States

**05:45 AM**

**2418: Planar Lens for GHz Fourier Ultrasonics**

Juneho Hwang, Benyamin Davaji, Justin Kuo, Amit Lal  
Cornell University, United States

**05:55 AM**

**1253: Integrated Chip Combined Ultrasound Stimulation with MEA for Investigating the Neural Circuit**

Wei Zhou, Zhengrong Lin, Wenbin Li, Lili Niu, Long Meng, Hairong Zheng  
Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

**4:15:00 AM - 6:15:00 AM**

**D1P-11: ASD: Poster AM - SAW Devices II**

**Session Chair(s):** Ryo Nakagawa (Murata Manufacturing)  
Hiroyuki Nakamura (Skyworks Solutions)

**04:15 AM**

**1291: Multifunctional Sensor (Magnetic Field and Temperature) Based on Microstructured and Multi-Layered SAW Device**

Harshad Mishra{2}, Michel Hehn{2}, Sami Hage-Ali{2}, Sébastien Petit-Watlot{2}, Prince W. Mengue{2}, Sergei Zghoon{1}, Hamid M'Jahed{2}, Daniel Lacour{2}, Omar Elmazria{2}

{1}National Research University MPEI, Russia;  
{2}Université de Lorraine / CNRS, France

**04:25 AM**

**1352: Leaky Surface Acoustic Wave with Velocity 10 km/s and Suppressed Leakage in LiNbO3 Plate Bonded to Sapphire**

Natalya Naumenko  
National University of Science and Technology MISiS, Russia

**04:35 AM**

**1665: Doped Silicon Temperature Compensation of Surface Acoustic Wave Devices**

Yiming Ma{3}, Xianhao Le{4}, Srinivas Merugu{1}, Jaibir Sharma{1}, Nan Wang{1}, Amit Lal{2}, Chengkuo Lee{4}, Eldwin Jiaqiang Ng{1}

{1}Agency for Science, Technology and Research, Singapore; {2}Agency for Science, Technology and Research / Cornell University, Singapore; {3}Agency for Science, Technology and Research / National University of Singapore, Singapore; {4}National University of Singapore, Singapore

**04:45 AM**

**1884: Towards a 915MHz High-Temperature Reflective Delay Line SAW Sensor**

Cecile Floer{4}, Jordan Maufay{3}, Sami Hage-Ali{4}, Pascal Nicolay{1}, Thierry Aubert{3}, Sergei Zghoon{2}, Omar Elmazria{4}

{1}Carinthia University of Applied Sciences / CiSMAT, Austria; {2}National Research University MPEI, Russia; {3}Université de Lorraine / CentraleSupélec, France; {4}Université de Lorraine / CNRS, France

**04:55 AM**

**1313: Implementation of Absolute Amplitude Measurement Function to High-Speed and Phase-Sensitive Laser Probe for RF SAW/BAW Devices**

Hikaru Takahashi, Naohiro Ono, Tatsuya Omori, Ken-Ya Hashimoto  
Chiba University, Japan

**4:15:00 AM - 6:15:00 AM**

**D1P-12: ASD: Poster AM - SAW Devices IV**

**Session Chair(s):** Ben Abbott (Skyworks Solutions)  
Marc Solal (Qorvo)

**05:05 AM**

**1072: Analysis of Leaky Surface Acoustic Wave Propagation Characteristics on Piezoelectric ScAlN Layer / Quartz Substrate**

Masashi Suzuki, Shoji Kakio  
University of Yamanashi, Japan

## Friday, September 11

05:15 AM

**1378: Leaky SAW Propagation Properties on LiNbO<sub>3</sub> Thin Plate Bonded to Similar-Material Substrate**

Takumi Fujimaki, Masashi Suzuki, Shoji Kakio  
University of Yamanashi, Japan

05:25 AM

**1796: Higher-Order Surface Acoustic Wave Modes of a Finite Elastic Solid**

Jinghui Wu<sup>{2}</sup>, Ken-Ya Hashimoto<sup>{1}</sup>, Zengwen Wu<sup>{2}</sup>, Bin Huang<sup>{2}</sup>, Ji Wang<sup>{2}</sup>  
<sup>{1}</sup>Chiba University, Japan; <sup>{2}</sup>Ningbo University, China

05:35 AM

**2279: Suppression of Spurious Modes on LGS with Euler Angle of (0°, 22°, 30°)**

Qingchuan Shan<sup>{2}</sup>, Han Ke<sup>{2}</sup>, Yirou Shi<sup>{2}</sup>, Wenchang Hao<sup>{1}</sup>, Wei Luo<sup>{1}</sup>, Tao Han<sup>{2}</sup>  
<sup>{1}</sup>Beijing Research Institute of Telemetry, China; <sup>{2}</sup>Shanghai Jiaotong University, China

05:45 AM

**1265: Analysis of SAW Slowness Shape on I.H.P. SAW Structures**

Yu-Po Wong<sup>{1}</sup>, Naoto Matsuoka<sup>{2}</sup>, Luyan Qiu<sup>{1}</sup>, Ken-Ya Hashimoto<sup>{1}</sup>  
<sup>{1}</sup>Chiba University, Japan; <sup>{2}</sup>Nihon Dempa Kogyo Co., Ltd., Japan

4:15:00 AM - 6:15:00 AM

**D1P-13: POA: Poster AM - Opto-Acoustics II**

Session Chair(s): Charles Courtney (University of Bath)

04:15 AM

**1235: Effects of Substrate Materials on Ultrasound Detection by SPR Sensors**

Shoya Ueno, Hayato Ichihashi, Keita Yano, Mami Matsukawa, Yoshiaki Watanabe  
Doshisha University, Japan

04:25 AM

**1562: Pulse Duration Influence on the Photoacoustic Temporal Waveform of the Liquid-Filled Thin Glass Capillary Embedded in a Soft Object**

Shili Qu, Yosuke Mizuno, Kentaro Nakamura  
Tokyo Institute of Technology, Japan

04:35 AM

**1836: Non-Intrusive Mapping of HIFU-Affected Region in Water Using Rainbow Schlieren Deflectometry (RSD)**

Pragya Gupta<sup>{1}</sup>, Atul Srivastava<sup>{2}</sup>  
<sup>{1}</sup>IITB-Monash Research Academy / Indian Institute of Technology Bombay, India; <sup>{2}</sup>Indian Institute of Technology Bombay, India

04:45 AM

**2006: Photoacoustic Imaging for Detecting Inflammation Resulting from Cancer Immunotherapy**

Janggun Jo, Girish Gandikota, Elena Schiopu, Nada Abdulaziz, Leslie Fecher, Christopher Lao, Xueding Wang  
University of Michigan, United States

04:55 AM

**2305: Robustness Enhancements of Time-of-Flight Measurements in a CDMA Ultrasonic Channel of an Opto-Acoustic Indoor Positioning System Using MEMS Microphones**

Martin Oberdorfer<sup>{2}</sup>, Dominik Esslinger<sup>{2}</sup>, Gregor Benz<sup>{1}</sup>, Oliver Sawodny<sup>{2}</sup>, Cristina Tarin<sup>{2}</sup>  
<sup>{1}</sup>Sarissa GmbH, Germany; <sup>{2}</sup>University of Stuttgart, Germany

4:15:00 AM - 6:15:00 AM

**D1P-15: PMI: Poster AM - Modelling & Inversion**

Session Chair(s): István A. Veres (Qorvo Inc.)

05:05 AM

**1442: Rapid Acoustic Holograms Enabled by Deep Learning**

Qin Lin<sup>{2}</sup>, Feiyan Cai<sup>{3}</sup>, Jiaqian Wang<sup>{2}</sup>, Rujun Zhang<sup>{1}</sup>, Fei Li<sup>{3}</sup>, Xiangxiang Xia<sup>{2}</sup>, Jinping Wang<sup>{2}</sup>, Zhiqiang Zhang<sup>{2}</sup>, Weibao Qiu<sup>{3}</sup>, Hairong Zheng<sup>{2}</sup>  
<sup>{1}</sup>Guangdong Medical University, China; <sup>{2}</sup>Paul C. Lauterbur Research Center for Biomedical Imaging, Shenzhen Institutes of Advanced Technology, China; <sup>{3}</sup>Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

05:15 AM

**1638: Ultrasound Imaging of the Brain Using Full Waveform Inversion**

Ulas Taskin<sup>{1}</sup>, Kjersti Eikrem<sup>{2}</sup>, Geir Nævdal<sup>{3}</sup>, Morten Jakobsen<sup>{4}</sup>, Dirk Verschuur<sup>{1}</sup>, Koen van Dongen<sup>{1}</sup>  
<sup>{1}</sup>Delft University of Technology, Netherlands; <sup>{2}</sup>NORCE, Norway; <sup>{3}</sup>Norwegian Research Centre, Norway; <sup>{4}</sup>University of Bergen, Norway

05:25 AM

**2151: Application of the Superposition Method with k-Wave Pseudo-Spectral Modelling**

Andrew Drainville<sup>{1}</sup>, Samuel Pichardo<sup>{2}</sup>  
<sup>{1}</sup>INSERM U1032 / LabTAU, France; <sup>{2}</sup>University of Calgary, Canada

05:35 AM

**2254: Efficient Simulation Algorithm Using Dynamic Mesh Segmentation for Pulsed Nonlinear Acoustic Propagation of Laser-Generated Focused Ultrasound**

Min Gyu Joo, Pilgyu Sang, Kyu-Kwan Park, Hyoung Won Baac  
Sungkyunkwan University, Korea

05:45 AM

**2334: Simulation Study of kHz Wave Modes Generated by a Wedge Embedded in Tissue**

Saif Bunni, Heikki Nieminen  
Aalto University, Finland

4:15:00 AM - 6:15:00 AM

**D1P-14: PGP: Poster AM - General Physical Acoustics II**

Session Chair(s): Andreas Mayer (HS Offenburg - Univ. of Applied Sciences, Gengenbach)

04:15 AM

**1121: A Simple Numerical Tool for the Evaluation of Acoustic Radiation Force on Helices**

Hakan Caldag, Serhat Yesilyurt

## Friday, September 11

Sabancı University, Turkey

**04:25 AM**

**1222: Analysis of Vibrations of Circular Quartz Crystal Resonators for Sensor Applications**

Qi Huang<sup>{2}</sup>, Bernd Neubig<sup>{1}</sup>, Zengwen Wu<sup>{2}</sup>, Longtao Xie<sup>{2}</sup>, Tingfeng Ma<sup>{2}</sup>, Ji Wang<sup>{2}</sup>  
<sup>{1}</sup>GmbH & Co. KG, Germany; <sup>{2}</sup>Ningbo University, China

**04:35 AM**

**2026: Engineering the Quasi-Rayleigh-Wave Beat Length for Embedded Information Storage Methodology**

Christopher Hakoda, Cristian Pantea, Vamshi Chillara  
Los Alamos National Laboratory, United States

**04:45 AM**

**2144: Investigation of the Limit Operating Temperature of LiNbO<sub>3</sub> as Substrate for SAW Devices**

Jordan Maufay<sup>{1}</sup>, Thierry Aubert<sup>{1}</sup>, Ninel Kokanyan<sup>{1}</sup>, Cecile Floer<sup>{2}</sup>, Sami Hage-Ali<sup>{2}</sup>, Omar Elmazria<sup>{2}</sup>  
<sup>{1}</sup>Université de Lorraine / CentraleSupélec, France; <sup>{2}</sup>Université de Lorraine / CNRS, France

**04:55 AM**

**AM**

**2150: Visualization of Acoustic Wave Phenomena by Numerical Simulation for Educational Purposes**

Yu-Po Wong<sup>{1}</sup>, Naoto Matsuoka<sup>{2}</sup>, Luyan Qiu<sup>{1}</sup>, Ken-Ya Hashimoto<sup>{1}</sup>  
<sup>{1}</sup>Chiba University, Japan; <sup>{2}</sup>Nihon Dempa Kogyo Co., Ltd., Japan

**05:05 AM**

**2501: Anomalous Behavior of Ultrasonic Love Waves Propagating in Two-Layer Waveguides Loaded with a Newtonian Liquid**

Piotr Kieczyński, Marek Szalewski, Andrzej Balcerzak, Krzysztof Wieja  
Institute of Fundamental Technological Research, Polish Academy of Sciences, Poland

**05:15 AM**

**1395: Rotation and Position Control of a Cubic Object Using Airborne Ultrasound**

Takumi Kasai, Takuro Furumoto, Hiroyuki Shinoda  
University of Tokyo, Japan

**05:25 AM**

**2429: The Pressure Threshold of the 1/2 Order Subharmonic Emissions in the Oscillations of Ultrasonically Excited Uncoated Air Bubbles Is Not at Twice the Resonance Nor It Is at the Resonance Frequency**

Amin Jafari Sojahrood, Hossein Haghi, Niloufar Rostami Shirazi, Raffi Karshafian, Michael C. Kolios  
Ryerson University, Canada

**05:35 AM**

**1663: Nonlinear Properties of Guided Acoustic Waves in a Soft Layer Between Stiff Quarter-Spaces**

Pavel Pupyrev<sup>{4}</sup>, Ilya Nedospasov<sup>{3}</sup>, Marek Rjfelka<sup>{1}</sup>, Andreas Mayer<sup>{2}</sup>  
<sup>{1}</sup>Fraunhofer Ceramic Technologies and Systems-IKTS, Germany; <sup>{2}</sup>Hs Offenburg - University Of Applied

Sciences, Germany; <sup>{3}</sup>Kotelnikov Institute of Radio Engineering and Electronics, Moscow, Russia; <sup>{4}</sup>Prokhorov General Physics Institute, Russia

**4:15:00 AM - 6:15:00 AM**

**D1P-16: PAT: Poster AM - Acoustic Tweezers & Particle Manipulation II**

**Session Chair(s):** Minoru Kurosawa (Tokyo Institute of Technology)

**04:15 AM**

**1024: Ultrahigh Frequency Surface Acoustic Waves Actuated Digital Micro-Centrifugal Chip for Rapid Separation of Sub-Micron Bioparticles**

Shuchang Liu, Weiwei Cui, Xuexin Duan, Wei Pang  
Tianjin University, China

**04:25 AM**

**1353: Dexterous and Precise Adjustment of the Focal Region Location in Acoustic Vortices**

Shifang Guo, Zhen Ya, Xuyan Guo, Pengying Wu, Mingxi Wan  
Xi'an Jiaotong University, China

**04:35 AM**

**1362: Reducing Spiraling in Transducer Array Based Acoustic Levitation**

Carl Andersson, Jens Ahrens  
Chalmers University of Technology, Sweden

**04:45 AM**

**1385: Particle Manipulation by a Novel Lamb Wave Resonator Array with Grating Reflectors**

Zhaoxun Wang, Suge Wang, Yuan Ning, Xuejiao Chen, Xuexin Duan, Wei Pang, Qingrui Yang  
Tianjin University, China

**04:55 AM**

**2458: Deep Learning-Based Intelligent Acoustic Trapping System for Determination of Invasion Potentials of Suspended Cancer Cells in an Acoustic Trap**

Sangyeon Youn, Kyungsu Lee, Jeehoon Son, Jae Youn Hwang  
Daegu Gyeongbuk Institute of Science and Technology, Korea

**4:15:00 AM - 6:15:00 AM**

**D1P-18: PUM: Poster AM - Ultrasonic Motors & Actuators**

**Session Chair(s):** Takahiko Yanagitani (Waseda University)

**05:05 AM**

**1069: Variable-Focus in Radial Direction in Liquid Crystal Lens Using Ultrasound Vibration**

Jessica Onaka, Takahiro Iwase, Daisuke Koyama  
Doshisha University, Japan

**05:15 AM**

**1230: Concave Liquid Crystal Lens with a Large Aperture Using Ultrasound Traveling Wave**

Takahiro Iwase<sup>{1}</sup>, Jessica Onaka<sup>{1}</sup>, Daisuke Koyama<sup>{1}</sup>, Akira Emoto<sup>{2}</sup>, Kentaro Nakamura<sup>{3}</sup>, Mami Matsukawa<sup>{1}</sup>

## Friday, September 11

{1}Doshisha University, Japan; {2}Tokushima University, Japan; {3}Tokyo Institute of Technology, Japan

**05:25 AM**

**1804: Propulsion and Speed Measurement of High Frequency Underwater SAW Actuators**

Sho Kajii, Deqing Kong, Kazuki Nishio, Minoru Kuribayashi Kurosawa  
Tokyo Institute of Technology, Japan

**05:35 AM**

**2413: Particle Excitation by Using a Piezoelectric Vibrator for a Hydraulic Valve**

Takefumi Kanda{1}, Kou Hashimoto{1}, Hikaru Yamamoto{1}, Shuichi Wakimoto{1}, Koichi Suzumori{2}, Takahiro Ukida{2}, Hiroyuki Nabaie{2}  
{1}Okayama University, Japan; {2}Tokyo Institute of Technology, Japan

**4:15:00 AM - 6:15:00 AM**

**D1P-17: PTF: Poster AM - Thin Films**

**Session Chair(s):** Ji Wang (Ningbo University)

**04:15 AM**

**1368: Deterioration in the Piezoelectric Property of ScAlN Thin Films by Negative Ion Bombardment Increased in Low-Pressure Sputtering Deposition**

Takumi Tominaga{1}, Shinji Takayanagi{1}, Takahiko Yanagitani{2}  
{1}Doshisha University, Japan; {2}Waseda University / ZAIKEN / JST-PRESTO, Japan

**04:25 AM**

**1966: Novel Method for Extracting Material Constants of Epitaxial Wurtzite AlScN Films on Sapphire Using Higher Order Surface Acoustic Wave Modes**

Niclas Manuel Feil{4}, Elena Mayer{3}, Bjoern Christian{4}, Anli Ding{1}, Agn e Zukauskait e{1}, Oliver Ambacher{2}  
{1}Fraunhofer Institute Applied Solid State Physics-IAF, Germany; {2}Fraunhofer Institute Applied Solid State Physics-IAF / University of Freiburg, Germany; {3}Offenburg University of Applied Sciences, Germany; {4}University of Freiburg, Germany

**04:35 AM**

**2058: Accurate Extraction of  $kt^2$  of Piezoelectric Film/Substrate Structure by Conversion Loss Method Subtracting Experimental Acoustic Losses in the Substrate**

Ryota Tatsumi{1}, Takahiko Yanagitani{2}  
{1}Waseda University, Japan; {2}Waseda University / ZAIKEN / JST-PRESTO, Japan

**04:45 AM**

**2187: Comb Transducer for Generation of SH0 Mode in Crystalline Piezoelectric Membrane**

Victor Plessky{2}, Julius Koskela{1}, Soumya Yandrapalli{1}  
{1}GVR Trade SA, Switzerland; {2}GVR Trade SA / Resonant Inc, Switzerland

**04:55 AM**

**2256: c-Axis Oriented ScAlN/ SiO2 Multilayer BAW Transformer for Rectifying Antenna Applications**

Kota Izumi{1}, Takahiko Yanagitani{2}

{1}Waseda University, Japan; {2}Waseda University / ZAIKEN / JST-PRESTO, Japan

**05:05 AM**

**2310: Measurement of Time Response of Electrical Properties in Thickness Shear Mode Resonator with Liquid Loadings**

Mao Watabe{1}, Shinji Takayanagi{1}, Takahiko Yanagitani{2}  
{1}Doshisha University, Japan; {2}Waseda University / ZAIKEN / JST-PRESTO, Japan

**05:15 AM**

**2476: Improvement of Crystallization and Shear-Mode Electromechanical Coupling of c-Axis-Parallel-Oriented ZnO Film by Annealing Treatment**

Shinji Takayanagi{1}, Kanae Kimoto{1}, Takahiko Yanagitani{2}  
{1}Doshisha University, Japan; {2}Waseda University / ZAIKEN / JST-PRESTO, Japan

**05:25 AM**

**2477: ScAlN Nano-Rods Structure Thin Film Grown by a Self-Shadowing Oblique Sputtering for High Electromechanical Coupling Transducer Applications**

Takumi Soutome{1}, Takahiko Yanagitani{2}  
{1}Waseda University / ZAIKEN, Japan; {2}Waseda University / ZAIKEN / JST-PRESTO, Japan

**05:35 AM**

**2481: Measurement of Antiresonant Frequency During DC Bias Voltage Application for Analysis of Second Harmonic Response of ScAlN on SMR**

Takumi Soutome{1}, Takahiko Yanagitani{2}  
{1}Waseda University / ZAIKEN, Japan; {2}Waseda University / ZAIKEN / JST-PRESTO, Japan

**05:45 AM**

**2488: Extracting Mechanical Q Factor of the Pure AlN, ZnO, and ScAlN Film Without Etching Substrate**

Naoya Iwata{2}, Sarina Kinoshita{1}, Takahiko Yanagitani{3}  
{1}Waseda University, Japan; {2}Waseda University / ZAIKEN, Japan; {3}Waseda University / ZAIKEN / JST-PRESTO, Japan

**05:55 AM**

**2489: Effect of Negative-Ion-Bombardment Suppression by Applying Voltage to Grids Set Between Substrate and Sputtering Target During Sputtering Deposition on Crystalline Orientation of ZnO Film**

Kohei Tominaga{1}, Shinji Takayanagi{1}, Takahiko Yanagitani{2}  
{1}Doshisha University, Japan; {2}Waseda University / ZAIKEN / JST-PRESTO, Japan

4:15:00 AM - 6:15:00 AM

D1P-19: NAS: Poster AM - Acoustic Sensors I

Session Chair(s): Kentaro Nakamura (Tokyo Institute of Technology)

04:15 AM

1040: A Wireless and Passive Temperature-Compensated SAW Strain Sensor

Wen Wang, Shuyao Fan, Xueling Li, Xufeng Xue  
Institute of Acoustics, Chinese Academy of Sciences, China

04:25 AM

1196: Large Piezoelectric Strain with Superior Thermal Stability of Lead-Free Potassium Sodium Niobate-Based Grain Orientation-Controlled Ceramics for High Frequency Ultrasonic Transducer Application

Yi Quan{3}, Wei Ren{3}, Chunlong Fei{4}, Lingyan Wang{3}, Gang Niu{3}, Jinyan Zhao{3}, Jian Zhuang{3}, Junshan Zhang{3}, Zuo-Guang Ye{1}, Tomoaki Karaki{2}  
{1}Simon Fraser University, Canada; {2}Toyama Prefectural University, Japan; {3}Xi'an Jiaotong University, China; {4}Xidian University, China

04:35 AM

1566: A Piezoelectric Toluene Sensor Based on Titanium Dioxide Nanostructured Composite Sensing Film

Yung-Yu Chen, Wei-Han Hsia  
Tatung University, Taiwan

04:45 AM

1968: Suitability of AFM Cantilevers As Wideband Acoustic Point Receivers for the Characterization of Acoustic Sources

Benoit Quesson, Paul van Neer, Maarten van Es, Daniele Piras, Kodai Hatakeyama, Abbas Mohtashami, Marco van der Lans  
Netherlands Organisation for Applied Scientific Research, Netherlands

04:55 AM

1982: Effect of Hydrophone Tip Shape on Acoustic Field and Acoustic Cavitation Behavior

Nagaya Okada{1}, Michihisa Shiiba{2}, Fujimaru Kaise{3}, Shinobu Yamauchi{3}, Toshio Sato{3}, Shinichi Takeuchi{3}  
{1}Honda Electronics Co., Ltd., Japan; {2}Nihon Institute of Medical Science, Japan; {3}Toin University of Yokohama, Japan

4:15:00 AM - 6:15:00 AM

D1P-20: NAS: Poster AM - Acoustic Sensors II

Session Chair(s): Kentaro Nakamura (Tokyo Institute of Technology)

05:05 AM

2240: Fiber-Optic Ultrasound Sensor with Low Reverberating Noises

Xiangdong Ma, Yiqi Cai, Lijun Xu, Jianguo Ma  
Beihang University, China

05:15 AM

1512: Acousto-Optic Modulator Based Electric Field Sensor

Yusuf Samet Yaras, F. Levent Degertekin  
Georgia Institute of Technology, United States

4:15:00 AM - 6:15:00 AM

D1P-21: NFM: Poster AM - Flow Measurement

Session Chair(s): Nishal Ramadas (Elster Instromet)

04:15 AM

1715: Experimental Characterization of a Linear Transducer Array Prototype for Ultrasonic Clamp-on Flow Metering

Jack Massaad{1}, Douwe van Willigen{1}, Paul van Neer{2}, Nico de Jong{3}, Michiel Pertijs{1}, Martin Verweij{1}  
{1}Delft University of Technology, Netherlands; {2}Delft University of Technology / Netherlands Organisation for Applied Scientific Research, Netherlands; {3}Erasmus University Medical Center / Delft University of Technology, Netherlands

04:25 AM

1963: An Algorithm to Reduce the Offset Error in Transit-Time Ultrasonic Flow Measurement

Douwe van Willigen{1}, Paul van Neer{2}, Jack Massaad{1}, Nico de Jong{3}, Martin Verweij{3}, Michiel Pertijs{1}  
{1}Delft University of Technology, Netherlands; {2}Delft University of Technology / Netherlands Organisation for Applied Scientific Research, Netherlands; {3}Erasmus University Medical Center / Delft University of Technology, Netherlands

4:15:00 AM - 6:15:00 AM

D1P-22: NSP: Poster AM - Deep Learning

Session Chair(s): Erdal Oruklu (Illinois Institute of Technology)

04:35 AM

1183: Automatic Feature Extraction Based on Meta Learning for Ultrasonic Flaw Classification

Kushal Virupakshappa, Erdal Oruklu  
Illinois Institute of Technology, United Kingdom; Illinois Institute of Technology, United States

04:45 AM

1576: Deep Convolutional Neural Networks Applied to Ultrasonic Images for Material Texture Recognition

Xin Zhang, Boyang Wang, Jafar Saniie  
Illinois Institute of Technology, United States

04:55 AM

2014: Deep Data Compression for Approximate Ultrasonic Image Formation

Georgios Piliikos{2}, Lars Horchens{1}, Kees Joost Batenburg{3}, Tristan van Leeuwen{5}, Felix Lucka{4}  
{1}Applus E&I Technology Centre, Netherlands; {2}Centrum Wiskunde & Informatica, Netherlands; {3}Centrum Wiskunde & Informatica / Leiden University, Netherlands; {4}Centrum Wiskunde & Informatica / University College London, Netherlands; {5}Utrecht University, Netherlands

## Friday, September 11

**05:05 AM**

**1893: Ultrasound Flaw Detection of Medium-Density Polyethylene Fused Joints Using Chord Transducers and Implementation of Artificial Intelligence**

Maryam Shafiei Alavijeh, Ryan Scott, Fedar Seviaryn, Roman Maev

University of Windsor, Canada

**4:15:00 AM - 6:15:00 AM**

**D1P-23: NDE: Poster AM - Non-Destructive Evaluation**

**Session Chair(s):** Robert Addison (Rockwell Science Center)

**04:15 AM**

**1013: Evaluation of Ultrasonic Target Detection by Alternate Transmission of Different Codes in M-Sequence Pulse Compression**

Khanistha Leetang, Shinnosuke Hirata, Hiroyuki Hachiya  
Tokyo Institute of Technology, Japan

**04:25 AM**

**1242: Fundamental Research on Shallow Underground Exploration Technology by Acoustic Irradiation Induced Vibration from UAV**

Tsuneyoshi Sugimoto<sup>{2}</sup>, Kazuko Sugimoto<sup>{2}</sup>, Itsuki Uechi<sup>{2}</sup>, Noriyuki Utagawa<sup>{1}</sup>, Chitose Kuroda<sup>{1}</sup>  
<sup>{1}</sup>SatoKogyo Co., Ltd., Japan; <sup>{2}</sup>Toin University of Yokohama, Japan

**04:35 AM**

**1402: Localization of Plastic Zone Around the Crack Tip Using Non-Collinear Ultrasonic Wave Mixing**

Xin Yin<sup>{2}</sup>, Wujun Zhu<sup>{2}</sup>, Yanxun Xiang<sup>{2}</sup>, Mingxi Deng<sup>{1}</sup>, Fuzhen Xuan<sup>{2}</sup>  
<sup>{1}</sup>Chongqing University, China; <sup>{2}</sup>East China University of Science and Technology, China

**04:45 AM**

**1584: Evaluation of the Localized Plasticity Using the Mixing of Counter-Propagating Lamb Waves**

Bin Lou<sup>{2}</sup>, Maoxun Sun<sup>{2}</sup>, Yanxun Xiang<sup>{2}</sup>, Mingxi Deng<sup>{1}</sup>  
<sup>{1}</sup>Chongqing University, China; <sup>{2}</sup>East China University of Science and Technology, China

**4:15:00 AM - 6:15:00 AM**

**D1P-24: NAI: Poster AM - Acoustic Imaging & Microscopy**

**Session Chair(s):** Edward Haeggstrom (University of Helsinki)

**04:55 AM**

**1077: Ultrasound Focused Beyond the Diffraction Limit with a Torus-Shaped Resin Lens**

Xiangxiang Xia, Feiyan Cai, Hui Zhou, Qin Lin, Jinping Wang, Hairong Zheng  
Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China

**05:05 AM**

**1565: Fast Scanning Method for Measuring Material Homogeneity Using the Line-Focus-Beam Ultrasonic-Material-Characterization System**

Yuji Ohashi, Yuui Yokota, Akihiro Yamaji, Masao Yoshino, Shunsuke Kurosawa, Kei Kamada, Hiroki Sato, Satoshi Toyoda, Akira Yoshikawa  
Tohoku University, Japan

**05:15 AM**

**2192: Optimization and Evaluation of a Biometric Recognition Technique Based on 3D Ultrasound Palm Vein**

Antonio Iula  
University of Basilicata, Italy

**4:15:00 AM - 6:15:00 AM**

**D1P-25: NTD: Poster AM - Transducers - NDE & Industrial**

**Session Chair(s):** Kui Yao (A STAR, Singapore)

**05:25 AM**

**1080: Detection of Micro-Scaled Flaws in the Steel Sheet Using 30 MHz Line-Focused Single-Element Ultrasound Transducer**

Yeongeun Kim<sup>{1}</sup>, Jongbeom Kim<sup>{1}</sup>, Joongho Ahn<sup>{1}</sup>, Hae Gyun Lim<sup>{1}</sup>, Ki Jong Lee<sup>{1}</sup>, Juseung Lee<sup>{2}</sup>, Chulhong Kim<sup>{1}</sup>, Hyung Ham Kim<sup>{1}</sup>  
<sup>{1}</sup>Pohang University of Science and Technology, United States; <sup>{1}</sup>Pohang University of Science and Technology, Korea; <sup>{2}</sup>POSCO, Korea

**05:35 AM**

**1802: Removal of Droplet on Glass Plate by Exciting Low Frequency Viscoelastic Vibration Through Gated High Intensity Surface Acoustic Waves**

Kentaro Nakamura, Soraki Fuchiwaki  
Tokyo Institute of Technology, Japan

**05:45 AM**

**1824: Schlieren Photography of 40-Khz Leaky Lamb Waves in Air**

Jan Hinrichs, Yannick Bendel, Matthias Rutsch, Gianni Allevato, Matthias Sachsenweger, Axel Jäger, Mario Kupnik  
Technische Universität Darmstadt, Germany

**4:15:00 AM - 6:15:00 AM**

**D1P-26: NWP: Poster AM - Wave Propagation**

**Session Chair(s):** James Blackshire (Air Force Research Laboratory)

**04:15 AM**

**1708: 19 kHz Large Capacity Ultrasonic Complex Vibration Welding System for Power Devices and Larger Specimens**

Jiromaru Tsujino  
Kanagawa University / LINK-US Co., Ltd, Japan

**04:25 AM**

**1921: Acoustic Spoof Surface Wave Propagating Along a Double Side Periodically Corrugated Coaxial Waveguide**

Norbert Cselyuszka, Vladimir Pashchenko, Nikolai Andrianov, Sarah Risquez, Mohssen Moridi  
Silicon Austria Labs, Austria

## Friday, September 11

**04:35 AM**

**2065: Development of Fine Dust Measurement Method Through Ultrasonic Multiple Scattering Numerical Analysis**

*Ukyong Woo, Jinyoung Hong, Ryulri Kim, Hajin Choi  
Soongsil University, Korea*

**04:45 AM**

**2158: Investigation of Transcranial Focused Ultrasound Attenuation with Multilayer Head Model**

*Xizi Song, Yufeng Ke, Jiande Guo, Dong Ming, Xinrui Chen  
Tianjin University, China*

**4:15:00 AM - 6:15:00 AM**

**D1P-27: NSH: Poster AM - Structural Health Monitoring**

**Session Chair(s):** Mario Kupnik (Technische Universität Darmstadt)

**04:55 AM**

**1027: Inspection of Subsurface Defects in CFRP-Plate with Using Point-Source Constrained Partial Differential Equation**

*Kenbu Teramoto, Haruka Ishibashi, Taku Mihara  
Saga University, Japan*

**05:05 AM**

**2474: Evaluation of Subsurface Defects Using Line-Laser Generated Rayleigh Wave and Machine Learning Method**

*Shifeng Guo, Dan Chen, Yehai Li, Xinyu Wu, Wei Feng  
Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China*

**05:15 AM**

**1705: A Contact-Less Method for Monitoring the Detachments in the Architectural Coverings of Ancient Structures by Using "ULTRAINO"**

*Giosuè Caliano  
University Roma Tre, Italy*

**4:15:00 AM - 6:15:00 AM**

**D1P-28: NAF: Poster AM - Acoustic Microfluidics**

**Session Chair(s):** James Friend (University of California, San Diego)

**05:25 AM**

**1321: Ultrafast Open Channel SAW Based Active Micromixer for Microfluidics**

*Umar Farooq, Xiufang Liu, Wei Zhou, Long Meng, Hairong Zheng  
Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China*

**05:35 AM**

**1383: Programmable Liquid Handling by a Multi-Resonant Transducer Array with Frequency Division Multiplexing**

*Yuan Ning, Menglun Zhang, Xuexin Duan, Wei Pang  
Tianjin University, China*

**4:15:00 AM - 6:15:00 AM**

**D1P-29: NSP: Poster AM - Signal Processing**

**Session Chair(s):** Joel Harley (University of Florida)

**04:15 AM**

**1240: Blind Vision for Real-Time Inspection of Spot Welds**

*Aryaz Baradarani<sup>{2}</sup>, Andriy Chertov<sup>{1}</sup>, Roman Gr. Maev<sup>{1}</sup>  
<sup>{1}</sup>University of Windsor / Tessonics Inc, Canada;  
<sup>{2}</sup>University of Windsor / University of Tabriz, Canada*

**04:25 AM**

**1534: Using Generative Adversarial Networks to Generate Ultrasonic Signals**

*Kushal Virupakshappa, Erdal Oruklu  
Illinois Institute of Technology, United States*

**04:35 AM**

**1897: Dictionary-Based Learning for 3D-Imaging with Air-Coupled Ultrasonic Phased Arrays**

*Raphael Müller, David Schenck, Gianni Allevato, Matthias Rutsch, Jan Hinrichs, Mario Kupnik, Marius Pesavento  
Technische Universität Darmstadt, Germany*

**04:45 AM**

**2261: Separation of Interfering Signals in an Ultrasonic Flow Measurement System by Using Variable Time-Delay Properties**

*Matthias Bächle, Fernando Puente León  
Karlsruhe Institute of Technology, Germany*

**04:55 AM**

**1860: Full Matrix Capture Data Modelling and Inversion Accounting for Wave Attenuation and Dispersion**

*Nans Laroche<sup>{4}</sup>, Ewen Carcreff<sup>{3}</sup>, Sébastien Bourguignon<sup>{1}</sup>, Jérôme Idier<sup>{1}</sup>, Aroune Duclos<sup>{2}</sup>  
<sup>{1}</sup>École Centrale de Nantes, France; <sup>{2}</sup>Le Mans Université / Laboratoire d'acoustique de l'université du Maine, France; <sup>{3}</sup>Phased Array Company, France; <sup>{4}</sup>Phased Array Company / École Centrale de Nantes, France*

**4:15:00 AM - 6:15:00 AM**

**D1P-30: NMC: Poster AM - Material and Defect Characterization**

**Session Chair(s):** Walter Arnold (Fraunhofer Institute for NDT)

**05:05 AM**

**1258: Dispersion of IDT-Induced High-Frequency Surface Acoustic Waves (SAW) - Application to the Mechanical and Dimensional Characterization of Mesoporous Silicon (MPS)**

*Tahar Kadi<sup>{1}</sup>, Marc Duquennoy<sup>{1}</sup>, Katir Ziouche<sup>{2}</sup>, Mohammadi Ouaftouh<sup>{1}</sup>, Nikolay Smagin<sup>{1}</sup>  
<sup>{1}</sup>IEMN-DOAE / Université Polytechnique Hauts-de-France, France; <sup>{2}</sup>Université de Lille, France*

**05:15 AM**

**1606: Non-Contact Air-Coupled Nondestructive System for Thin Laminated Film Defects Using Pulse Compression and Focused Slanted Transmission**

*Eunwoo Kil, Ilseob Song, Yangmoo Yoo  
Sogang University, Korea*

## Friday, September 11

**05:25 AM**

**1700: Anisotropy of Ultrasonically Induced Electric Potentials in Bone**

*Tsukasa Nakamura, Mineaki Takata, Tomoya Oda, Shinji Takayanagi, Mami Matsukawa  
Doshisha University, Japan*

**4:15:00 AM - 6:15:00 AM**

**D1P-31: NSP: Poster AM - Ultrasonic Communication**

**Session Chair(s):** Jafar Saniie (Illinois Institute of Technology)

**05:35 AM**

**1827: Low Depth Time Reversal Modulation Technique for Ultrasonic Guided Waves-Based Communications**

*Federica Zonzini, Nicola Testoni, Alessandro Marzani, Luca De Marchi  
University of Bologna, Italy*

**05:45 AM**

**1170: Video Streaming Using Ultrasound as a Communication Channel: Towards a Standalone Device**

*Zhengchang Kou, Michael Oelze  
University of Illinois at Urbana-Champaign, United States*

**4:15:00 AM - 6:15:00 AM**

**D1P-32: Memorial Session for Robert K. Thalhammer**

**Session Chair(s):** Koen W.A. Van Dongen (TU Delft)  
Dave Feld

**04:15 AM**

**2506: In Memoriam Robert K. Thalhammer**

*III Kimmo Kokkonen, Dave Feld  
Germany*

**4:15:00 AM - 6:15:00 AM**

**D1P-33: TIS: Poster AM - Electronics & Systems**

**Session Chair(s):** Jeremy Brown (Dalhousie University)

**04:15 AM**

**1257: A FPGA Based Front-End Circuit for Air-Coupled CMUT Arrays: Preliminary Design**

*Lei Ye{2}, Jian Li{2}, Dongmei Liang{1}, Hui Zhang{2}, Lu Yu{2}, Zhuochen Wang{2}  
{1}state key laboratory of precision measurement technology and instrument, tianjin university, China;  
{2}Tianjin University, China*

**04:25 AM**

**1629: A 12×80 Element Ultrasound Transceiver ASIC with Enhanced Charge Injection Performance for 3-D Carotid Artery Imaging**

*Taehoon Kim{1}, Fabian Fool{4}, Eunchul Kang{1}, Zu-Yao Chang{1}, Emile Noothout{1}, Johan G. Bosch{2}, Martin D. Verweij{1}, Nico de Jong{3}, Michiel Pertijs{1}  
{1}Delft University of Technology, Netherlands;  
{2}Erasmus University Medical Center, Netherlands;  
{3}Erasmus University Medical Center / Delft University of Technology, Netherlands;  
{4}Medical Imaging, ImPhys, Applied Sciences / Delft University of Technology, Netherlands*

**04:35 AM**

**1918: Energy Consumption Model for Front-End Electronics of Battery-Powered Ultrasound Devices**

*Mingliang Tan, Michiel Pertijs  
Delft University of Technology, Netherlands*

**4:15:00 AM - 6:15:00 AM**

**D1P-34: TPF: Poster AM - Applications of Piezoelectrics**

**Session Chair(s):** Xiaoning Jiang (NC State University)

**04:45 AM**

**1202: High-Frequency Wide-Bandwidth Ultrasonic Transducer for Precise and Flexible Liquid Transfer**

*Suzi Liang, Zhiqiang Zhang, Hairong Zheng, Weibao Qiu  
Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China*

**04:55 AM**

**1491: Increased Usable Frequency Band for Underwater Transducers with Single Crystal**

*Ellen Sagaas Roed{2}, Kenneth Kirkeng Andersen{3}, Martin Bring{1}, Frank Tichy{1}, Else-Marie Aasjord{1}, Lars Hoff{3}  
{1}Kongsberg Maritime, Norway; {2}Kongsberg Maritime / University of South-Eastern Norway, Norway; {3}University of South-Eastern Norway, Norway*

**05:05 AM**

**1579: Higher Frequency Plate Ultrasonic Transducer for Tactile Sensation Reproduction**

*Masaya Takasaki, Hiroshi Kimura, Daisuke Yamaguchi, Yuji Ishino, Takeshi Mizuno  
Saitama University, Japan*

**05:15 AM**

**2329: Multilayer Piezoelectric ScAlN Film Transducers for Ultrasonic Microscopy in the VHF Range**

*Yusuke Korai{1}, Masashi Suzuki{2}, Takahiko Yanagitani{3}  
{1}Hitachi Ltd. / Waseda University, Japan; {2}University of Yamanashi, Japan; {3}Waseda University / ZAIKEN / JST-PRESTO, Japan*

**05:25 AM**

**2491: Giga-Hertz Piezoelectric Epitaxial PZT/La-SrTiO<sub>3</sub> Transducer for the Application of Fingerprint Imaging**

*Yusuke Sato{1}, Takahiko Yanagitani{2}  
{1}Waseda University, Japan; {2}Waseda University / ZAIKEN / JST-PRESTO, Japan*

**6:30:00 AM - 8:00:00 AM**

**D2L-01: MPA: Novel Approaches in Photoacoustics**

**Session Chair(s):** Geoffrey Luke (Dartmouth College)

**06:30 AM**

**1197: Photoacoustic Imaging of Organ Fibrosis**

*Eno Hysi{1}, Xiaolin He{2}, Tianzhou Zhang{2}, Muhannad Fadhel{1}, Darren Yuen{2}, Michael C. Kolios{1}  
{1}Ryerson University, Canada; {2}St. Michael's Hospital, Canada*

**06:45 AM**

**1290: In Vivo US/PA Image-Guided Magnetic Delivery of Stem Cells Labeled with Cytocompatible Photomagnetic Nanoparticles**

## Friday, September 11

Kelsey Kubelick, C. Ross Ethier, Stanislav Emelianov  
Georgia Institute of Technology, United States

**07:00 AM**

**2229: Multispectral Photoacoustic Imaging of Aggressive Prostate Cancer in Vivo Using PAMAM Dendrimer Conjugated Agent**

Yixuan Wu<sup>{2}</sup>, Jeeun Kang<sup>{1}</sup>, Wojciech Lesniak<sup>{1}</sup>, Srikanth Boinapally<sup>{1}</sup>, Sangeeta Ray Banerjee<sup>{1}</sup>, Ala Lisok<sup>{1}</sup>, Anna Jablonska<sup>{2}</sup>, Martin Pomper<sup>{1}</sup>, Emad Boctor<sup>{1}</sup>  
<sup>{1}</sup>Johns Hopkins Medical Institute, United States;  
<sup>{2}</sup>Johns Hopkins University, United States

**07:15 AM**

**1387: Lipid Spectral Histology**

Sophine Iskander-Rizk, Mirjam Visscher, Astrid Moerman, Antonius van der Steen, Gijs van Soest  
Erasmus University Medical Center, Netherlands

**07:30 AM**

**2444: F-Mode Ultraviolet Photoacoustic Remote Sensing for Label-Free Virtual H&E Histopathology**

Pradyumna Kedariseti, Nathaniel Haven, Brendon Restall, Matthew Martell, Roger Zemp  
University of Alberta, Canada

**07:45 AM**

**1168: Integrated Simultaneous Photoacoustic Microscopy, Optical Coherence Tomography, and Fluorescence Microscopy for Rabbit Ocular Imaging in Vivo**

Wei Zhang, Phuc Nguyen, Yanxiu Li, Yannis Paulus, Xueding Wang  
University of Michigan, United States

**6:30:00 AM - 8:00:00 AM**

**D2L-02: MIM: Functional & Multimodal Imaging**

**Session Chair(s):** Kang Kim (University of Pittsburgh)  
Jan D'hooge (Catholic University of Leuven)

**06:30 AM**

**2455: Non-Invasive Optogenetic Activation with Functional Ultrasound**

Christian Aurup, Antonios Poulipoulos, Stephen Lee, Elisa Konofagou  
Columbia University, United States

**06:45 AM**

**1940: Investigating Simultaneous Neurovascular and Mechanical Coupling in the Rodent Brain with Ultrafast Imaging**

Florian Laszlo<sup>{1}</sup>, Claire Rabut<sup>{1}</sup>, Sophie Pezet<sup>{4}</sup>, Thomas Defieux<sup>{3}</sup>, Mickaël Tanter<sup>{2}</sup>  
<sup>{1}</sup>Physics for Medicine Paris, France; <sup>{2}</sup>Physics for Medicine Paris, INSERM U1273, ESPCI Paris, PSL University, CNRS FRE 2031, France; <sup>{3}</sup>Physics for Medicine Paris, Inserm, ESPCI Paris, CNRS, PSL University, France; <sup>{4}</sup>Physics for Medicine, INSERM U1273, ESPCI Paris, CNRS, PSL Research University, France

**7:00 AM**

**1756: Automatic High Frame Rate Spectral Doppler Envelope Detection Algorithm to Calculate Resistivity Index Images of Neonatal Brain**

Jorinde Kortenbout<sup>{3}</sup>, Sophie Costerus<sup>{3}</sup>, Jurgen de Graaff<sup>{3}</sup>, Glen McLaughlin<sup>{4}</sup>, Nico de Jong<sup>{2}</sup>, Jeroen Dudink<sup>{5}</sup>, Johan G. Bosch<sup>{1}</sup>, Hendrik Vos<sup>{3}</sup>  
<sup>{1}</sup>Erasmus University Medical Center, Netherlands;  
<sup>{2}</sup>Erasmus University Medical Center / Delft University of Technology, Netherlands; <sup>{3}</sup>Erasmus University Medical Center / University Medical Center Rotterdam, Netherlands; <sup>{4}</sup>Mindray Innovation Center, Netherlands; <sup>{5}</sup>Wilhelmina Children's Hospital / University Medical Center Utrecht, Netherlands

**07:15 AM**

**2374: Acoustoelectric Imaging for Beat-to-Beat Cardiac Activation Wave Mapping in an in Vivo Swine Model**

Alexander Alvarez<sup>{2}</sup>, Chet Preston<sup>{2}</sup>, Teodoro Trujillo<sup>{2}</sup>, Sonia Vohnout<sup>{1}</sup>, Russell Witte<sup>{2}</sup>  
<sup>{1}</sup>ElectroSonix, LLC, United States; <sup>{2}</sup>University of Arizona, United States

**07:30 AM**

**1167: Ionizing Radiation Acoustic Imaging (iRAI) for Real-Time Monitoring of External Beam Radiotherapy**

Wei Zhang, Ibrahim Oraiqat, Issam El Naqa, Xueding Wang  
University of Michigan, United States

**07:45 AM**

**1033: Real-Time and Freehand Multimodal Imaging: Combining White Light Endoscopy with All-Optical Ultrasound**

Erwin Jozef Alles, George Dwyer, Richard James Colchester, Efthymios Maneas, Danail Stoyanov, Adrien Emmanuel Desjardins  
University College London, United Kingdom

**6:30:00 AM - 8:00:00 AM**

**D2L-03: MEL: Advancing Elastographic Tissue Characterization**

**Session Chair(s):** Matthew Urban (Mayo Clinic)

**06:30 AM**

**1090: Viscoelastic Response (ViSR) Ultrasound: Methods, Validation, and in Vivo Clinical Applications of a New Approach to Viscoelastic Property Assessment**

Caterina M. Gallippi  
North Carolina State University / University of North Carolina at Chapel Hill, United States

**07:00 AM**

**2439: Differentiating Malignant from Benign Breast Masses in Women, in Vivo, Using VisR-Assessed Mechanical Anisotropy**

Gabriela Torres<sup>{1}</sup>, Christopher Moore<sup>{1}</sup>, Doreen Steed<sup>{2}</sup>, Melissa Caughey<sup>{2}</sup>, Jasmin Merhout<sup>{2}</sup>, Shanah Kirk<sup>{2}</sup>, Terry Hartman<sup>{2}</sup>, Cherie Kuzmiak<sup>{2}</sup>, Emily Ray<sup>{2}</sup>, Caterina Gallippi<sup>{1}</sup>  
<sup>{1}</sup>North Carolina State University / University of North Carolina at Chapel Hill, United States; <sup>{2}</sup>University of North Carolina at Chapel Hill, United States

## Friday, September 11

07:15 AM

**1283: Evaluating Kidney Biopsy Prediction Using Shear Wave Elastography and Machine Learning Techniques and Shapley Explanation Techniques**

Luiz Vasconcelos<sup>{3}</sup>, Carolina Amador<sup>{2}</sup>, Sara Aristizabal<sup>{4}</sup>, Ivan Nenadic<sup>{1}</sup>, Matthew Urban<sup>{1}</sup>  
<sup>{1}</sup>Mayo Clinic, United States; <sup>{2}</sup>Philips Research North America, United States; <sup>{3}</sup>University of Minnesota - Rochester, United States; <sup>{4}</sup>Well Living Lab, Inc., United States

07:30 AM

**1725: In Vivo Semi-3D Functional Ultrasound Imaging of Healthy and Aneurysmal Abdominal Aortas**

Larissa Jansen<sup>{2}</sup>, Joerik de Ruijter<sup>{2}</sup>, Hans-Martin Schwab<sup>{2}</sup>, Marc van Sambeek<sup>{1}</sup>, Frans van de Vosse<sup>{2}</sup>, Richard Lopata<sup>{2}</sup>  
<sup>{1}</sup>Catharina Hospital, Netherlands; <sup>{2}</sup>Eindhoven University of Technology, Netherlands

07:45 AM

**1916: A New Elastographic Technique Using Acoustic Vortices**

Noé Jiménez, José María Benlloch, Francisco Camarena  
Universitat Politècnica de València, Spain

6:30:00 AM - 8:00:00 AM

**D2L-04: NWP: Wave Propagation & NMC Material & Defect Characterization**

Session Chair(s): Paul Wilcox (University of Bristol)  
Joel Harley (University of Florida)

06:30 AM

**2093: Ultrasonic Guided Wave Imaging of Plates Containing Defects and Inclusions**

Annamaria Pau  
Sapienza University of Rome, Italy

07:00 AM

**2148: Experimental Investigation of Low Frequency Vibration in Synthetic Tibial Cortical Bone**

Anurup Guha<sup>{2}</sup>, Michael Aynardi<sup>{1}</sup>, Parisa Shokouhi<sup>{2}</sup>, Cliff Lissenden<sup>{2}</sup>  
<sup>{1}</sup>Penn State Health Milton S. Hershey Medical Center, United States; <sup>{2}</sup>Pennsylvania State University, United States

07:15 AM

**2438: Characterization of Piezoelectric AlScN on CMOS HBAR Systems**

Yutong Liu<sup>{2}</sup>, Justin Kuo<sup>{2}</sup>, Amit Lal<sup>{2}</sup>, Jaibir Sharma<sup>{1}</sup>, Navab Singh<sup>{1}</sup>  
<sup>{1}</sup>Agency for Science, Technology and Research, Singapore; <sup>{2}</sup>Cornell University, United States

07:30 AM

**2471: Combining Texture Analysis with Quantitative Ultrasound Parameters and Statistical Imaging for the Assessment of Additive Manufacturing Components**

Chun-Hui Lin, Huang-Chen Lin, Shyh-Hau Wang  
National Cheng Kung University, Taiwan

07:45 AM

**1539: In-situ Ultrasonic Monitoring for Adhesive-Bonded Structure by Utilizing Piezoelectricity of the Adhesive**

Kui Yao, Zheng Zheng Wong, Shuting Chen, Suo Hon Lim, Menglong Liu, Fangsen Cui  
Agency for Science, Technology and Research, Singapore

6:30:00 AM - 8:00:00 AM

**D2L-05: SPS: Special Session on Ultrasound and Electronics**

Session Chair(s): David Cowell (University of Leeds)  
Omer Oralkan (NC State University)

06:30 AM

**1809: Forward-Viewing, Robotically-Steerable Guidewire System for Peripheral Chronic Total Occlusions: Transducer and Imaging System Development**

Graham Collins<sup>{3}</sup>, Achraj Sarma<sup>{2}</sup>, Zachary Bercu<sup>{1}</sup>, Jaydev Desai<sup>{3}</sup>, Brooks Lindsey<sup>{2}</sup>  
<sup>{1}</sup>Emory University, United States; <sup>{2}</sup>Georgia Institute of Technology, United States; <sup>{3}</sup>Georgia Institute of Technology / Emory University, United States

06:45 AM

**1164: A 1-D CMUT Transducer with Front-End ASIC in a 9 French Catheter for Intracardiac**

**Echocardiography: Acoustic and Imaging Evaluation**  
Tony Matéo<sup>{2}</sup>, Philippe Vince<sup>{2}</sup>, Nicolas Sénégon<sup>{2}</sup>, Mingliang Tan<sup>{1}</sup>, Eunchul Kang<sup>{1}</sup>, Michiel Pertijs<sup>{1}</sup>  
<sup>{1}</sup>Delft University of Technology, Netherlands; <sup>{2}</sup>Vermon SA, France

07:00 AM

**1452: Phased Electromagnetic Acoustic Transducer (EMAT) Array for Rayleigh Wave Surface Defect Detection**

Lunci Xiang, David Greenshields, Steve Dixon, Rachel Edwards  
University of Warwick, United Kingdom

07:15 AM

**1020: 5 GHz A1 Mode Lateral Overtone Bulk Acoustic Resonators in Thin-Film Lithium Niobate**

Ruo Chen Lu, Yansong Yang, Songbin Gong  
University of Illinois at Urbana-Champaign, United States

07:30 AM

**Panel**

David Cowell, University of Leeds  
Brooks Lindsey, Georgia Institute of Technology  
Xiaochen Xu, Texas Instruments  
Giulio Ricotti, ST Microelectronics

8:30:00 AM - 9:30:00 AM

**D3L-01: MIS: Cardiac Imaging**

Session Chair(s): Mickael Tanter (INSERM)

08:30 AM

**1405: Aortic Strain Imaging Using Bistatic Coherent Dual-Transducer Ultrasound**

Vera van Hal<sup>{2}</sup>, Hein de Hoop<sup>{2}</sup>, Marc van Sambeek<sup>{1}</sup>, Hans-Martin Schwab<sup>{2}</sup>, Richard Lopata<sup>{2}</sup>  
<sup>{1}</sup>Catharina Hospital, Netherlands; <sup>{2}</sup>Eindhoven University of Technology, Netherlands

## Friday, September 11

08:45 AM

### 1728: Quality Control of Echocardiographic Images Using Deep Learning

Mahdi Tabassian<sup>{2}</sup>, Lamia Al Saikhan<sup>{3}</sup>, Paulo Tostes<sup>{2}</sup>, Chloe Park<sup>{3}</sup>, Guy Lloyd<sup>{1}</sup>, Alun Hughes<sup>{3}</sup>, Jan D'Hooge<sup>{2}</sup>

<sup>{1}</sup>Barts Heart Centre, United Kingdom; <sup>{2}</sup>Katholieke Universiteit Leuven, Belgium; <sup>{3}</sup>University College London, United Kingdom

09:00 AM

### 1730: A Fully Automatic Segmentation Method to Assess the Geometry of the Intraluminal Thrombus and Arterial Wall of Abdominal Aortic Aneurysms in 3-D+t US Images

Arjet Nievergeld<sup>{2}</sup>, Esther Maas<sup>{2}</sup>, Joerik de Ruijter<sup>{2}</sup>, Frans van de Vosse<sup>{2}</sup>, Marc van Sambeek<sup>{1}</sup>, Richard Lopata<sup>{2}</sup>

<sup>{1}</sup>Catharina Hospital, Netherlands; <sup>{2}</sup>Eindhoven University of Technology, Netherlands

09:15 AM

### 1956: 3D Principal Strain Analysis for Cardiac Infarct Zone Identification

Jonathan Langdon<sup>{2}</sup>, Zhao Liu<sup>{2}</sup>, Geng-Shi Jeng<sup>{1}</sup>, John Stendahl<sup>{2}</sup>, Albert Sinusas<sup>{2}</sup>, Matthew O'Donnell<sup>{1}</sup>, James Duncan<sup>{2}</sup>

<sup>{1}</sup>University of Washington, United States; <sup>{2}</sup>Yale School of Medicine, United States

8:30:00 AM - 9:30:00 AM

### D3L-02: MTN: Theranostics & Image Guidance

Session Chair(s): Mark Borden (University of Colorado Boulder)

Ralf Seip (SonaCare Medical, LLC)

08:30 AM

### 1641: Acoustically Detonated Biomolecules for Targeted and Genetically Encoded Cavitation

Avinoam Bar-Zion, Atousa Nourmahnad, Marjorie Buss, Robert C. Hurt, Shirin Shivaie, Ojas Pradhan, Margaret B. Swift, David R. Mittelstein, Dina Malounda, Mohamad Abedi, Mikhail G. Shapiro

California Institute of Technology, United States

08:45 AM

### 1165: Real-Time Visualization of a Focused Ultrasound Beam Using Ultrasonic Backscatter for Monitoring of Mechanical-Based Therapies

Miles Thies, Michael Oelze

University of Illinois at Urbana-Champaign, United States

09:00 AM

### 1487: Characterize Brain Tumor Genetic Signatures with Focused Ultrasound-Enabled Liquid Biopsy (FUS-LBx)

Christopher Pacia, Lifei Zhu, Jinyun Yuan, Yimei Yue, Hong Chen

Washington University in St. Louis, United States

09:15 AM

### 2265: Cavitation Dose Mapping for Prediction of Localized Drug Concentration in Brain Drug Delivery Using Focused Ultrasound

Sua Bae, Pilsu Kim, Sara Lee, Tai-Kyong Song  
Sogang University, Korea

8:30:00 AM - 9:30:00 AM

### D3L-03: MEL: Muscle Elastography

Session Chair(s): Caterina Gallippi (University of North Carolina)

08:30 AM

### 1458: Pleural Strain Measurements During Mechanical Ventilation Using Ultrasound Elastography: a Proof of Concept Study

Martin Girard<sup>{3}</sup>, Marie-Hélène Roy Cardinal<sup>{3}</sup>, Sébastien Garneau<sup>{3}</sup>, Alexandros Cavayas<sup>{1}</sup>, André Denault<sup>{2}</sup>, Guy Cloutier<sup>{3}</sup>

<sup>{1}</sup>Sacré-Coeur Hospital of Montreal, Canada; <sup>{2}</sup>University of Montreal Hospital, Canada; <sup>{3}</sup>University of Montreal Hospital Research Center, Canada

08:45 AM

### 2249: Diagnosis of Obstructive Sleep Apnea Using Dynamic Strain Measurements of Tongue Muscle

Shih-Jou Chung, Yu-Wen Huang, Pei-Lin Lee, Pai-Chi Li  
National Taiwan University, Taiwan

09:00 AM

### 1869: Ultra-Fast Ultrasound Strain Imaging for Quantifying Fatigue Effect of the Human Quadriceps Muscle Due to Neuromuscular Electrical Stimulation

Zhiyu Sheng<sup>{2}</sup>, Nitin Sharma<sup>{1}</sup>, Kang Kim<sup>{3}</sup>

<sup>{1}</sup>North Carolina State University / University of North Carolina at Chapel Hill, United States; <sup>{2}</sup>University of Pittsburgh, United States; <sup>{3}</sup>University of Pittsburgh / University of Pittsburgh Medical Center, United States

09:15 AM

### 1825: Demonstration of Complex Shear Wave Patterns in Skeletal Muscle in Vivo Using 3D SWE

Anna Knight<sup>{1}</sup>, Courtney Trutna<sup>{1}</sup>, Ned Rouze<sup>{1}</sup>, Lisa Hobson-Webb<sup>{1}</sup>, Mark Palmeri<sup>{1}</sup>, Annette Caenen<sup>{2}</sup>, Kathryn Nightingale<sup>{1}</sup>

<sup>{1}</sup>Duke University, United States; <sup>{2}</sup>Ghent University / IBiTech-bioMMeda, Belgium

8:30:00 AM - 9:30:00 AM

### D3L-04: NAI: Acoustic Imaging & Microscopy & NPA Photoacoustics - in Memoriam Calvin Quate

Session Chair(s): Walter Arnold (Fraunhofer Institute for NDT)

Mario Kupnik (Technische Universität Darmstadt)

08:30 AM

### 1492: Tracking Performance in Ultrasound Super-Resolution Imaging

Iman Taghavi<sup>{2}</sup>, Sofie Bech Andersen<sup>{3}</sup>, Carlos Villagomez Hoyos<sup>{1}</sup>, Mikkel Schou<sup>{2}</sup>, Sigrid Husebø Øygard<sup>{2}</sup>, Fredrik Gran<sup>{1}</sup>, Kristoffer Lindskov Hansen<sup>{3}</sup>, Charlotte Mehlin Sørensen<sup>{3}</sup>, Michael Bachmann Nielsen<sup>{3}</sup>, Matthias Bo Stuart<sup>{2}</sup>, Jørgen Arendt

<sup>{1}</sup>BK Medical, Denmark; <sup>{2}</sup>Technical University of Denmark, Denmark; <sup>{3}</sup>University of Copenhagen, Denmark

**Friday, September 11**

**08:45 AM**

**Depth-Seeing with an Ultrasonic Force Microscope**

*Walter Arnold (in place of withdrawn paper)*

**09:00 AM**

**2212: Dual-Modal B-Mode Ultrasound and Photoacoustic Imaging in a Tomographic Configuration**

*Xiran Cai{2}, Josquin Foiret{2}, Jeesu Kim{1}, Chulhong Kim{1}, Katherine W. Ferrara{2}*

*{1}Pohang University of Science and Technology, Korea; {2}Stanford University, United States*

**09:15 AM**

**1957: Resolution Enhanced Non-Contact Thermoacoustic Imaging Using Coded Pulse Excitation**

*Ajay Singhvi, Aidan Fitzpatrick, Amin Arbabian  
Stanford University, United States*