

# ISTU 2021

20<sup>th</sup> Annual International Symposium  
for Therapeutic Ultrasound

**JUNE 6 (Sun) ~ 9 (Wed), 2021**

**HICO, Gyeongju, Korea**



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**7<sup>th</sup> Annual Meeting and  
General Assembly  
of Korean Society  
for Therapeutic Ultrasound**





# INTERNATIONAL SOCIETY FOR THERAPEUTIC ULTRASOUND

***Thank you for attending our 20th Annual International Symposium!***

The International Society for Therapeutic Ultrasound (ISTU) is a non-profit organization founded in 2001 to increase and diffuse knowledge of therapeutic ultrasound within the scientific and medical communities, and to facilitate the translation of therapeutic ultrasound techniques into the clinical area for the benefit of patients worldwide. We are committed to bringing knowledge of therapeutic ultrasound to our members around the world through the **Annual International Symposium for Therapeutic Ultrasound** and the virtual **ISTU On-Air Webinar Series**.

## ***Upcoming Webinars***

*SAVE THE DATES!*

**June 24, 2021: Young-sun Kim, M.D., Ph.D.**  
"Focused Ultrasound in Gynecology"

**July 22, 2021: Toshio Yamaguchi**  
"Focused Ultrasound in the Brain: Clinical Applications and Technical Challenges in Japan"



# ISTU 2022

21<sup>st</sup> Annual International Symposium  
on Therapeutic Ultrasound

**June 7 - 10, 2022**  
**Toronto, Canada**

Presented by:



**ISTU 2023 will be in Lyon, France on April 17 - 20, 2023**

***Visit [ISTU.org](http://ISTU.org) to learn more about our upcoming programs!***





# ISTU 2021

20<sup>th</sup> Annual International Symposium  
for Therapeutic Ultrasound

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## Welcome Message

It is my honor to welcome you to the 20th Annual International Symposium for Therapeutic Ultrasound and officially kick off this important annual event. Thank you all for joining this first-ever hybrid meeting of the International Society for Therapeutic Ultrasound (ISTU). I appreciate your effort to be together virtually and join those in beautiful Gyeongju, Korea that are able to participate in person.

I especially want to thank the President of KSTU, Min Joo Choi, PhD, the President of ISTU 2021, Jin Woo Chang, MD, and the Chair of ISTU 2021 Organizing Committee, Jae Young Lee, MD, for their excellent leadership and quick adaptation to the ever changing demands during the global pandemic. I also want to extend my gratitude to the members of the local planning team in Korea who have truly brought this meeting to its successful culmination with countless hours of ingenuity, flexibility, and goodwill during challenging times.

Since the establishment of our Society in 2001, ISTU has laid the foundation for the continuous improvement and advancement of therapeutic ultrasound technology by providing the means for the international community in ultrasound to come together once every year to collaborate and share knowledge. Through this, experts in all aspects of therapeutic ultrasound have together advanced the application of this technology in both scientific and medical fields as well as updated best practices for its usage.

This year's annual symposium will continue this tradition by hosting a wide range of scientific talks and programs that allow its participants to take home with them something truly valuable and interesting. Renowned experts in the field of therapeutic ultrasound will address the issues and challenges currently facing both scientific and clinical applications. This meeting brings together the great minds leading the future of the field and highlights the diverse body of work by so many of our members.

I encourage you to make the most of our virtual platform – by experiencing the live streamed sessions together, and contributing to the various Live Q & A sessions which always result in great discussion and in-depth learning. Enjoy the flexibility of having the pre-recorded lectures available on a time frame that works for your schedule. The Virtual Platform will be available from June 7th to July 10th to give you greater access. Please remember to visit the online virtual exhibits and interact with our sponsors that have continued to support our Society during these challenging times. We simply can't thank them enough for their contribution to this event.

I sincerely hope this symposium will inspire new ideas and encourage innovations throughout all the different facets of this exciting field to lead us to a better, healthier world.



**Joo Ha Hwang, M.D., Ph.D.**  
President of ISTU

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Dear Colleagues,

On behalf of the organizing committee, it is our great pleasure to host the 20th Annual International Symposium for Therapeutic Ultrasound (ISTU 2021) from June 6-9, 2021 at the Hwabaek International Convention Center (HICO) in Gyeongju, South Korea.

The COVID-19 pandemic has made it difficult for our ISTU members from around the world to gather together in Korea's beautiful, 1000-year-old ancient capital city for this 20th ISTU conference. However, considering the nearly 450 registrants that have committed to meeting nonetheless, we intend to have one of the most successful conferences we've ever had in spreading knowledge and advancing this field.

This year's meeting will mark the first ever, hybrid meeting; delivered so that participants are able to attend either in-person or virtually from all over the world.

ISTU 2021 will host a wide range of scientific talks, programs as well as networking opportunities for participants to join in on through the interactive online platform. Similar to the live, in-person conference, audience members will be able to participate in Q&A discussions after each presentation as well as communicate on the platform's chat board.

Additionally, all live-streamed content from the symposium will be available to watch on-demand for one month following the event, allowing participants to view anything that they may have missed during the live conference.

We are excited to explore this new approach to conferencing and we hope it gives everyone a refreshing experience that encourages new perspectives and ideas.

We look forward to meeting you in-person in the nearest future.



**Min Joo Choi, PhD**  
President of KSTU



**Jin Woo Chang, MD**  
President of ISTU 2021



**Jae Young Lee, MD**  
Chair of  
ISTU 2021 Organizing Committee

# Organization

## ISTU 2021 Organizing Committee

Co-Chairs	Jae Young Lee	Seoul National University, Republic of Korea
	Min Joo Choi	Jeju National University, Republic of Korea
Secretary-General	Young-sun Kim	MINT Intervention Hospital, Republic of Korea
Administrative Secretary	Ki Joo Pahk	Korea Institute of Science and Technology, Republic of Korea
Scientific Committee	Hak Jong Lee	Seoul National University, Republic of Korea
	Hyungmin Kim	Korea Institute of Science and Technology, Republic of Korea
International Liaison Committee	Eun-Joo Park	Seoul National University, Republic of Korea

## ISTU

President	Joo Ha Hwang	Stanford University, United States of America
Secretary-General	Kim Butts Pauly	Stanford University, United States of America
Fry & Lizzi Awards Committee	Jean-François Aubry	Physics for Medicine Paris, France
Student Membership & Awards Committee	Gail ter Haar	The Institute of Cancer Research, United Kingdom
	Robert Staruch	Profound Medical, Canada
Scientific Committee	Robin Cleveland	University of Oxford, United Kingdom
	Vera A. Khokhlova	University of Washington, United States of America
Executive Director	Shelly Reid	ISTU

## KSTU

President	Min Joo Choi	Jeju National University, Republic of Korea
Senior Vice-President	Jae Young Lee	Seoul National University, Republic of Korea
Vice-President	Yongrae Roh	Kyungpook National University, Republic of Korea
Secretary-General	Young-sun Kim	MINT Intervention Hospital, Republic of Korea
Director of Academic Affairs	Hak Jong Lee	Seoul National University, Republic of Korea
	Hyungmin Kim	Korea Institute of Science and Technology, Republic of Korea
Director of Planning	Jongbum Seo	Yonsei University, Republic of Korea
	Won Seok Chang	Yonsei University, Republic of Korea
Director of Information	Dong Ho Lee	Seoul National University, Republic of Korea
Director of Public Relation	Sung Yong Cho	Seoul National University, Republic of Korea
	Joonho Seo	Korea Institute of Machinery & Materials, Republic of Korea
Director of Research	Jin Ho Chang	Daegu Gyeongbuk Institute of Science and Technology, Republic of Korea
	Heung Ho Choi	Inje University, Republic of Korea
	Kang Il Lee	Kwangwon National University, Republic of Korea
Director of International Affairs	Eun-Joo Park	Seoul National University, Republic of Korea
	Seung-June Oh	Seoul National University, Republic of Korea
	Won-Suk Ohm	Yonsei University, Republic of Korea
	Kidong Kim	Seoul National University, Republic of Korea
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Director of Safety	Ki Joo Pahk	Korea Institute of Science and Technology, Republic of Korea
Auditor	Mok-Kun Jeong	Daejin University, Republic of Korea
Advisor	Jin Woo Chang	Yonsei University, Republic of Korea

# Plenary Session Speakers

June 7 (Mon)



09:30-10:00

## Therapy Ultrasound : a Lack of Focus

Gail ter Haar (The Institute of Cancer Research, United Kingdom)



10:00-10:30

## An Update on a 30-Year Study of the Therapeutic Applications of Lithotripsy

Lawrence A. Crum (University of Washington, United States of America)

June 8 (Tue)

09:05-09:35 Fry Award Winner

## The Future Perspective of Brain MRgFUS for Neurosurgery : lessons learned, trouble faced and future direction at Yonsei University

Jin Woo Chang (Yonsei University, Republic of Korea)



09:40-10:10 Lizzi Award Winner

## Histotripsy and Lithotripsy: Acoustic Interactions and Control of Mechanical Disintegration by Focused Ultrasound

Adam Maxwell (University of Washington, United States of America)



10:10-10:40 Lizzi Award Winner

## Stimulating Tissue Regeneration Using Ultrasound-Modulated Biochemical and Biophysical Cues

Mario L. Fabiilli (University of Michigan, United States of America)



## Program at a Glance

Time	June 6 (Day 1)	June 7 (Day 2)	June 8 (Day 3)	June 9 (Day 4)
07:00-08:00		Registration	Student Mentorship Session	Registration
08:00-09:00		Education Session 1	Education Session 2	Education Session 3
09:00-10:00		Opening Remarks	Plenary Session 2	Non-Thermal FUS
		Plenary Session 1		
10:00-11:00		Coffee Break	Coffee Break	Coffee Break
11:00-12:00		Physics and Modelling	Brain Therapy	Emerging Technologies & Hardware
12:00-13:00		Lunch	Student Poster Award Speed Talks	Lunch
13:00-14:00		Student Award Presentations	Neuromodulation	Other Applications
14:00-15:00			Coffee Break	Coffee Break
15:00-16:00	Registration	Coffee Break	Drug Delivery	Student Award Announcements/ Debate Session
16:00-17:00		Image-Guidance and Monitoring		Closing Remarks
17:00-18:00		ISTU General Assembly	Thermal Ablation	
18:00-19:00	Welcome Reception		Banquet	
19:00-20:00				
20:00-21:00				

\*KSTU General Assembly: June 8 (Tue), 12:30-13:30, Room 103 (1F)

# Detailed Program

## June 6 (Sun)

18:00-20:00 **Welcome Reception** Lobby (1F)

## June 7 (Mon)

08:00-09:00 **Education Session 1** Room 101-104

CHAIRPERSON Kim Butts Pauly (Stanford University, United States of America)

08:00-08:25 **Ultrasound Bioeffects**  
Zhen Xu (University of Michigan, United States of America)

08:25-08:50 **Cancer Therapy of Musculoskeletal Tumors with FUS**  
Matthew Bucknor (University of California, San Francisco, United States of America)

08:50-09:00 Break

09:00-09:30 **Opening Remarks** Room 101-104

Joo Ha Hwang, President of ISTU  
Jin Woo Chang, President of ISTU 2021  
Min Joo Choi, President of KSTU  
Jae Young Lee, Chair of ISTU 2021 Organizing Committee

09:30-10:30 **Plenary Session 1** Room 101-104

CHAIRPERSON Vera A. Khokhlova (University of Washington, United States of America)

09:30-10:00 **Therapy Ultrasound : a Lack of Focus**  
Gail ter Haar (The Institute of Cancer Research, United Kingdom)

10:00-10:30 **An Update on a 30-Year Study of the Therapeutic Applications of Lithotripsy**  
Lawrence A. Crum (University of Washington, United States of America)

10:30-11:00 Coffee Break

11:00-12:30 **Scientific Session 1 - Physics and Modelling** Room 101-104

CHAIRPERSONS Michael Gray (University of Oxford, United Kingdom)  
Jean-François Aubry (Physics for Medicine Paris, France)  
Jong-Bum Seo (Yonsei University, Republic of Korea)

11:00-11:06 **Aberration-Producing Body-Wall Phantom for High-Intensity Focused Ultrasound Applications**  
Alex Peek (University of Washington, United States of America)



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- 11:06-11:12 **Noninvasive Prediction of Transcranial High-Intensity Focused Ultrasound Therapy Characteristics Using the Hybrid Angular Spectrum Method**  
Collin Smith (University of Minnesota, United States of America)
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- 11:12-11:18 **"HIFU Beam": A Tool for Modeling Axially Symmetric Nonlinear Acoustic Fields Generated by Focused Therapeutic Transducers in a Layered Medium**  
Petr Yuldashev (M.V. Lomonosov Moscow State University, Russian Federation)
- 
- 11:18-11:24 **Predicting Target Temperature in Transcranial MRgFUS Treatment Using a Deep Learning Network**  
Sijia Guo (University of Maryland School and Medicine, United States of America)
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- 11:24-11:30 **Quantifying the Micro-Structural Parameters of Human Skull Using Micro-CT and Their Correlation with Low-Frequency Ultrasound Attenuation**  
Omid Yousefian (Columbia University, United States of America)
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- 11:30-11:36 **Modeling 2D Burger's Equation Using Physics Informed Neural Networks**  
Shaikhah Alkhadr (Pennsylvania State University, United States of America)
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- 11:36-11:45 Live Q&A
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- 11:45-11:51 **Numerical Prediction of the Potential Extent of Pelvic Tumour Ablation by Magnetic Resonance-Guided High Intensity Focused Ultrasound**  
Ngo Fung Daniel Lam (Institute of Cancer Research, United Kingdom)
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- 11:51-11:57 **3D Real-Time Acoustic Simulation for Transcranial Focused Ultrasound Using Conditional Generative Adversarial Network**  
Tae Young Park (Korea Institute of Science and Technology, Republic of Korea)
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- 11:57-12:03 **Aberration Correction Using Ray Approximation with Account for Refraction in Transcranial HIFU Applications**  
Pavel Rosnitskiy (Lomonosov Moscow State University, Russian Federation)
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- 12:03-12:09 **Measuring Thermal, Spectral, and Spatial Variations of Complex Ultrasound Reflection and Transmission Coefficients in the Temporal Bone Using Orthogonal Frequency-Division Multiplexing**  
Collin Smith (University of Minnesota, United States of America)
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- 12:09-12:15 **Investigating a Deployable Concentric Ring Sector-Vortex Ultrasound Phased Array Applicator for Endoluminal and Laparoscopic Intervention**  
Muhammad Zubair (University of California, San Francisco, United States of America)
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- 12:15-12:21 **Visualization of Spatially and Temporally Heterogenous Thermal Washout in the Application of MR-HIFU Hyperthermia**  
Lukas Sebeke (University Clinic of Cologne, Germany)
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- 12:21-12:30 Live Q&A

12:30-13:30	<b>Lunch / Poster Session</b>	Room 300C
13:30-15:30	<b>Student Award Presentations</b>	Room 101-104
CHAIRPERSONS Gail ter Haar (The Institute of Cancer Research, United Kingdom) Robert Staruch (Profound Medical, Canada)		
13:30-13:40	<b>Endoluminal Ultrasound Applicator for Delivering Volumetric Hyperthermia to the Pancreas</b>	Muhammad Zubair (University of California, San Francisco, United States of America)
13:40-13:50	<b>2D vs 3D Pressure Scans: Difference in the Performance Assessment of Transcranial Aberration Correction</b>	Thomas Bancel (Physics for Medicine Paris, France)
13:50-14:00	<b>cGAN-Based Synthetic CT for MRI-Guided Transcranial Focused Ultrasound: A Feasibility Study</b>	Heekyung Koh (Korea Institute of Science and Technology, Republic of Korea)
14:00-14:10	<b>Static Magnetic Fields Dampen Focused Ultrasound-Mediated Blood-Brain Barrier Opening</b>	Yaoheng Yang (Washington University in St. Louis, United States of America)
14:10-14:20	<b>Transcranial Theranostic Ultrasound Pre-Planning and Blood-Brain Barrier Opening Using a Phased Array In-Vitro and In-Vivo</b>	Alec Batts (Columbia University, United States of America)
14:20-14:30	<b>Non-Invasive Ablation of Fetal Rabbit Umbilicus Using MR-Guided High Intensity Focused Ultrasound (HIFU) Therapy</b>	Ava Danialy (University of Toronto, Canada)
14:30-14:40	<b>In-Vivo Non Invasive HIFU Treatment of The Liver Using a Toroidal Transducer</b>	Sophie Cambroner (LabTAU, INSERM, France)
14:40-14:50	<b>Abdominal Low-Intensity Pulsed Ultrasound Modulate Spleen-Derived Inflammatory Responses and Improves Therapeutic Outcomes of Murine 4T1 Breast Tumors</b>	Gadi Cohen (National Institute of Health, United States of America)
14:50-15:00	<b>Nanobubbles Actuated Ultrasound Deep Brain Stimulation</b>	Xuandi Hou (The Hong Kong Polytechnic University, Hong Kong)
15:00-15:10	<b>Assessing the Validity of Using Sub/Ultraharmonic Emissions to Actively Control Blood-Spinal Cord Barrier Opening with Short Burst Exposures</b>	Paige Smith (University of Toronto, Canada)
15:10-15:20	<b>Initial Preclinical Results of a Prototype Transrectal Histotripsy Device for Prostate Cancer Ablation</b>	Rishi Sekar (University of Washington, United States of America)

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15:20-15:30 **Closed-Loop Trans-Skull Ultrasound Hyperthermia Promotes Acute Changes in the Transvascular Transport Dynamics in the Brain Tumor Microenvironment**  
Chulyong Kim (Georgia Institute of Technology, United States of America)

15:30-16:00 Coffee Break

16:00-17:30 **Scientific Session 2 - Image-Guidance and Monitoring** Room 101-104

CHAIRPERSONS Kevin Haworth (University of Cincinnati, United States of America)  
Juan Tu (Nanjing University, China)  
Jae Young Lee (Seoul National University, Republic of Korea)

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16:00-16:06 **A Novel Beamforming Method with High Spatial and Temporal Resolution in Passive Cavitation Imaging**  
Mok Kun Jeong (Daejin University, Republic of Korea)

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16:06-16:12 **Closed-Loop Control of a Human System for MRI-Guided Focused Ultrasound Brain Therapy for Pre-Clinical Testing**  
Samuel Pichardo (University of Calgary, Canada)

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16:12-16:18 **Monitoring Drug Delivery to the Brain Emitting Single Cycle Ultrasound Pulses**  
Sophie V Morse (Imperial College London, United Kingdom)

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16:18-16:24 **High Temporal Resolution Simultaneous PRF-T1 MR Thermometry and Shear Wave Elastography for MR-Guided Focused Ultrasound Monitoring**  
Henrik Odén (University of Utah, United States of America)

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16:24-16:30 **Adapting the Proteus Platform for Image-Guided Focused Ultrasound Experimentation in Pre-Clinical Commercial Devices**  
Aidan Johnson (University of Calgary, Canada)

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16:30-16:36 **High Pulse Repetition Frequency Doppler Ultrasound Imaging Method to Monitor Boiling Histotripsy Lesion Formation**  
Minho Song (University of Washington, United States of America)

16:36-16:45 Live Q&A

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16:45-16:51 **In-Vitro Characterization of Fluorescence Intensity Modulation by Focused Ultrasound**  
Hector Estrada (University of Zurich, Switzerland)

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16:51-16:57 **Electromechanical Wave Imaging Using an Intracardiac Probe In-Vivo**  
Jade Robert (LabTAU INSERM, France)

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16:57-17:03 **Deep Learning Based Synthetic CT Skull for Transcranial MRgFUS Interventions Using 3D V-Net-Transfer Learning Implications**  
Sijia Guo (University of Maryland School and Medicine, United States of America)

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17:03-17:09 **Passive Elastography for HIFU Lesion Detection in Prostate Cancer Using Conventional B-Mode Images**  
Thomas Payen (LabTAU, INSERM, France)

17:09-17:15 **MR-ARFI Displacement Phase Increases with Focal Depth at the Same Acoustic Intensity**  
Kristin Quah (Stanford University, United States of America)

17:15-17:21 **High Intensity Focused Ultrasound (HIFU) Phantom for the Measurement of 2D Temperature Distribution Inside**  
Nafra Samiudin (Korea Research Institute of Standards and Science, Republic of Korea)

17:21-17:30 Live Q&A

17:30-18:00 **ISTU General Assembly**

## June 8 (Tue)

07:00-08:00 **Student Mentorship Session** Room 101-104

CHAIRPERSONS Robert Staruch (Profound Medical, Canada)  
Richard J. Price (University of Virginia, United States of America)  
Natasha Sheybani (Stanford University, Focused Ultrasound Foundation, United States of America)

PANELS Christian Coviello (OxSonic Therapeutics, United Kingdom)  
Jessica Foley (Focused Ultrasound Foundation, United States of America)  
Ki Joo Pahk (Korea Institute of Science and Technology, Republic of Korea)  
Joan Vidal-Jove (Comprehensive Tumor Center Barcelona, Spain)  
Zhen Xu (University of Michigan, United States of America)  
Eun-Joo Park (Seoul National University Hospital, Republic of Korea)

08:00-09:00 **Education Session 2** Room 101-104

CHAIRPERSON Joo Ha Hwang (Stanford University, United States of America)

08:00-08:25 **FUS-Enhanced Drug Delivery**  
Holger Gröll (University Hospital of Cologne, Germany)

08:25-08:50 **Neuromodulation**  
Seung-Schik Yoo (Harvard Medical School, United States of America)

08:50-09:00 Break

09:00-10:40 **Plenary Session 2** Room 101-104

CHAIRPERSON Jean-François Aubry (Physics for Medicine Paris, France)

09:00-09:05 **Fry Award Winner Introduction**

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09:05-09:35 **The Future Perspective of Brain MRgFUS for Neurosurgery : lessons learned, trouble faced and future direction at Yonsei University**

Jin Woo Chang (Yonsei University, Republic of Korea)

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09:35-09:40 **Lizzi Award Winner Introduction**

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09:40-10:10 **Histotripsy and Lithotripsy: Acoustic Interactions and Control of Mechanical Disintegration by Focused Ultrasound**

Adam Maxwell (University of Washington, United States of America)

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10:10-10:40 **Stimulating Tissue Regeneration Using Ultrasound-Modulated Biochemical and Biophysical Cues**

Mario L. Fabiilli (University of Michigan, United States of America)

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10:40-11:00 Coffee Break

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11:00-12:30 **Scientific Session 3 - Brain Therapy**

Room 101-104

CHAIRPERSONS

Meaghan O'Reilly (Sunnybrook Research Institute, Canada)

Kim Butts Pauly (Stanford University, United States of America)

Jin Woo Chang (Yonsei University, Republic of Korea)

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11:00-11:06 **An Acoustic Measurement Library for Non-Invasive Trans-Rodent Skull Ultrasonic Focusing at High Frequency**

Saba Rahimi (Sunnybrook Research Institute, Canada)

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11:06-11:12 **Robotic Trajectories for Blood-Brain Barrier Opening with Focused Ultrasound on Large Areas**

Gaelle Thomas (CNRS-University of Strasbourg, France)

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11:12-11:18 **Acoustic Cluster Therapy (ACT®) Enhances Extravasation and Parenchymal Accumulation of Core-Crosslinked Polymeric Micelles in the Brain**

Melina Mühlenpfordt (Norwegian University of Science and Technology, Norway)

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11:18-11:24 **Approaches to Treat Brain Tumor; Photodynamic Therapy and Sonodynamic Therapy in Rat Model**

Junwon Park (Yonsei University College of Medicine, Republic of Korea)

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11:24-11:30 **Improved Glymphatic-Lymphatic Drainage of Beta-Amyloid by FUS Treatment with Microbubbles in Alzheimer's Disease Model**

Eun-Joo Park (Seoul National University Hospital, Republic of Korea)

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11:30-11:36 **Neuronavigation-Guided Focused Ultrasound for Non-Invasive Blood-Brain Barrier Opening in the Prefrontal Cortex of Alzheimer's Disease Patients with Real-Time Cavitation Monitoring**

Antonios Poulipoulos (Columbia University, United States of America)

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11:36-11:45 Live Q&A

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11:45-11:51	<b>MRI Characterization of Histotripsy Ablation in an In-Vivo Murine Brain Tumor Model</b> Sang Won Choi (University of Michigan, United States of America)	
11:51-11:57	<b>Closed-Loop Microbubble Enhanced Focused Ultrasound System for Controlled and Targeted BBB Opening</b> Hohyun Lee (Georgia Institute of Technology, United States of America)	
11:57-12:03	<b>Blood-Brain Barrier Opening Across a Ultrasound-Transparent Cranial Prosthesis In-Vitro</b> Luca Raspagliesi (Humanitas Research Hospital, Italy)	
12:03-12:09	<b>Feasibility and Efficacy of Magnetic Resonance-Guided Focused Ultrasound Surgery with Autofocusing Echo Imaging</b> Kyung won Chang (Yonsei University College of Medicine, Republic of Korea)	
12:09-12:15	<b>Transcranial MR-Guided Histotripsy for Brain Surgery - Preclinical Investigation</b> Ning Lu (University of Michigan, United States of America)	
12:15-12:21	<b>Acoustic Cavitation of Microbubbles in Cerebral Microvessels</b> James Bezer (Imperial College London, United Kingdom)	
12:21-12:30	Live Q&A	
12:30-13:30	<b>Student Poster Award Speed Talks</b>	Room 101-104
CHAIRPERSONS	Gail ter Haar (The Institute of Cancer Research, United Kingdom) Robert Staruch (Profound Medical, Canada)	
12:30-12:34	<b>Intra-Operative HIFU Treatment of the Liver at the Hepato-Caval Confluence Using a Toroidal Transducer. Results of In-Vivo Experiments</b> Sophie Cambroner (LabTAU, INSERM, France)	
12:34-12:38	<b>Efficient and Safe FUS-Mediated BBB Opening at the Whole Brainstem</b> Yan Gong (Washington University in St. Louis, United States of America)	
12:38-12:42	<b>A Robotic MRI-Guided High-Intensity Focused Ultrasound Neonatal Neurosurgery Platform: Assessment of Targeting Accuracy and Precision</b> Hrishikesh Raghuram (University of Toronto, Canada)	
12:42-12:46	<b>Sonothermogenetics Enables Noninvasive and Cell-Type Specific Deep Brain Neuromodulation</b> Yaoheng Yang (Washington University in St. Louis, United States of America)	
12:46-12:50	<b>Sonobiopsy Enhances Detection of Tumor-Derived DNA</b> Christopher Pacia (Washington University in St. Louis, United States of America)	
12:50-12:54	<b>In-Vivo Porcine Tendon Release Using High-Intensity Focused Ultrasound Long-Pulse Histotripsy Followed by Thermal Ablation</b> Imogen den Otter Moore (University of Toronto, Canada)	

12:54-12:58	<b>Acoustic Cavitation of Microbubbles in Cerebral Microvessels</b> James Bezer (Imperial College London, United Kingdom)	
12:58-13:02	<b>Transcranial MR-guided Histotripsy for Brain Surgery - Preclinical Investigation</b> Ning Lu (University of Michigan, United States of America)	
13:02-13:06	<b>Measuring Thermal, Spectral, and Spatial Variations of Complex Ultrasound Reflection and Transmission Coefficients in the Temporal Bone Using Orthogonal Frequency Division Multiplexing</b> Collin Smith (University of Minnesota, United States of America)	
13:06-13:10	<b>Compact Cell Sonoporation Device for Adhesive Cells</b> Mohammad Jahromi (University of Calgary, Canada)	
13:10-13:14	<b>Examining the In-Vitro Cytotoxicity of Focused Ultrasound Cavitated Docetaxel-Loaded Nanobubbles on Breast Cancer Mice Model Cells</b> Patrick Dong Min Chang (University of Toronto, Canada)	
13:14-13:18	<b>Monitoring Stable Cavitation for Safe BBB Disruption</b> Sonia Khan (University of Calgary, Canada)	
13:18-13:22	<b>Investigation of Sonosensitive PLGA and PEG-PLGA Nanocapsules for Drug Delivery with Use of Focused Ultrasound</b> Ula Savsek (Friedrich–Alexander University Erlangen–Nürnberg, Germany)	
13:22-13:26	<b>A Murine Model in a Novel Treatment for Deep Infiltrating Rectosigmoid Endometriosis with Therapeutic Ultrasounds</b> Morgane Dairien (LabTAU, France)	
12:30-13:30	<b>Lunch</b>	Room 300C
12:30-13:30	<b>KSTU General Assembly</b>	Room 103
13:30-15:00	<b>Scientific Session 4 - Neuromodulation</b>	Room 101-104
CHAIRPERSONS	Charles F. Caskey (Vanderbilt University Medical Center, United States of America) Lei Sun (Hong Kong Polytechnic University, Hong Kong) Hyungmin Kim (Korea Institute of Science and Technology, Republic of Korea)	
13:30-13:42	<b>Sonogenetic Deep Brain Stimulation in Freely Moving Mice</b> Quanxiang Xian (Hong Kong Polytechnic University, China)	
13:42-13:48	<b>Acoustic Monitoring of Neuromodulation Using Definity-Derived Nanodroplets</b> Harriet Lea-Banks (Sunnybrook Research Institute, Canada)	

13:48-13:54 **Microelectrode Array (MEA) Measurements of Single Pulse Focused Ultrasound (FUS)-Induced Neural Responses in Ex-Vivo Acute Hippocampal Brain Slices**  
Ivan Suarez-Castellanos (LabTAU INSERM, France)

13:54-14:00 **Transcranial Displacement Imaging for Monitoring of FUS Neuromodulation**  
Tara Kugelman (Columbia University, United States of America)

14:00-14:09 Live Q&A

14:09-14:21 **Sonothermogenetics Enables Noninvasive and Cell-Type Specific Deep Brain Neuromodulation**  
Yaoheng Yang (Washington University in St. Louis, United States of America)

14:21-14:27 **Focused Ultrasound-Mediated Enhancement of Topical Lidocaine Anesthesia in Rats**  
Hyun-Chul Kim (Harvard Medical School, United States of America)

14:27-14:33 **Wideband Frequency Ultrasonic Modulation of Astrocytic TRPA1 via Capacitive Micromachined Ultrasonic Transducer**  
HaeYoun Kim (Korea Institute of Science and Technology, Republic of Korea)

14:33-14:39 **Trans-Spinal Focused Ultrasound Stimulation Suppresses Chemically-Induced Tremor in Mice**  
Evgenii Kim (Korea Institute of Science and Technology, Republic of Korea)

14:39-14:48 Live Q&A

14:48-15:30 Coffee Break

15:30-17:00 **Scientific Session 5 - Drug Delivery** Room 101-104

**CHAIRPERSONS** Hong Chen (Washington University in St. Louis, United States of America)  
Klazina Kooiman (Erasmus MC University Medical Center Rotterdam, Netherlands)  
Eun-Joo Park (Seoul National University Hospital, Republic of Korea)

15:30-15:42 **Chronic Effects of Cavitation-Aided Gemcitabine Delivery to Pancreas Cancer on Tumor Microenvironment in KPC Mouse Model**  
Tatiana Khokhlova (University of Washington, United States of America)

15:42-15:48 **Polymeric Ultrasound Theranostic Agents for Targeted Delivery of Dexamethasone**  
James Kwan (University of Oxford, United Kingdom)

15:48-15:54 **Focused Ultrasound-Enhanced Delivery of Radiolabeled Agents to Diffuse Intrinsic Pontine Glioma**  
Dezhuang Ye (Washington University in St. Louis, United States of America)

15:54-16:00 **Image-Guided, Ultrasound-Induced Cavitation Enhances Cetuximab Delivery and Efficacy in Solid Murine Tumors Using the Clinical SonoTran System**  
Christian Coviello (OxSonics Therapeutics, United Kingdom)



16:00-16:09	Live Q&A	
16:09-16:15	<b>Ultrasound-Responsive Nitric Oxide Microbubbles for the Treatment of Biofilms in Chronic Wounds</b>	
	Dario Carugo (University College London, United Kingdom)	
16:15-16:21	<b>Cavitation Emissions Nucleated by Definity Infused through an Ekosonic Catheter in a Flow Phantom</b>	
	Maxime Lafond (Université de Lyon, France)	
16:21-16:27	<b>Treating Non-Healing Bone Infections with Focused Ultrasound and Antibiotic-Loaded Thermally Sensitive Liposomes</b>	
	Harshini Ashar (Oklahoma State University, United States of America)	
16:27-16:33	<b>Enhancement of Blood-Tumor Barrier Permeability in Rat Brain Tumor Model through Additional Focused Ultrasound Stimulation</b>	
	Hungkyu Huh (Daegu-Gyeongbuk Medical Innovation Foundation, Republic of Korea)	
16:33-16:39	<b>Controlled Release of basic Fibroblast Growth Factor (bFGF) Using Acoustic Droplet Vaporization (ADV) Enhances Angiogenesis and Reperfusion in the Murine Hind Limb Ischemia Model</b>	
	Mario L. Fabiilli (University of Michigan, United States of America)	
16:39-16:48	Live Q&A	
17:00-18:30	<b>Scientific Session 6 - Thermal FUS</b>	Room 101-104
CHAIRPERSONS	Joan Vidal-Jove (Comprehensive Tumor Center Barcelona, Spain) Allison Payne (University of Utah, United States of America) Young-sun Kim (MINT Intervention Hospital, Republic of Korea)	
17:00-17:12	<b>Histotripsy in Liver Tumors. Immune Effects, Low Inflammation and Rapid Resolution of the Ablation Lesions</b>	
	Joan Vidal-Jove (Comprehensive Tumor Center Barcelona, Spain)	
17:12-17:18	<b>MRI-Guided Focused Ultrasound Robotic System for Preclinical Use of Small and Large Animals</b>	
	Anastasia Antoniou (Cyprus University of Technology, Cyprus)	
17:18-17:24	<b>Intra-Operative HIFU Treatment of the Liver at the Hepato-Caval Confluence Using a Toroidal Transducer. Results of In-Vivo Experiments</b>	
	Sophie Cambrono (LabTAU, INSERM, France)	
17:24-17:30	<b>Simulation of HIFU Therapy for Head and Neck Cancer</b>	
	Abdul Mohizin (Kookmin University, Republic of Korea)	
17:30-17:39	Live Q&A	

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- 17:39-17:45 **Oncological and Functional Outcomes of Focal Therapy with High-Intensity Focused Ultrasound for Localized Prostate Cancer in Asians: A Multi-Institutional Prospective Study**  
Sunao Shoji (Tokai University School of Medicine, Japan)
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- 17:45-17:51 **Maximization of the Pressure Using Shifted Focalization from the Acoustic Axis with a Truncated Toroidal Transducer**  
Sophie Cambronero (LabTAU, INSERM, France)
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- 17:51-17:57 **Feasibility of Treating an Oral Cancer in a Canine Patient with Focused Ultrasound Ablation**  
Ashish Ranjan (Oklahoma State University, United States of America)
- 
- 17:57-18:03 **In-Vivo Porcine Tendon Release Using High-Intensity Focused Ultrasound**  
William Chu Kwan (University of Toronto, Canada)
- 
- 18:03-18:09 **Acoustic Holograms for Large-Volume Hyperthermia**  
Diana Andrés (Universitat Politècnica de València, Spain)
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- 18:09-18:18 Live Q&A
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- 19:00- **Banquet** Lahan Select Hotel, Agena / Regel Hall (2F)

## June 9 (Wed)

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- 08:00-09:00 **Education Session 3** Room 101-104
- CHAIRPERSON Meaghan O'Reilly (Sunnybrook Research Institute, Canada)
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- 08:00-08:25 **Women's Health**  
Suzanne LeBlanc (FUS Foundation, United States of America)
- 
- 08:25-08:50 **FUS-Mediated Immune Response**  
Petros Mouratidis (The Institute of Cancer Research, United Kingdom)
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- 08:50-09:00 Break
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- 09:00-10:30 **Scientific Session 7 - Non-thermal FUS** Room 101-104
- CHAIRPERSONS Julianna Simon (Pennsylvania State University, United States of America)  
Wen-Shiang Chen (National Taiwan University Hospital, Taiwan)  
Ki Joo Pahk (Korea Institute of Science and Technology, Republic of Korea)
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- 09:00-09:06 **Non-Invasive Ultrasound Therapy of Calcified Aortic Stenosis: First-in-Human Study**  
Daniel Suarez (Cardiawave SA, France)
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- 09:06-09:12 **Investigation of Histotripsy for the Treatment of Uterine Leiomyomas: A Feasibility Study in Ex-Vivo Human Uterine Fibroids**  
Faith Robinson (Virginia Tech School of Medicine, United States of America)
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- 09:12-09:18 **Localised Mechanical Tissue Fractionation by Pressure-Modulated Shockwave Histotripsy: An In-Vivo Study**  
Ki Joo Pahk (Korea Institute of Science and Technology, Republic of Korea)
- 
- 09:18-09:24 **Investigation of the Long-Term Healing Response of the Liver to Boiling Histotripsy Treatment In-Vivo**  
Jeongmin Heo (Korea Institute of Science and Technology, Republic of Korea)
- 
- 09:24-09:30 **Phase Aberration Correction for HIFU Therapy with a 256-element Spiral Array**  
Gilles P. L. Thomas (University of Washington, United States of America)
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- 09:30-09:36 **Low Energy Histotripsy of Breast Cancer Tumor via Low Frequency Insonation of Microbubbles: In-Vitro and In-Vivo Pilot Study**  
Mike Bismuth (Tel Aviv University, Israel)
- 
- 09:36-09:45 Live Q&A
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- 09:45-09:51 **Particle-Mediated Histotripsy for the Targeted Treatment of Catheter-Associated Urinary Tract Infections (CAUTIs)**  
Chris Childers (Virginia Tech Carilion School of Medicine, United States of America)
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- 09:51-09:57 **The Feasibility of Using Pulsed Focused Ultrasound and Oncolytic Viruses to Treat Murine Pancreatic Tumours**  
Petros Mouratidis (The Institute of Cancer Research, United Kingdom)
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- 09:57-10:03 **Histotripsy for the Treatment of Canine Osteosarcoma and Soft Tissue Sarcoma: In-Vivo Feasibility Study**  
Lauren Arnold (Virginia Polytechnic Institute and State University, United States of America)
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- 10:03-10:09 **Development of 3D Tough Hydrogels Mimicking Fibrous Prostate Tissue for Histotripsy**  
Yashwanth Nanda Kumar (University of Washington, United States of America)
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- 10:09-10:15 **Volumetric Boiling Histotripsy in Abdominal Targets In-Vivo Using an Ultrasound-Guided Prototype System with Aberration Correction and Motion Compensation**  
Vera A. Khokhlova (University of Washington, United States of America)
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- 10:15-10:21 **In-Vivo Porcine Tendon Release Using High-Intensity Focused Ultrasound Long-Pulse Histotripsy Followed by Thermal Ablation**  
Imogen den Otter Moore (University of Toronto, Canada)
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- 10:21-10:30 Live Q&A
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- 10:30-11:00 Coffee Break
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11:00-12:30	<b>Scientific Session 8 - Emerging Technologies &amp; Hardware</b>	Room 101-104
CHAIRPERSONS	Adam Maxwell (University of Washington, United States of America) W. Apoutou N'Djin (LabTAU, France) Yongrae Roh (Kyungpook National University, Republic of Korea)	
11:00-11:06	<b>Increased HL-1 Cardiomyocyte Viability Following Simulated Ischemia and Controlled Hypoxic Reperfusion</b>	
	Kevin Haworth (University of Cincinnati, United States of America)	
11:06-11:12	<b>Evaluation of a Preclinical Dual-Mode CMUT Probe for Endocavitary Ultrasound-Guided HIFU Therapy: Acoustic Characterizations and Preliminary In-Vitro Experiments</b>	
	Ivan Suarez-Castellanos (LabTAU, INSERM, France)	
11:12-11:18	<b>Controlled Remote Acoustic Manipulation of Objects in the Body</b>	
	Mohamed A Ghanem (University of Washington, United States of America)	
11:18-11:24	<b>Pressure Limits for Tissue Cavitation during Burst Wave Lithotripsy Exposures</b>	
	Adam Maxwell (University of Washington, United States of America)	
11:24-11:30	<b>Softening Connective Tissue Using Ultrasonic Cavitation</b>	
	Ippei Yagi (Tokyo Metropolitan University, Japan)	
11:30-11:36	<b>Pulsed Focused Ultrasound Induces DNA Damage and Reactive Oxygen Species Production in Tumor Cells through Intracellular Calcium Transients</b>	
	Scott Burks (National Institute of Health Clinical Center, United States of America)	
11:36-11:45	Live Q&A	
11:45-11:51	<b>Probability of Cavitation for Single-Cycle Pulses Applied to Poly (Methacrylic Acid)-Coated Iron Oxide (PMAA-FeOx) Nanoparticles in Degassed Aqueous Suspension</b>	
	Connor Edsall (Virginia Polytechnic and State University, United States of America)	
11:51-11:57	<b>Mechanical Wobbling HIFU Transducer for Volumetric Treatment of Uterine Fibroids</b>	
	Yongrae Roh (Kyungpook National University, Republic of Korea)	
11:57-12:03	<b>Improving Imaging Signal-to-Noise in tcMRgFUS Using a Ring of External Coils and 'Propeller Beanie' Passive Crossed Wires: A Numerical Study</b>	
	Xinqiang Yan (Vanderbilt University Medical Center, United States of America)	
12:03-12:09	<b>Dual-Mode Linear Array for Image-Guided Pulsed HIFU</b>	
	Randall Williams (University of Washington, United States of America)	
12:09-12:15	<b>Sonobiopsy Enhances Detection of Tumor-Derived DNA</b>	
	Christopher Pacia (Washington University in St. Louis, United States of America)	

12:15-12:21	<b>A Robotic MRI-Guided High-Intensity Focused Ultrasound Neonatal Neurosurgery Platform: Assessment of Targeting Accuracy and Precision</b> Hrishikesh Raghuram (University of Toronto, Canada)	
12:21-12:30	Live Q&A	
12:30-13:30	<b>Lunch / Poster Session</b>	Room 300C
13:30-15:00	<b>Scientific Session 9 - Other Applications</b>	Room 101-104
CHAIRPERSONS	Natasha Sheybani (Stanford University, Focused Ultrasound Foundation, United States of America) Yufeng Zhou (Chongqing Medical University, China) Hak Jong Lee (Seoul National University Bundang Hospital, Republic of Korea)	
13:30-13:36	<b>Effect of Murine Vendor on Anti-Tumor Immune Responses to Non-Ablative Pulsed Focused Ultrasound</b> Parwathy Chandran (National Institutes of Health, United States of America)	
13:36-13:42	<b>Focused Ultrasound-Enhanced Intranasal Delivery (Fusin) of Immune Checkpoint Inhibitors to the Brainstem Gliomas</b> Dezhuang Ye (Washington University in St. Louis, United States of America)	
13:42-13:48	<b>Ultrasound Targeted Microbubble Destruction Alleviates Immunosuppression Caused by CD71+ Erythroid Cells in Advanced Luis Lung Cancer Mouse Mode</b> Xi Tan (The Second Hospital of the Chinese Army Medical University, China)	
13:48-13:54	<b>Focused Ultrasound Enhances Checkpoint Blockade Immunotherapy for Glioblastoma via Targeted Immunomodulation</b> Tao Sun (Harvard Medical School, United States of America)	
13:54-14:00	<b>Gas-Filled Protein Nanostructures as Cavitation Nuclei for Molecule-Specific Sonodynamic Therapy</b> Lei Sun (Hong Kong Polytechnic University, Hong Kong)	
14:00-14:09	Live Q&A	
14:09-14:15	<b>Assessment of Water Molecule Transport after Focused Ultrasound and Microbubbles induced Blood-Brain Barrier Disruption in Rat</b> Mun Han (Daegu-Gyeongbuk Medical Innovation Foundation, Republic of Korea)	
14:15-14:21	<b>The New Insight of the Neuro-Inflammatory Response Following Focused Ultrasound-Mediated Blood-Brain Barrier Disruption</b> Juyoung Park (Daegu-Gyeongbuk Medical Innovation Foundation, Republic of Korea)	
14:21-14:27	<b>Enhanced Insulin Secretion by Ultrasound Stimulation via Activation of CFTR in Pancreatic Islet <math>\beta</math> Cells</b> Jinghui Guo (Hong Kong Polytechnic University, Hong Kong)	

14:27-14:33 **Spectral Ultrasound Analysis of the Stimulatory Effect of Therapeutic Ultrasound on the Beating Activity of Cultured Cardiomyocytes**

Andrew Chen (The George Washington University, United States of America)

14:33-14:39 **Robot-Assisted Tracking of Anatomical Structures for the Application of High Intensity Focused Ultrasound**

Michael Unger (University Leipzig, Germany)

14:39-14:48 Live Q&A

15:00-15:30 Coffee Break

15:30-16:30 **Student Award Announcements / Debate Session**

Room 101-104

### **Student Award Announcements**

Gail ter Haar (The Institute of Cancer Research, United Kingdom)

Robert Staruch (Profound Medical, Canada)

### **Debate Session**

#### **Transcranial Ultrasound Neuromodulation; a True Signal or Background Noise**

CHAIRPERSON Robin Cleveland (University of Oxford, United Kingdom)

DISCUSSANTS Wynn Legon (Virginia Tech Carilion Research Institute, United States of America)

Jean-François Aubry (Physics for Medicine Paris, France)

16:30-17:00 Closing Remarks

Room 101-104

# E-poster

All E-posters will be available on the ISTU 2021 Virtual Platform until July 10<sup>th</sup>. If you attend the ISTU 2021 on-site, you can use the computer in the Preview and E-poster Room.

## 1. Physics and Modelling

- 
- EP1-01 **Numerical Solution of the Acoustic Wave Propagation Using Physics Informed Neural Network**  
Xilun Liu (Pennsylvania State University, United States of America)
- 
- EP1-02 **Visualization Method for Wide Range of Temperature Distribution to Evaluate Therapeutic Ultrasound Devices**  
Ryo Takagi (National Institute of Advanced Industrial Science and Technology, Japan)
- 
- EP1-03 **A Practical Estimation of the Ballistic Shock Pulse Produced in Cavitating Water**  
Ohbin Kwon (Jeju National University, Republic of Korea)
- 
- EP1-04 **Influence of Bone Properties on Transcranial Acoustic Propagation Using Ray Tracing Numerical Simulation**  
Robert Andrew Drainville (LabTAU, INSERM, France)
- 
- EP1-05 **The Internal Cavitation Threshold in Soft Tissue Using a Dual-Frequency Driving Signal**  
Tatiana Filonets (National Taiwan University, Taiwan)
- 
- EP1-06 **Acoustic Field Measurement Method in Phantom**  
Peng Xu (Shanghai Jiao Tong University, China)
- 
- EP1-07 **A Low-Cost, Ultrafast Temperature Measurement Device for Use Under Ultrasound Exposure**  
Simone Ambrogio (Guy's and St Thomas' Hospital NHS Foundation Trust, United Kingdom)
- 
- EP1-08 **Fem Simulation and Piv Analysis of Acoustic Streaming Generated by Low Intensity Ultrasound with Different Incident Angles**  
Qi Zhang (Nanjing University, China)
- 
- EP1-09 **Observed Features of the Light Emission From Cavitation Bubbles Produced by an Electromagnetic Shock Wave Lithotripter**  
Hyunjae Song (Sogang University, Republic of Korea)
- 
- EP1-10 **Accuracy of Transcranial Focused Ultrasound (tFUS) Beam Predictions Using Acoustic Maps Derived From Pseudo-CT: Assessment in Six Subjects**  
Bastien Guerin (Massachusetts General Hospital, United States of America)
- 
- EP1-11 **A Thermochromic Test Object for HIFU Thermal Therapy**  
Simone Ambrogio (Guy's and St Thomas' Hospital NHS Foundation Trust, United Kingdom)
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- EP1-12 **Physics Informed Neural Networks Simulation of the Temperature Rise Induced by Ultrasound Transducer Using a 2D Bioheat Transfer Equation**  
Yuzhang Wang (Pennsylvania State University, United States of America)
- 
- EP1-13 **Simulations and Hydrophone Scans for Characterizing Acoustic Properties of Bone**  
Samuel Clinard (University of Utah, United States of America)
- 
- EP1-14 **A Passive Cavitation Detector's Angle Relative to an Emitter and to Ultrasound-Exposed Microbubbles Alters the Captured Acoustic Signal**  
Krit Sujarittam (Imperial College London, United Kingdom)
- 
- EP1-15 **Calibrating Ultrasound Power through Fourier-Optical Images**  
Florian Steinmeyer (Technische Hochschule Nuernberg, Germany)
- 
- EP1-16 **An Optimized Density - Longitudinal Sound Speed Model in the Vertebral Lamina and Spinous Process**  
Rui Xu (University of Toronto, Canada)
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## 2. Image-guidance and Monitoring

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- EP2-01 **Influence of Cavitation Bubbles on Measuring the Ballistic Impulsive Wave Produced in Water Using a Laser Doppler Method**  
Ohbin Kwon (Jeju National University, Republic of Korea)
- 
- EP2-02 **A Motion Compensation Algorithm to Improve Thermometry during MRgHIFU Controlled Hyperthermia**  
Suzanne Wong (University of Toronto, Canada)
- 
- EP2-03 **Read, Attend, and Map: Neural Passive Cavitation Mapping with Waveform Attention**  
Gwansuk Kang (Stanford University, United States of America)
- 
- EP2-04 **Monitoring Stable Cavitation for Safe BBB Disruption**  
Sonia Khan (University of Calgary, Canada)
- 
- EP2-05 **Frequency Mixing Enhances Contrast Imaging with Microbubbles for Ultrasound-Guided Therapy**  
Keren Karlinsky (Tel-Aviv University, Israel)
- 
- EP2-06 **Fast Focal Spot Detection by Analysing Echo Harmonics of Low Energy HIFU Pulses**  
Milan Fritsche (Technische Hochschule Nürnberg, Germany)
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- EP2-07 **Development of Antibody-Modified Nanobubbles Using Linker Polypeptides for Tumor Ultrasound Imaging**  
Nobuhito Hamano (Tokyo University of Pharmacy and Life Sciences, Japan)
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- EP2-08 **In-Vivo Use of an MRI-Invisible Acoustic Coupling Material**  
Steven Allen (Brigham Young University, United States of America)
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- EP2-09 **Reduced-FOV 3D MR-ARFI with a Joint Model-Based Reconstruction for Targeting Focused Ultrasound Neuromodulation**  
Huiwen Luo (Vanderbilt University, United States of America)
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- EP2-10 **Design of Integrated Focused Ultrasound and MRI Radiofrequency Arrays for Functional Imaging during Neuromodulation Procedures**  
Matthew Wilcox (Vanderbilt University, United States of America)

### 3. Brain Therapy

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- EP3-01 **Transcranial Lesion Formation for Seizure Suppression in Epilepsy Model**  
Collin Smith (University of Minnesota, United States of America)
- 
- EP3-02 **Safety of Blood-Brain Barrier Opening with Rapid Short-Pulse (RaSP) Sequences In-Vivo**  
Sophie V Morse (Imperial College London, United Kingdom)
- 
- EP3-03 **Mechanism Underlying the Enhanced Blood-Brain-Barrier Opening Effect Induced by Acoustically Activated Nanodroplets**  
Renjie Song (Nanjing University, China)
- 
- EP3-04 **Holographic Lenses to Enhance Thalamic Therapy through the Temporal Bone Window**  
Diana Andrés (Universitat Politècnica de València, Spain)
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- EP3-05 **Focusing Ultrasonic Vortices Across the Human Skull by Acoustic Holograms**  
Noé Jiménez (Universitat Politècnica de València, Spain)
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- EP3-06 **Modeling of Acoustic Holograms for Intensity-Modulated Ultrasound in Pediatric Brain Tumors**  
Sergio Jiménez-Gambín (Universitat Politècnica de València, Spain)
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- EP3-07 **Establishing Drug Delivery to the Pons Using Short-Pulse Ultrasound and Microbubbles**  
Dani Chattenton (The Institute of Cancer Research, United Kingdom)
- 
- EP3-08 **Transcranial Peak Focal Pressure Estimation by Using Kranion Software in Human Skull**  
Woongbin Kang (Jeju National University, Republic of Korea)
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- EP3-09 **Intracranial Sonodynamic Therapy with 5-Aminolevulinic Acid and Sodium Fluorescein: Safety Study in a Porcine Model**  
Matteo Gionso (Humanitas University, Italy)
- 
- EP3-10 **Blood-Brain Barrier Opening Mechanism via Transcytosis and Tight Junction Protein Modulation by Focused Ultrasound.**  
Younghee Seo (Yonsei University College of Medicine, Republic of Korea)
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- EP3-11 **Non-Invasive Focused Ultrasound Facilitates the Intracranial Transplantation of Mesenchymal Stem Cells Inducing Cell-Adhesion Molecule Alterations**  
Ji Young Park (Yonsei University College of Medicine, Republic of Korea)
- 
- EP3-12 **Extensive Magnetic Resonance Guided Focused Ultrasound Mediated Blood-Brain Barrier Opening for the Treatment of Alzheimer's Disease: A Proof-of-Concept Study**  
So Hee Park (Yonsei University College of Medicine, Republic of Korea)
- 
- EP3-13 **Focused Ultrasound Induced Blood-Brain Barrier Opening to Facilitate Brain Tumor Suppressive Response in Radiation Therapy**  
Kuochen Wei (Chang Gung Memorial Hospital, Taiwan)
- 
- EP3-14 **Cavitation Mapping Based on Dual-Mode Ultrasound Phased Array**  
Trung Nguyen Hoang (Chang Gung University, Taiwan)
- 
- EP3-15 **Focused Ultrasound Induced Blood-Brain Barrier Opening Guided by Camera-Assisted Augmented Reality Setup**  
Trung Nguyen Hoang (Chang Gung University, Taiwan)
- 
- EP3-16 **Repeated Magnetic Resonance Image-Guided Focused Ultrasound Sonications to Enhance Low Dose of Liposomal Doxorubicin Delivery Weekly against 9L Gliosarcoma in a Rat Model**  
Sheng-Kai Wu (Sunnybrook Research Institute, Canada)

#### **4. Neuromodulation**

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- EP4-01 **Cytoskeleton Rearrangement of Cells in 3D Tissue Phantom Induced by Low Intensity Pulsed Ultrasound**  
Hyo Jun Kim (Korea Institute of Science and Technology, Republic of Korea)
- 
- EP4-02 **Study of Spatial and Temporal Dynamics of Focused Ultrasound (FUS)-Stimulated Calcium Transients in an In-Vitro Human Neural Cell Model**  
Ivan Suarez-Castellanos (Lab TAU, France)
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- EP4-03 **Closed-Loop Control of Epileptic Seizures by Low-Intensity Focused Ultrasound Brain Stimulation on the Awake Rodent Model**  
Jeungeun Kum (Korea Institute of Science and Technology, Republic of Korea)
- 
- EP4-05 **A Pilot Clinical Study of Low-Intensity Transcranial Focused Ultrasound in Alzheimer's Disease**  
Yong An Chung (The Catholic University of Korea, Republic of Korea)
- 
- EP4-06 **Ultrasound Neurostimulation of the Motor Cortex in Mice: Methods, Impact and Safety**  
Rasha Nouredine (Université de Tours & Lebanese University, France)
- 
- EP4-07 **Application of an Acoustic Reflective Casing for In-Vitro Neuromodulation: Pilot Reproducibility Data**  
Jak Loree-Spacek (University of Calgary, Canada)
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- EP4-08 **Optimizing Isoflurane Anesthesia Methodology for Focused Ultrasound Neuromodulation in Mice**  
Jake Hesselink (University of Calgary, Canada)
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- EP4-09 **Focal Ablation of the Spinal Dorsal Root Ganglion with MR-Guided Focused Ultrasound to Treat Lower Back Pain**  
Marta Iversen (University of Utah, United States of America)
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- EP4-10 **Remote Perturbation of Visual Behavior in Primates**  
Taylor Webb (University of Utah, United States of America)

## 5. Drug Delivery

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- EP5-01 **Highly Stable Microbubbles for Enhanced Cancer Diagnosis and Therapy through Exosome Hybridization**  
Yongho Jang (Sogang University, Republic of Korea)
- 
- EP5-02 **Acoustic and Thermal Characterization of Poly (lactic-co-glycolic acid) (PLGA)-Fibrin Composite Scaffolds for Use in High Intensity Focused Ultrasound (HIFU) Transgene Expression**  
Alexander Hostetler (University of Michigan, United States of America)
- 
- EP5-03 **Examining the In-Vitro Cytotoxicity of Focused Ultrasound Cavitated Docetaxel-Loaded Nanobubbles on Breast Cancer Mice Model Cells**  
Patrick Dong Min Chang (University of Toronto, Canada)
- 
- EP5-04 **Feasibility of Therapeutic Ultrasound Application in Topical Scleral Delivery of Avastin**  
Hanaa Almgobil (George Washington University, United States of America)
- 
- EP5-05 **Efficient and Safe FUS-Mediated BBB Opening at the Whole Brainstem**  
Yan Gong (Washington University in St. Louis, United States of America)
- 
- EP5-06 **Sonophoresis with Ultrasound Responsive Lipid Bubble for Transdermal Drug Delivery**  
Jongbum Seo (Yonsei University, Republic of Korea)
- 
- EP5-07 **Effect of Diagnostic Ultrasound and Microbubble Enhanced Chemotherapy on Metastasis of Rabbit VX2 Tumor**  
Xi Tan (The Second Hospital of the Army Medical University, China)
- 
- EP5-08 **Investigation of Sonosensitive PLGA and PEG-PLGA Nanocapsules for Drug Delivery with Use of Focused Ultrasound**  
Ula Savsek (Friedrich–Alexander University Erlangen–Nürnberg, Germany)
- 
- EP5-10 **Enhancing the Efficacy of Micron-Scale Drug-Eluting Bubble-Beads via Acoustic Cavitation**  
Joshua Owen (National Institutes of Health, United States of America)
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EP5-11 **Reloadable Drug Reservoirs in the Brain: DBCO-Cy7 Clearance from the Brain Following Ultrasound-Mediated Delivery**

Phillip Durham (The University of North Carolina at Chapel Hill, United States of America)

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EP5-12 **Spatially Directed Angiogenesis Via The Controlled Release of Basic Fibroblast Growth Factor (bFGF) Using Acoustic Droplet Vaporization (ADV)**

Mario L. Fabiilli (University of Michigan, United States of America)

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## 6. Thermal FUS

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EP6-02 **Assessment of Rectosigmoid Deep Infiltrating Endometriosis Acoustic Properties**

Morgane Dairien (LAB Tau, France)

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EP6-03 **An Improved Polyacrylamide Hydrogel Phantom for Monitoring HIFU Lipolysis**

Seong-Chan Kim (Jeju National University, Republic of Korea)

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EP6-04 **Thermal Dose Optimization Method for Focused Ultrasound Treatment**

Xilun Liu (Pennsylvania State University, United States of America)

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EP6-05 **A Murine Model in a Novel Treatment for Deep Infiltrating Rectosigmoid Endometriosis with Therapeutic Ultrasounds**

Morgane Dairien (LAB Tau, France)

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EP6-06 **High-Intensity Focused Ultrasound (HIFU) Therapy for Unresectable Pancreatic Cancer**

Atsushi Sofuni (Tokyo Medical University, Japan)

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EP6-07 **Effects of MR-HIFU Ablation on Bone Composition and Mineral Properties**

Sin Yuiin Yeo (University Hospital of Cologne, Germany)

---

EP6-08 **Two-Year Survival Outcome of HIFU Ablation for Inresectable Pancreatic Cancer: A Retrospective Study**

Kun Zhou (The Second Affiliated Hospital of Chongqing Medical University, China)

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EP6-09 **Radiosensitization Effect of Magnetic Resonance Imaging-Guided Focused Ultrasound in Prostate Xenograft Mice Model**

Xinrui Zhang (University of Leipzig, Germany)

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## 7. Non-thermal FUS

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EP7-01 **Optimizing Histotripsy Parameter Settings for the Treatment of Benign Prostatic Hyperplasia**

Zorawar Singh (University of Washington, United States of America)

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EP7-02 **In-Vivo Liver Tissue Decellularisation by Pressure-Modulated Shockwave Histotripsy**

Jeongmin Heo (Korea Institute of Science and Technology, Republic of Korea)

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- 
- EP7-03 **In-Vitro Assessment of Lytic Dose on Histotripsy-Enhanced Thrombolysis**  
Samuel Hendley (University of Chicago, United States of America)
- 
- EP7-04 **Stimulated Drug Delivery Using a Programmable Ultrasound Scanner Equipped with a 3D Transducer Array**  
Ryan Margolis (University of Texas at Dallas, United States of America)
- 
- EP7-05 **Partial Histotripsy Ablation Promotes Tumor Free Survival in an In-Vivo Orthotopic, Metastatic Rodent Liver Tumor Model**  
Tejaswi Worlikar (University of Michigan, United States of America)
- 
- EP7-06 **Histotripsy Bubble Dynamics in an Anisotropic Gel Phantom**  
Jacob Elliott (Pennsylvania State University, United States of America)
- 
- EP7-07 **Pancreas Tumor Disruption with Focused Ultrasound**  
Joan Vidal-Jove (Comprehensive Tumor Center Barcelona, Spain)
- 
- EP7-08 **Atomization of Bovine Tendon on a Planar Tissue-Air Interface**  
Molly Smallcomb (Pennsylvania State University, United States of America)
- 
- EP7-09 **Nanodroplet-Mediated Histotripsy Using Low Frequency Ultrasound for Low Energy Cancer Therapy**  
Bar Glickstein (Tel Aviv University, Israel)
- 
- EP7-11 **Safety Margins of Focus Positioning during Boiling Histotripsy Liquefaction of Large Hematomas Adjacent to Gas-Containing Organs**  
Ekaterina Ponomarchuk (Lomonosov Moscow State University, Russian Federation)
- 
- EP7-12 **Pulsing Schemes for Phase Change Nanodroplet-Mediated Sonothrombolysis**  
Jinwook Kim (The University of North Carolina at Chapel Hill, United States of America)
- 
- EP7-13 **The Effects of Focused Ultrasound on Hippocampal Long-Term Potentiation in a Mouse Model of Alzheimer's Disease**  
Chanho Kong (Yonsei University College of Medicine, Republic of Korea)

## 8. Emerging Technologies and Hardware

- 
- EP8-01 **Intracellular Calcium Signaling Dynamics during Non-Ablative Focused Ultrasound**  
Scott Burks (National Institute of Health Clinical Center, United States of America)
- 
- EP8-02 **Investigating the Influence of Passive 'Propeller Beanie' Crossed Wires on Local Receive-Only Coils in the Insightec tcMRgFUS System**  
Xinqiang Yan (Vanderbilt University Medical Center, United States of America)
- 
- EP8-03 **Passive Cavitation Detection with a Needle Hydrophone Array**  
Zheng Jiang (Imperial College London, United Kingdom)
-

- 
- EP8-04 **Compact Cell Sonoporation Device for Adhesive Cells**  
Mohammad Jahromi (University of Calgary, Canada)
- 
- EP8-05 **Sound Pressure by Structural Changes of Carbon Nanotube Transducers**  
Jooho Lee (Jeju National University, Republic of Korea)
- 
- EP8-06 **Compact Cell Device to Perform Sonoporation Experiments on Adherent Cells**  
Ganga Poudel (University of Calgary, Canada)
- 
- EP8-07 **Multi-Axial Transducers for Passive Point Source Localization**  
Nathan Meulenbroek (University of Calgary, Canada)
- 
- EP8-08 **Physiologically-Relevant 3D-Printed Microchannels for Controlled Study of Microbubble Ultrasound Backscatter**  
Roger Domingo-Roca (University of Strathclyde, United Kingdom)
- 

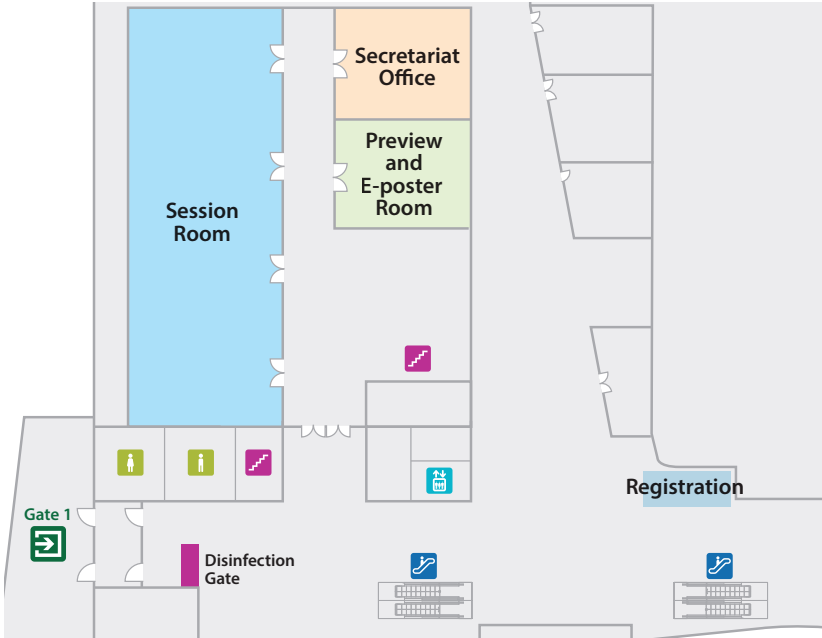
## 9. Other applications

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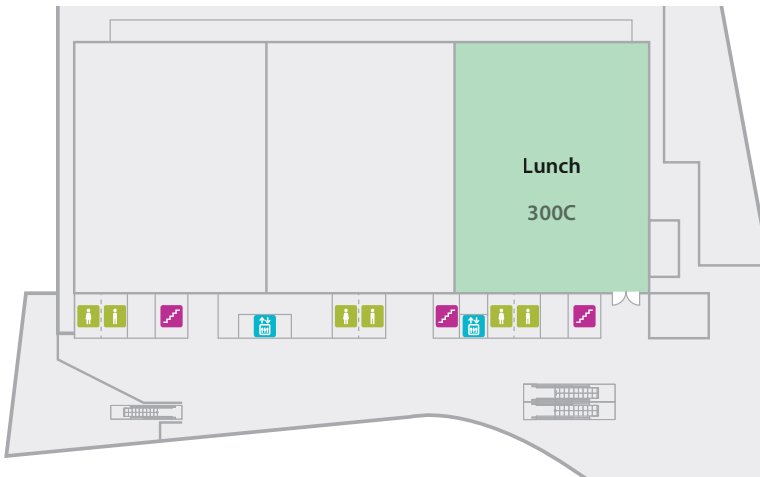
- EP9-02 **Variability in Acoustic Outputs From the Shock Wave Transmitters Line-Up Employed in a Ballistic Shock Wave Device**  
Ohbin Kwon (Jeju National University, Republic of Korea)
- 
- EP9-03 **Assembling and Testing a System for Ultrasound Hyperthermia in Small Animals**  
Raphaela Baesso (National Physical Laboratory, United Kingdom)
- 
- EP9-04 **Low-Intensity Ultrasound Inhibits Melanoma Cell Proliferation In-Vitro and Tumor Growth In-Vivo**  
Loreto Feril (Fukuoka University School of Medicine, Japan)
- 
- EP9-05 **A Robot Design Implementing Two-Step Positioning of Ultrasound Transducer for Brain Stimulation**  
Joonho Seo (Korea Institute of Machinery and Materials, Republic of Korea)
- 
- EP9-06 **Elucidation of the Physical Properties of Bulk Nanobubbles: The Effect of Bubble Size on Ultrasonic Gene Therapy**  
Hiroshi Kida (Fukuoka University School of Medicine, Japan)
- 
- EP9-07 **Efficacy and Comparison of the Ultrasonographic Contrast in Rat Models with Various Muscle Injuries**  
Da-Sol Kim (Jeonbuk National University Hospital, Republic of Korea)
- 
- EP9-09 **In-Vitro Study of Effective Mechanisms in Cell Death by Therapeutic Ultrasound and Microbubbles**  
Eun-Joo Park (Seoul National University Hospital, Republic of Korea)
-

# Floor Plan

1F



3F



# Registration

## Registration Desk

Location	Lobby (1F)	
Working Hours	June 6 (Sun)	15:00-18:00
	June 7 (Mon)	07:00-18:00
	June 8 (Tue)	07:00-18:00
	June 9 (Wed)	07:00-15:00

## Congress Kit

A congress kit will be given to each registered in-person attendee. This will include the Program Book and your name tag in an ISTU 2021 keepsake bag.

## Name Tag

As a security requirement, please wear your name tag at all times within the venues to access sessions and catering.

## Certificate of Attendance

Participants can download a certificate of attendance from 'My Page' on the ISTU 2021 website after the meeting.

## Lost & Found

Should you lose or find anything, please report to the registration desk for assistance.



# 평점안내 (for Korean Participants)

## 대한의사협회 평점안내

대한의사협회 연수교육지침에 의거하여, 각각의 세션마다 입·퇴실 시간이 확인되어야 평점을 받을 수 있습니다. 버튼을 누르지 않으면 수강시간이 계산되지 않으니 반드시 세션 전후에 한번씩 눌러주시기 바랍니다. 누락으로 인한 사후 반영은 불가합니다.

## 출결 체크 안내

### 현장

하루에 두번이상 바코드 스캐너에 명찰을 태그해주시기 바랍니다.

### 온라인

- 화면 우측 하단에 있는 입장(세션입장)과 퇴장(세션퇴장) 버튼을 클릭하시기 바랍니다.
- 버튼을 누르지 않거나 화면 상단의 뒤로가기 버튼을 클릭하시면 시간이 계산되지 않습니다.
- 프로그램에 제시된 순서 강의 시간만 수강시간으로 인정됩니다. (개회식, 총회 등은 포함되지 않습니다.)
- 강의 시작시간 이전에 로그인, 종료시간 이후에 로그아웃하여도 강의 시작과 종료시간 기준으로 수강시간이 계산됩니다.

## 평점 안내

구분	6월 7일(월)	6월 8일(화)	6월 9일(수)
평점	6평점	6평점	6평점
지급평점	시간 당 부분 평점 있으며, 체류 시간에 따라 점수 계산 (체류시간 60분당 1평점) 1 시간 이상 - 2 시간 미만: 1 평점 2 시간 이상 - 3 시간 미만: 2 평점 3 시간 이상 - 4 시간 미만: 3 평점 4 시간 이상 - 5 시간 미만: 4 평점 5 시간 이상 - 6 시간 미만: 5 평점 6 시간 이상: 6 평점		

## 온라인 심포지엄 페이지 안내

ISTU 2021 온라인링크 주소 : <http://virtual.istu2021.org>

- 상기 링크는 6월 7일부터 접속 가능하며, ID/PW는 ISTU 2021 홈페이지에 등록하신 ID(이메일주소)와 istu2021을 입력하시면 됩니다.
- 동일 ID로 중복 로그인이 불가능합니다.
- 온라인 심포지엄 페이지는 PC 접속 및 Chrome에 최적화되어 있습니다.
- Internet Explorer로는 접속이 불가능하며, Microsoft Edge로 접속 시 뒤틀림 현상이 있을 수 있으니 Chrome으로 접속해주시기 바랍니다.

# Official & Social Program

## Welcome Reception

LOCATION Lobby (1F)  
DATE & TIME June 6 (Sun), 18:00-20:00

## Opening Remarks

LOCATION Room 101-104(1F) and live streaming  
DATE & TIME June 7 (Mon), 09:00-09:30

## ISTU General Assembly

LOCATION Live streaming  
DATE & TIME June 7 (Mon), 17:30-18:00

## KSTU General Assembly

LOCATION Room 103 (1F)  
DATE & TIME June 8 (Tue), 12:30-13:30

## Banquet

LOCATION Lahan Select Hotel, Agena / Regel Hall (2F)  
DATE & TIME June 8 (Tue), 19:00

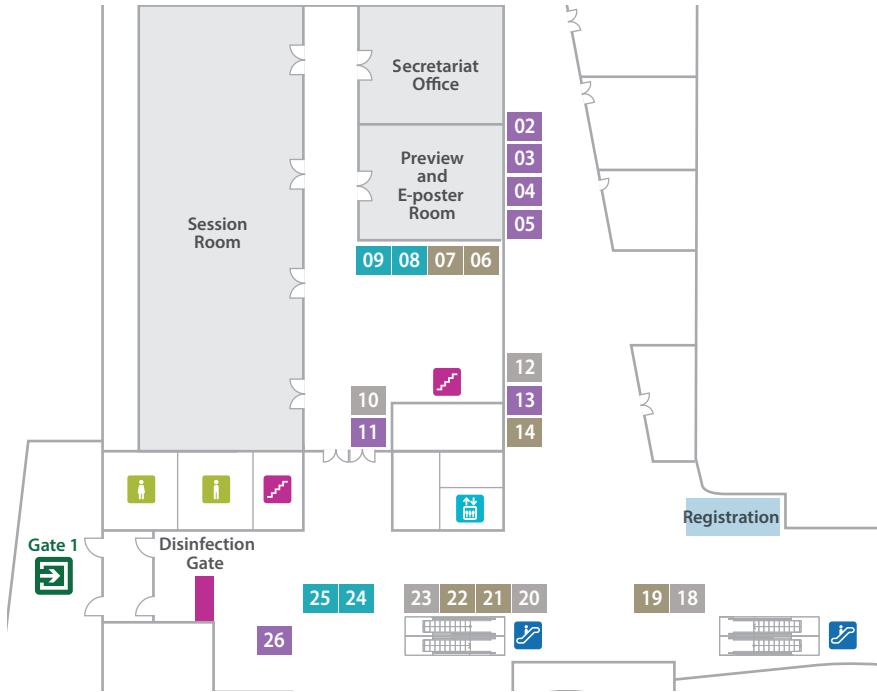
## Student Award Announcements

LOCATION Room 101-104(1F) and live streaming  
DATE & TIME June 9 (Wed), 15:30-16:30

## Closing Remarks

LOCATION Room 101-104(1F) and live streaming  
DATE & TIME June 9 (Wed), 16:30

# Exhibitions



Platinum	Central Medical Service Co., Ltd.	24, 25
	Huons. Co. Ltd.	8, 9
Silver	IMGT Co., Ltd.	20
	DK Life Science Co.	12
	GE Healthcare Korea	23
	Bracco Imaging Korea, Ltd.	18
	HNT Medical Co., Ltd.	10
Bronze	Verasonics, Inc.	6
	Guerbet Korea	21
	DK Medical Solutions Co., Ltd	7
	Philips Korea Ltd.	19

Bronze	JM Mediworks Co, Ltd.	14
	Bayer Korea Ltd.	22
Exhibitor	Canon Medical Systems Korea Co., Ltd.	4, 5
	STARmed Co., Ltd.	11
	KORUST Co., Ltd	3
	Neurosona Co., Ltd.	13
	Korean Society of Ultrasound in Medicine	2
	Alpinion Medical Systems Co., Ltd.	26

## General Information

### Information for Virtual Meeting

Website Address	<a href="http://virtual.istu2021.org">http://virtual.istu2021.org</a>
Access Period	June 7 (Mon) – July 10 (Sat), 2021
Browser	Google Chrome *The ISTU 2021 Virtual Platform is optimized for Google Chrome. Please use Google Chrome when joining the platform as it may not run properly on other browsers (i.e. Internet Explorer, Microsoft Edge, Safari, Firefox, etc.)
How to Log-in	ID: Email address used to sign-up on the ISTU 2021 website PW: istu2021 *If you need to change your password, please contact the secretariat at <a href="mailto:office@istu2021.org">office@istu2021.org</a> .

### Information for Speakers

#### Preview / E-poster Room

	June 7 (Mon)	07:00-18:00
Operation Hours	June 8 (Tue)	07:00-18:00
	June 9 (Wed)	07:00-16:00
Place	Room 105 (1F)	

#### How to proceed with the session

ISTU 2021 will be live-streamed using all the presenters' pre-recorded presentation videos. However, we strongly encourage all chairs and speakers to attend the sessions over Zoom at the time of their respective presentations (GMT+9) as we will hold live Q&A sessions during each session. We ask that all speakers and chairs be connected and in the Zoom waiting room 20 minutes before the session begins. The orientation for speakers will be conducted at this time.

#### Consent for Use of Meeting Content

We will have all the ISTU 2021 content available to view 'on-demand' for a period of one month following the event on our Virtual Platform for all paid ISTU registrants to view. ISTU reserves the right to use meeting content such as photographs, lectures, abstracts, and video recordings from the sessions in our future materials, our website, and within our Member Archives. We cordially request that you submit an 'Opt-Out Form' for the meeting content if you would prefer to withdraw your consent for ISTU future usage.

## Live Q&A

Session chairs will select questions from the platform's live chat that viewers write in and will ask those questions to the speakers during the live Q&A.

## Information for On-site Attendees

### Lunch

The meal will be served in Room 300C.

Date & Time	Time	Place
June 7 (Mon)	12:30-13:30	Room 300C (3F)
June 8 (Tue)	12:30-13:30	Room 300C (3F)
June 9 (Wed)	12:30-13:30	Room 300C (3F)

### Shuttle Bus Schedule

Singyeongju Station → HICO		
Date	Departure	Time
June 6 (Sun)	Singyeongju Station	15:30, 16:45, 18:10
June 7 (Mon)	Singyeongju Station	08:50, 10:15
HICO → Singyeongju Station		
Date	Departure	Time
June 9 (Wed)	HICO	17:00, 18:20

## Evaluation Survey

Please take a moment to complete a very short Evaluation Survey. We appreciate your feedback which is very important for the development of future ISTU programs.

<https://www.surveymonkey.com/r/ISTU2021>



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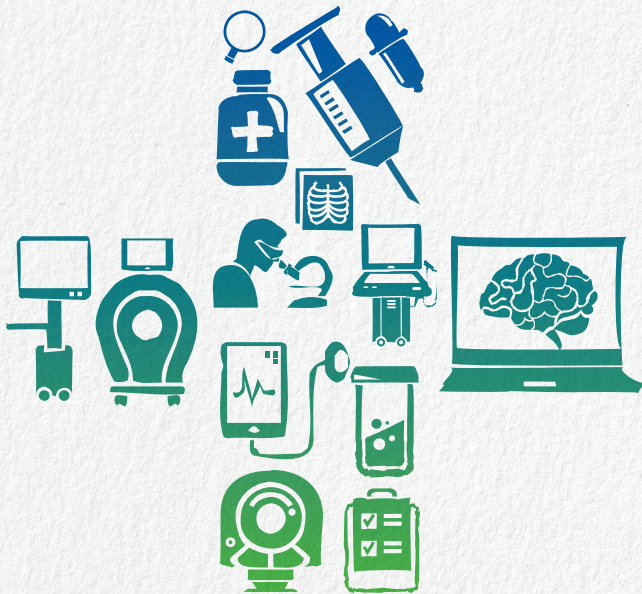
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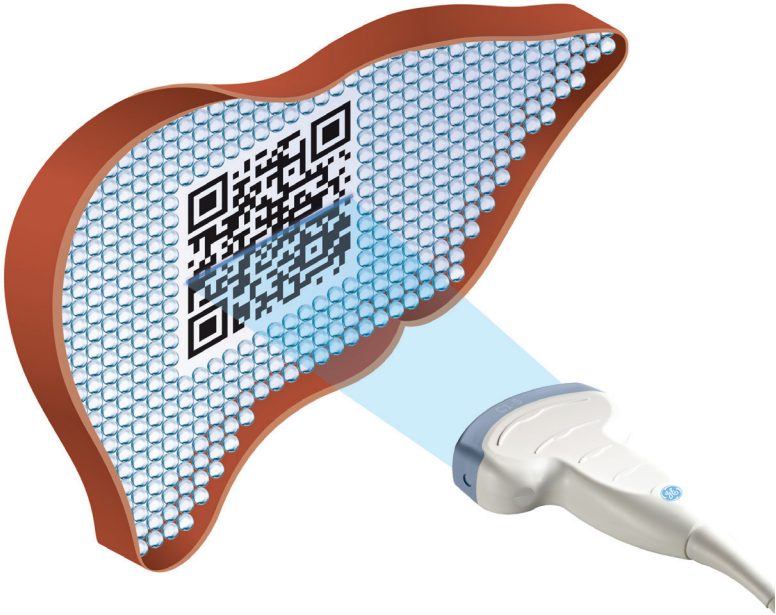
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Reference: 1. Masanori Takahashi et al, AJR 2011; 196:W123-W131 2. Moriyasu and Itoh, AJR 2009; 193:86-95

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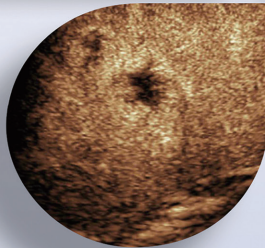
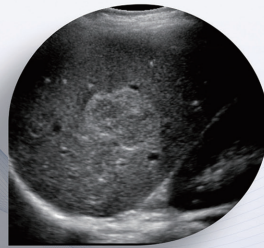
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References: 1. Contrast enhanced ultrasound for the characterization of focal liver lesions – Diagnostic accuracy in clinical practice (DEGLUM multicenter trial) – D. Strobel et al., *Ultraschall in Med* 2008; 29:499-505 2. Role of contrast-enhanced ultrasound in the blinded assessment of focal liver lesions in comparison with MDCT and CEMR: Results from a multicentre clinical trial - F. Tranquart et al., *European Journal of Cancer Supplements* 2008; 6: 9-15.

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Generator : 고전압 인버터 방식



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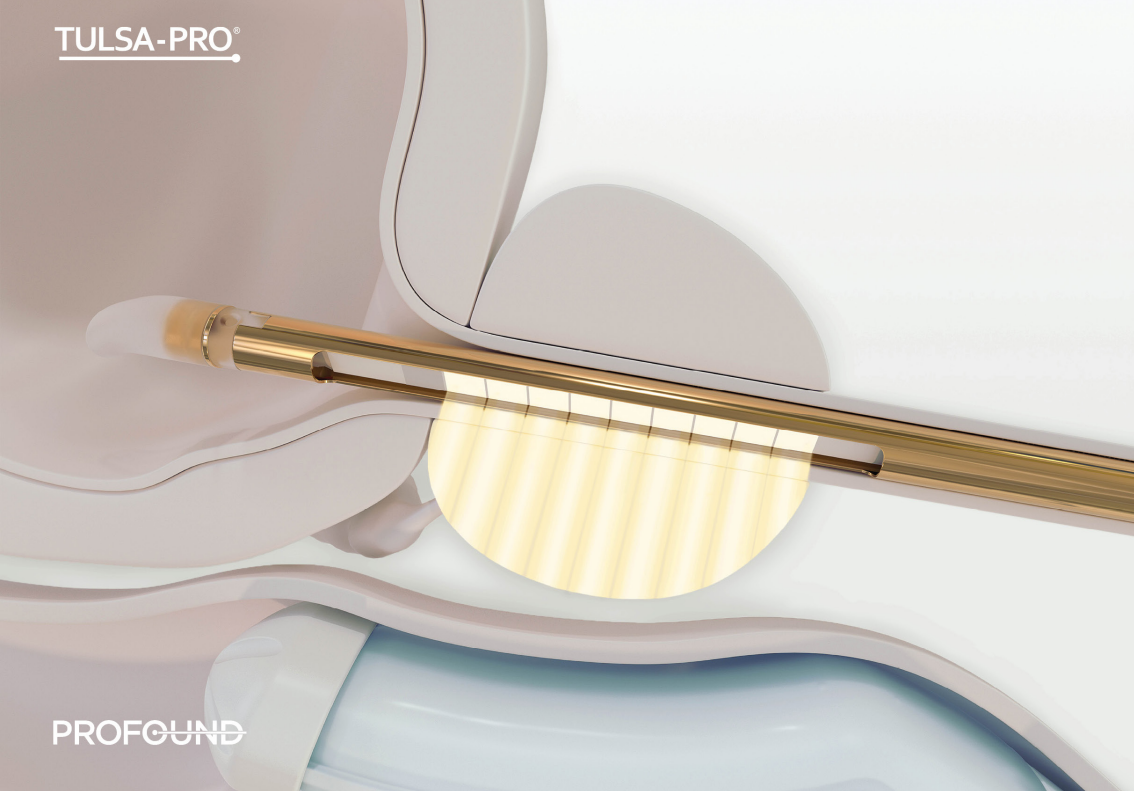
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# Confidence is U



1. Kawanishi DK, Saito M, Ishii H, et al. Ultravist® DEU (iopromide) in intravascular use: a pooled analysis of three non-contrast-enhanced studies in 13,212 patients. *Acta Radiol*. 2015;56:1007-1014.

2. Kwon JY. Value-added functionality of Ultravist® DEU (iopromide) in percutaneous coronary catheterization: real-world multicenter experience with 12,133 patients. *From the JBIR 2017 Evidence Mapping*. 2015;11:1281-1291.

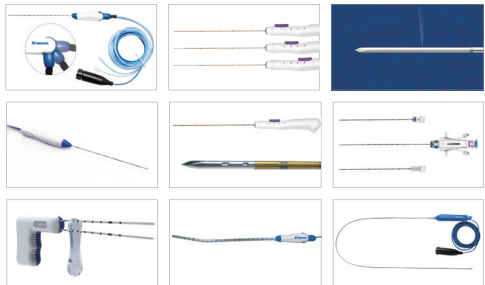
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- Lung RFA
- Renal Cancer RFA
- Bone Tumor RFA
- Osteoid Osteoma RFA
- Thyroid RFA
- Varicose Vein RFA
- Myolysis RFA
- Endometrial Ablation
- Bloodless Liver Resection
- Semi-Automatic Biopsy Guns
- Guiding Systems for Biopsy & RFA
- RF Pain Management



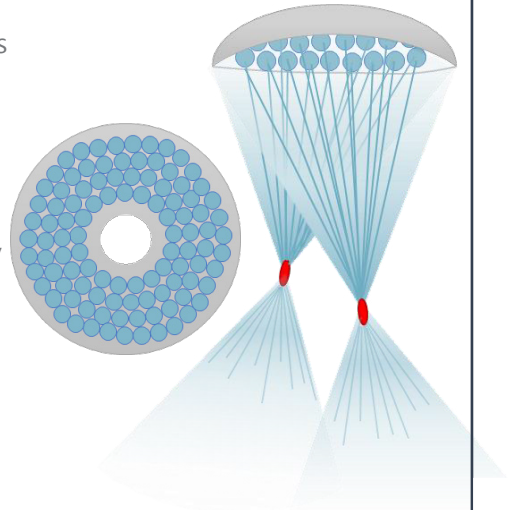
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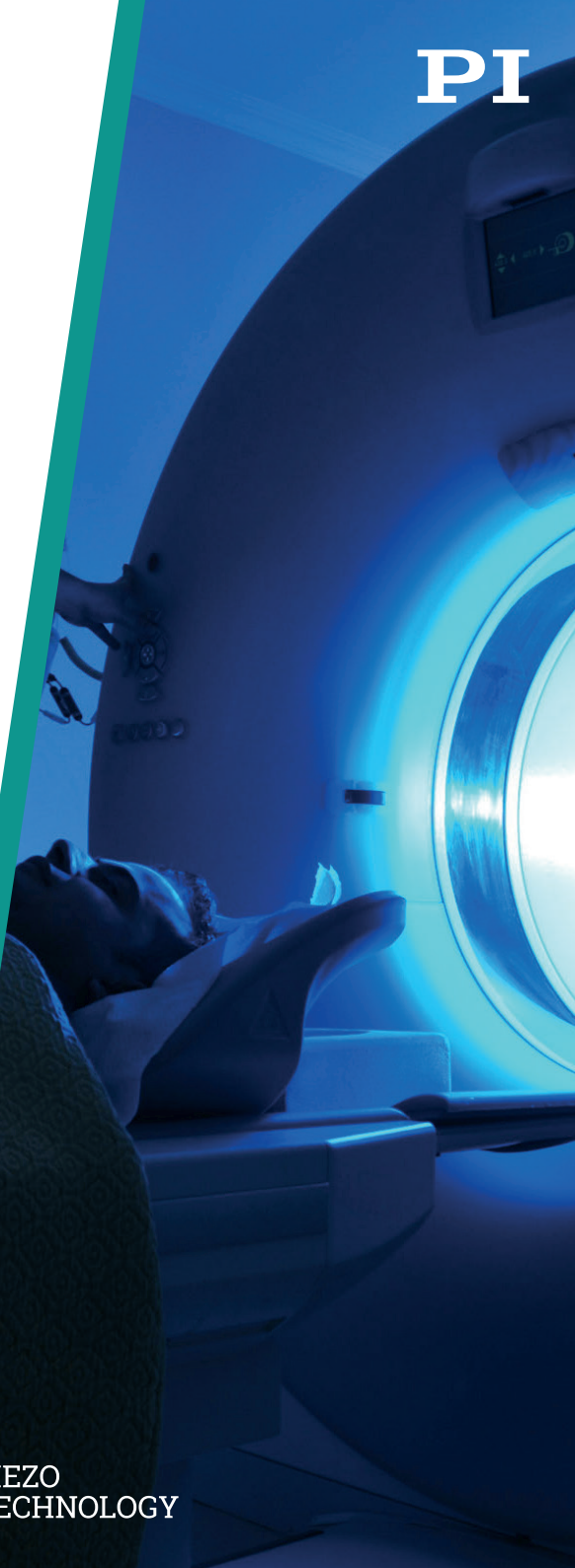
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**+ An efficient process**

- Tandem 기능 : 2개의 다른 조영제를 병렬로 사용 가능
- 동일 제품의 조영제 2병을 동시 사용시 CA1에서 CA2로 자동교체
- 50ml ~ 1,000ml 용기 사용 가능(Bag, Bottle 타입 무관)
- Pump tube : 1일 1회 설정 (최대 24시간 사용 가능)



**+ Safe and reliable application**

- 에어디텍타가 Pump tube 내의 기포를 즉시 감지하여 보다 안전하게 검사
- 1μl의 기포를 감지, 누적 1ml 도달 시 주입 일시 정지



**+ Economical and environmentally friendly**

- 간편한 조작으로 환자 준비 시간 단축
- 2가지 소모품(Pump tube, Patient tube)만 사용
- Pump tube : 최대 24시간 동안 다수의 환자에게 사용 가능
- Patient tube : 환자 당 1회 사용



**+ Multi-compatible and individual**

- 사용자의 요구에 이상적으로 맞추어진 CT motion은 다양한 환자들의 검사 요건에 최적화됨



**+ A high level of hygiene**

- 24시간 사용 가능한 펌프튜브는 매 검사 후 셀라인으로 자동 세척됨