



# 6th International Symposium on Focused Ultrasound 2018

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**RESTON, VIRGINIA | OCTOBER 21-25, 2018**

**Abstract Book**

Hyatt Regency Reston  
Reston, Virginia, USA



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## Welcome Messages



### From the Honorary President

This week, I join my colleagues as we convene for the Focused Ultrasound Foundation's biennial event. I am honored to be a part of this invaluable opportunity to gather and learn of the latest advances and techniques in the field of therapeutic ultrasound.

In my clinical practice, I have personally seen this technology change lives. Focused ultrasound has enabled a four-year-old child with a desmoid tumor in her forearm to participate in gymnastics again. It has made it possible for a 78-year-old man with painful metastatic melanoma to stop his narcotics for the first time in years and ride his horse to his cabin in the mountains. And it has allowed an 84-year-old woman who was isolated by her hand and vocal tremor to feel confident about speaking with her friends and family on the phone and eating with them at a restaurant. I truly believe that focused ultrasound is an incredibly effective, noninvasive solution for many patients, and yet, we have just begun to scratch the surface of its applications.

The Symposium is an opportunity to broaden focused ultrasound's impact into new indications and innovative uses of the technology. We are able to draw inspiration from work being done around the world and create collegial contacts with whom we can collaborate on future projects.

I encourage you to spend this week exploring new ideas and establishing new partnerships, allied to expand the field of therapeutic ultrasound beyond its current achievements.

*Pejman Ghanouni, MD, PhD*

Assistant Professor of Radiology, and, by courtesy, of Neurosurgery and of Urology  
Stanford University Medical Center  
Honorary Symposium President

## Welcome Messages (continued)



### From the Foundation Chairman

Dear Colleagues:

Welcome to the 6th International Symposium on Focused Ultrasound. There has never been a more important time to convene as we acknowledge the field's immense growth in the past two years. There are now more than 100 clinical indications for which focused ultrasound is in various stages of research, development, and commercialization. This is an astonishing increase since the Foundation was created in 2006, and this progress is the result of your hard work, dedication, and innovation.

Over the next four days, we will share data, foster collaboration, and identify applications that offer maximum value to patients. We will hear from leading experts in this innovative field as they share findings through a record 240 oral and poster presentations.

I cannot stress enough the importance of exploring new partnerships this week as you are surrounded by leaders in all stages of focused ultrasound research and commercialization. The event provides unique value to all attendees: clinicians can communicate their medical needs, manufacturers have the opportunity to showcase their products, and scientists will share newly identified mechanisms of action that can translate into treatments.

We appreciate your participation in the Symposium and your steadfast commitment to advancing focused ultrasound technology. I am confident that at the close of this event, you will feel inspired to pursue the important research and collaborations that will make tangible progress toward improving patients' lives.

In closing, I would like to acknowledge the generosity of our donors and the support of our sponsors. They have made this meeting possible. Thank you.

Be well,

*Neal F. Kassell, MD*

Chairman, Focused Ultrasound Foundation

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## Trans-cranial magnetic resonance-guided focused ultrasound (tcMRgFUS) system integrated with a 1.5T: An SNR study on DQA phantoms

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**Background:** In recent years transcranial Magnetic Resonance-guided Focused Ultrasound Surgery (tcMRgFUS) treatments have been performed only using 3T units. Since following some internal analysis, planning images obtained using a 1.5T MRI's body RF coil (as usually done with 3T systems) showed generally reasonable quality in terms of anatomy visualization and SNR but thermal images noise was above acceptable standard for treatments, a dedicated 2-channels head coil was developed (INSIGHTEC Ltd.) to ensure an adequate signal-to-noise ratio (SNR). Hence, we present the imaging protocol and the technological methods successfully used with the world-first installation of a certified tcMRgFUS system (ExAblate 4000, INSIGHTEC Ltd.) integrated with a 1.5T scanner (Signa HDxt, GE Medical Systems).

**Methods:** We used the NEMA (2008) test methods for measuring the SNR of both MRI's body RF coil and the dedicated coil. T2w-FRFSE images were obtained from a dedicated tcMRgFUS daily quality assurance (DQA) phantom using the same MRI protocol subsequently used for real treatments planning.

**Results:** Compared to that achieved using MRI's body RF coil, the dedicated coil resulted in significantly larger values of the SNR on all planes. In particular, for the axial plane, using the body RF coil we measured a SNR equal to 2.5, 5.1 and 6.0 at 1, 4 and 6 NEXs respectively whereas it was equal to 27.5, 51.5 and 67.3 when using the dedicated 2-ch head coil: therefore, an increase of more than 10 times was achieved. For the coronal and the sagittal planes, we measured a gain of about 6 and 3 times respectively.

**Conclusions:** Even though the SNR linearly increases with magnetic field strength, it should be underlined that on a 1.5T scanner the use of a dedicated coil enabled us to obtain images with a SNR roughly 5 times larger than those acquired on 3T scanners using MRI's body RF coil.

**Acknowledgements:** The installation of the tcMRgFUS equipment used in this work was funded by the Italian Ministry of Education, University and Research (MIUR) within the project "Programma Operativo Nazionale 2007-3013" (PONa3\_00011; Project Leader: Prof. Carlo Catalano).

# Thank you!

The Focused Ultrasound Foundation wishes to thank its exceptional Board of Directors and Council for their steadfast dedication to helping make focused ultrasound a clinical reality and improve the lives of millions of patients.

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