

PROGRAM AND REGISTRATION

44th International Symposium on Ultrasonic Imaging and Tissue Characterization

June 5 – June 7, 2019
Westin Arlington Gateway
Arlington, VA

The annual International Symposium on Ultrasonic Imaging and Tissue Characterization has long been recognized as one of the world's leading forums concerned with ultrasonic technology for medical applications. Forty-five technical contributions will be presented this year. Many of the presentations will deal with clinical evaluation of novel methodologies and instrumentation for tissue characterization.

The program includes technical sessions on tissue parameters, tissue elasticity, ARFI, photoacoustics, imaging and imaging/robotics. In a special session to be held on Wednesday afternoon, NIH representatives will respond to questions regarding research-funding opportunities in the face of budget constraints at NIH.

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PROGRAM

WEDNESDAY, JUNE 5

7:30 a.m. **Registration/Coffee and Pastry**

8:30 a.m. **Welcome**
Ernest J. Feleppa, *Symposium Chairman*

8:35 a.m. **1. TISSUE PARAMETERS 1**
Chair: Gregory J. Czarnota, *U Toronto*

1.1 **Breast lesion characterization using quantitative ultrasound mean-values, texture and texture-derivates**, Laurentius Osapoetra, Lakshamanan Sannachi, Hadi Moghadas, Daniel DiCenzo, Karina Quiaoit, Kashuf Fatima, Gregory Czarnota, *Sunnybrook Health Sci Ctr, Sunnybrook Res Inst*

8:51 a.m.

1.2 **Early prediction of breast cancer therapy responses using quantitative ultrasound texture derivative method with machine learning approach**, Steven Brade, Lakshmanan Sannachi, Christopher Kolios, Gregory Czarnota, *Sunnybrook Health Sci Ctr, Sunnybrook Res Inst*

9:07 a.m.

1.3 **A priori prediction of breast cancer response to neoadjuvant chemotherapy using quantitative ultrasound texture-derivative methods combined with machine learning**, Steven Brade, Lakshamanan Sannachi, Christopher Kolios, Gregory Czarnota, *Sunnybrook Health Sci Ctr*

9:23 a.m. **2. ELASTICITY**
Chair: Timothy J. Hall, *U Wisconsin-Madison*

2.1 **Longitudinal study of shear wave speeds in the human cervix during pregnancy**, Lindsey Carlson, Helen Feltovich,

Timothy Hall, *Intermountain Healthcare, U Wisconsin -Madison*

9:39 a.m.

2.2 Quality metric for multi-compression accumulated displacement estimates in nonlinear elasticity imaging, Yuqi Wang, Timothy J. Hall, *U Wisconsin-Madison*

9:55 a.m.

2.3 Comparative study of PVCp and gel-oil elasticity phantoms for 3D printing, Tara Diba, Nima Akhlaghi, Jason Zara, William Vogt, Timothy Hall, Brian Garra, *George Washington U, FDA, U Wisconsin-Madison*

10:11 p.m. **Coffee**

10:56 p.m.

2.4 2D tracking improves quantitative nonlinear shear modulus estimation, Soumya Goswami, Rifat Ahmed, Marvin M. Doyley, Stephen A. McAleavey, *U Rochester*

11:12 a.m.

2:5 Local phase velocity imaging (LPVI) for shear wave elastography of *in vivo* kidneys using a clinical scanner, Piotr Kijanka, Matthew W. Urban, *Mayo Clinic, AGH, U Sci Tech, Poland*

11:28 a.m.

2.6 Convolutional neural network for displacement and strain estimation for ultrasound elastography, Md Golam Kibria, Hassan Rivaz, *Concordia U*

11:44 a.m.

2.7 Physics-driven machine-learning approach to quantitative 3-D quasi-static elastography, Cameron Hoerig, Jamshid Ghaboussi, Michael F. Insana, *U Illinois, Urbana-Champaign*

12:00 p.m. **Lunch**

2:00 p.m. **3. IMAGING 1**

Chair: Siddhartha Sikdar, *George Mason U*

3.1 Tissue Doppler imaging to detect muscle fatigue, Joseph Majdi, Siddhartha Sikdar, *George Mason U*

2:16 p.m.

3.2 Contrast plane wave Doppler imaging of the rat eye, Ronald H. Silverman, Raksha Urs, Gulgun Tezel, Jeffrey A. Ketterling, Alfred C.H. Yu, Billy Y.S. Yiu, *Columbia U Med Ctr, Riverside Res, U Waterloo*

2:32 p.m.

3.3 Proprioceptive sonomyographic control: A novel ultrasound-based method for prosthetic control for upper-extremity amputees, Shriniwas Patwardhan, Biswarup Mukherjee, Ananya S. Dhawan, Nima Akhlaghi, Wilsaan Joiner, Siddhartha Sikdar, *George Mason U, U California, Davis*

2:48 p.m.

3.4 Safety and acoustic output characterization of a time delay spectrometry based ultrasound imaging system, Biswarup Mukherjee, Ananya S. Dhawan, Elizabeth Tarbox, Nima Akhlaghi, Paul Gammell, Parag Chitnis, Siddhartha Sikdar, *George Mason U, Gammell Applied Tech*

3:04 p.m. **Coffee**

3:46 p.m. **4. IMAGING 2**

Chair: Gregg E. Trahey, *Duke U*

4.1 Fast subsample speckle tracking method based on normalized cross correlation, Brandon Rebholz, Mohamed Almekkawy, *Penns State U*

4:02 p.m.

4.2 Ultrasound-waveform tomography using speckle diffraction, Lianjie Huang, Benxin Chi, Kai Gao, Yunsong Huang, *Los Alamos National Lab*

4:18 p.m.

4.3 Adaptive clutter subtraction in B-mode imaging using lag-one coherence (LOC), Will Long, Nick Bottenus, Gregg E. Trahey, *Duke U*

4:34 p.m.

4.4 Characterization of *in-vivo* human breast tumors using Harmonic Motion Imaging (HMI) — Initial clinical feasibility, Niloufar Saharkhiz, Hermes Kamimur, Rachel Weber, Bret Taback, Richard Ha, Elisa Konofagou, *Columbia U, New York-Presbyterian Hosp*

4:50 p.m. **5. NIH PROGRAM FUNDING (Discussion)**

Houston Baker, *NCI*; Ruth S. Grossman, *OSR/NIGMS*; and James G. Miller, *Washington U. in St. Louis* (Moderator)

5:25 p.m. **Adjourn**

THURSDAY, JUNE 6

8:00 a.m. **Coffee and Pastry**

9:00 a.m. **6. IMAGING /ROBOTICS**

Chair: Emad M. Boctor, *Johns Hopkins U*

6.1 **Robotic hand-over-hand control framework for trans-abdominal ultrasound with implications for co-robotic ultrasound tomography guided by endorectal probe**, Kevin Gilboy, Mahya Shahbazi, Russell Taylor, Emad Boctor, *Johns Hopkins U*

9:16 a.m

6.2 **Autonomous robotic ultrasound scanning with six-degree-of-freedom force feedback control**, Jakub T. Kaminski, Haichong K. Zhang, *Worcester Polytech Inst*

9:32 a.m.

6.3 **Modular ultrasound for needle guidance: a hands-free approach**, Keshuai Xu, Christian A. Hernandez, Younsu Kim, Haichong K. Zhang, Emad M. Boctor, *Johns Hopkins U, Worcester Polytech Inst*

9:48 a.m

6.4 **Phantom for simulating multi-modality imaging in transcatheter interventions**, Michael A. Speidel, Lindsay E. Bodart, Martin G. Wagner, Amish N. Raval, Timothy J. Hall, *U Wisconsin-Madison*

10:04 a.m. **Coffee**

10:49 a.m. **7. PHOTOACOUSTICS**

Chair: Muyinatu A. Lediju Bell, *Johns Hopkins U*

7.1 **Contrast-enhanced spectroscopic photoacoustic imaging of prostate cancer using fluorescence-quenching prostate-specific membrane antigen (PSMA)-targeted contrast agent**, Jeeun Kang, Yixuan Wu, Ala Lisok, Haichong K. Zhang, Martin G. Pomper, Sangeeta Ray, Emad M. Boctor, *Johns Hopkins U, Johns Hopkins Med Institutions*

11:05 a.m

7.2 **Photoacoustic imaging of signals from a custom drill tip inside a human vertebra with coherence-based beam-forming**, Eduardo Gonzalez, Alycen Wiacek, Muyinatu A. Lediju Bell, *Johns Hopkins U*

11:21 a.m.

7.3 **Additive noise models for simulated photoacoustic coherence-based imaging**, Brooke Stephanian, Michelle T. Graham, Huayu Hou, Muyinatu A. Lediju Bell, *Johns Hopkins U*

11:37 a.m.

7.4 **Pixel-wise deep learning for improving image reconstruction in photoacoustic tomography**, Steven Guan, Amir A. Khan, Siddhartha Sikdar, Parag V. Chitnis, *George Mason U*

11:53 a.m. **Lunch**

2:00 p.m. **8. ARFI**

Chair: Kathryn R. Nightingale, *Duke U*

8.1 **Combining 3D ARFI, SWEI, B-mode and QUS to improve identification of prostate cancer**, D. Cody Morris, Derek Y. Chan, Hong Chen, Mark L. Palmeri, Thomas J. Polascik, Jonathan Mamou, Kathryn R. Nightingale, *Duke U, Riverside Res, Duke U Med Ctr*

2:16 p.m.

8.2 **Toward frequency-dependent modulus reconstruction from ARFI wave fields**, Sanjay Yengul, Olalekan Babaniyi, Paul E. Barbone, *Boston U*

2:32 p.m.

8.3 **Regularized shear wave speed reconstruction with an on-axis ARFI-based prior**, Derek Y. Chan, Ned C. Rouze, Mark L. Palmeri, Kathryn R. Nightingale, *Duke U*

2:48 p.m.

8.4 **Assessing lag-one coherence as a tool for ARFI bias estimation**, James Long, Anna Knight, Gregg Trahey, Kathryn Nightingale, *Duke U*

3:04 p .m.

8.5 **Efficient calculation of Green's tensor describing shear wave propagation in incompressible, transversely isotropic material**, Ned C. Rouze, Mark L. Palmeri, Kathryn R. Nightingale, *Duke U*

3:20 p.m. **Coffee**

4:05 p.m. **9. IMAGING 3**

Chair: Jeremy J. Dahl, *Stanford U*.

9.1 **Distinguishing solid from fluid breast masses with coherence-based ultrasound imaging**, Alycen Wiacek, Eniola Oluyemi, Kelly Myers, Susan Harvey, Muyinatu A. Lediju Bell, *Johns Hopkins U*

4:21 p.m

9.2 **Constrained swept synthetic aperture imaging without external tracking**, Nick Bottenus, *Duke U*

4:37 p.m

9.3 **Reverberation noise suppression in channel data using 3D fully convolutional neural networks**, Leandra Brickson, Dongwoon Hyun, Jeremy J. Dahl, *Stanford U*

4:53 p.m

9.43 **Phase aberration correction by time-delay computation from local sound speed estimation**, Rehman Ali, Jeremy J. Dahl, *Stanford U*

5:09 p.m.

9.5 Multi-covariate imaging of sub-resolution targets: initial clinical results, Matthew Morgan, Gregg Trahey, William Walker, *Duke U*

5:25 p.m. **Adjourn**

FRIDAY, JUNE 7

8:00 a.m. **Coffee and Pastry**

9:00 a.m. **10. TISSUE PARAMETERS 2**

Chair: Marie Muller, *NC State U, Raleigh*

10.1 Modeling ultrasound attenuation in random porous structures mimicking cortical bone, using Independent Scattering Approximation (ISA): Solving the direct and inverse problems, Omid Yousefian, R.D. White, H.T. Banks, Marie Muller, *NC State U, Raleigh*

9:16 a.m.

10.2 Effects of microstructure on attenuation, scattering and apparent absorption coefficients: Application to porous structures mimicking cortical bone, Yasamin Karbalaieisadegh, Omid Yousefian, Marie Muller, *North Carolina State U, Raleigh*

9:32 a.m.

10.3 Extraction of micro-architectural properties of cortical bone using ultrasound attenuation and an artificial neural network, Kaustav Mohanty, Omid Yousefian, Yasamin Karbalaieisadegh, Micah Ulrich, Marie Muller, *NC State U, Raleigh*

9:48 a.m.

10.4 Detection and staging of Idiopathic Pulmonary Fibrosis (IPF) using ultrasound backscattering and diffusivity:

In vivo rodent study, Kaustav Mohanty, John Blackwell, Mir Ali, Thomas Egan, Marie Muller, *UNC State U, UNC Chapel Hill*

10:04 a.m. **Coffee**

10:34 a.m. **11. TISSUE PARAMETERS 3**

Chair: Ernest J. Feleppa, *Riverside Research*

11.1 Breast tumor classification using homodyned K distribution, Ehsan Ul Islam Abil, Goutam Ghoshal, Sabiq Muh-tadi, Shaiban Ahmed, Rasheed Abid, Juan Shan, S.N. Akhlaghi, Brian S. Garra, Rafiul Hasan, S. Kaisar Alam, *Islamic U Tech, Bangladesh, AIDI Engineering, Uttara U, Bangladesh, Pace U, FDA, King Fahd U Petroleum Minerals, Imagine Consulting Services, Rutgers U, Coll New Jersey*

10:50 a.m.

11.2 New way to detect fiber-like structures using effective scatterer diameter estimation, Mohammadreza Kari, Helen Feltovich, Timothy J. Hall, *U Wisconsin-Madison, Intermountain Healthcare*

11:06 a.m.

11.3 Ultrasound thermometry for HIFU therapy: CNN LSTM approach, Changfan Chen, Younsu Kim, Chloe Audigier, Ari Partanen, Emad Boctor, *Johns Hopkins U, Profound Medical Corp*

11:22 a.m.

11.4 Comparison of deep-learning and classical image processing for skin segmentation, Felix Jin, Michael Postiglione, Anna Knig, Adela R. Cardones, Mark Palmeri, *Duke U, Duke U Med Ctr*

11:38 p.m. **Adjourn**

GENERAL INFORMATION

REGISTRATION

All attendees are charged a registration fee to help defray the costs of conducting the Symposium. The general registration fee is \$550 (\$590 if postmarked after **May 3**). Graduate students who identify their school and advisor on the registration form will be charged \$350 (\$380 after **May 3**). **Postdoctoral fellows must pay the full registration fee.**

Advance registration is requested in order to complete local arrangements. Please send the registration card (p. 6) along with your registration fee (checks made payable to “Tissue Characterization Symposium,” *no purchase orders, please*) to:

**Symposium on Ultrasonic Imaging
and Tissue Characterization**
2 Fulham Court
Silver Spring, MD 20902

Checks must be in U.S. dollars and drawn on a U.S. bank. Add a \$30 processing fee if the check is not drawn on a U.S. bank.

You can pay by credit card for an additional \$25 fee *per registration* (\$15 additional for student registration). Please send the registration card (p. 7) with your credit card number, expiration date and 3- or 4-digit security code either by: (1) mail to the above address, (2) fax to (240) 427-3899 or (3) email attachment to mmlinzer@verizon.net. As a security precaution, do not send your credit card information in the body of the email.

Late registration will be held at the Westin Arlington Gateway beginning at 8:00 a.m. on Wednesday, June 5.

HOTEL

The Westin Arlington Gateway is the venue for all meeting activities. It is a four-star luxury hotel located in Arlington, VA. The meeting will take place in a beautiful, large ballroom. Very-high ceilings and absence of support pillars provide unrestricted views of two large projector screens.

The hotel is surrounded by a large number of restaurants. Amenities include an indoor heated pool and whirlpool, a 24-hour fitness center, a Starbucks and a 24-hour business center. Free WiFi, as well as free access to three computers and a color printer, are provided in the hotel lobby. For additional information, see the hotel web site: westinarlingtongateway.com.

ROOM RESERVATIONS

The Symposium has guaranteed a *limited number of rooms* at a special Symposium rate of \$259 for a single or double room. The cut-off date for reserving a room at this rate is **May 3, 2019**. However, if you are planning to attend the meeting, we urge you to make your room reservation as soon as possible. You can make a reservation via:

<https://www.starwoodmeeting.com/events/start.action?id=18>

06269211&key=2C25E6F3

Alternatively, you can call the Central Reservations office at (888) 627-7076 and request the rate for the Tissue Characterization Symposium conference.

SOCIAL PROGRAM

A continental breakfast will be served each morning before the sessions. Coffee and tea will be available during the morning sessions and coffee, tea and cold drinks at mid-afternoon breaks.

CASUAL DRESS CODE

Dress code is casual, e.g., no ties or jackets for men. Casual dress will make all of us more comfortable, simplify our packing and help maintain an atmosphere of open and informal dialog at the Symposium.

TRANSPORTATION

The Westin Arlington Gateway is located two blocks from the Ballston Metro station, placing it within minutes of downtown Washington, Capitol Hill and National Airport (Blue Line). Bus service to Dulles Airport, as well as to New York City, is available near the Rosslyn Metro station, a few subway stops away. The NYC Tripper and Vamoose buses cost as little as \$27 each way and feature free WiFi and electrical outlets. The hotel is also serviced by shuttle service from National and Dulles Airports. Hotel valet parking is available at \$26/day.

PROGRAM AND ABSTRACTS

Prior to the meeting, the program and abstracts will be sent to our mailing list and made available on our website: uitc-symposium.org. Downloading these files onto a laptop, tablet or smartphone will allow attendees to read and annotate them during the sessions.

EXHIBITS

A limited amount of exhibit space for commercial scientific equipment is available just outside the meeting ballroom. Contact Mel Linzer for more information on exhibit options.

FOR ADDITIONAL INFORMATION, contact:

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2 Fulham Court
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