Bio

My research interests are focused on the development and clinical translation of new ultrasound imaging techniques to improve the quality and diagnostic value of ultrasound imaging. My interests are in clinical translation of ultrasound molecular imaging for early cancer detection, improving image quality in difficult-to-image patients, and to reduce noise artifacts in ultrasound images. In my research, I have refined adaptive beamforming methods such as coherence-based imaging, helped to pioneer the use of deep learning tools on raw ultrasound data to produce more accurate B-mode images and more sensitive ultrasound molecular images, and developed GPU-based software beamforming tools to deploy these methods in real-time on experimental and clinical imaging systems.

LINKS

- Open-source GPU-based real-time software beamformer: https://gitlab.com/dongwoon.hyun/rtbf
- B-mode imaging with a neural-network beamformer: https://gitlab.com/dongwoon.hyun/nn_bmode

Publications

PUBLICATIONS

- Short-Lag Spatial Coherence Imaging in 1.5-D and 1.75-D Arrays: Elevation Performance and Array Design Considerations. *IEEE TRANSACTIONS ON ULTRASONICS FERROELECTRICS AND FREQUENCY CONTROL*
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- Beamforming and Speckle Reduction Using Neural Networks. *IEEE transactions on ultrasonics, ferroelectrics, and frequency control*
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- Improved Visualization in Difficult-to-Image Stress Echocardiography Patients Using Real-Time Harmonic Spatial Coherence Imaging. *IEEE TRANSACTIONS ON ULTRASONICS FERROELECTRICS AND FREQUENCY CONTROL*
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- CLINICAL UTILITY OF FETAL SHORT-LAG SPATIAL COHERENCE IMAGING. *ULTRASOUND IN MEDICINE AND BIOLOGY*
  Long, W., Hyun, D., Choudhury, K., Bradway, D., McNally, P., Boyd, B., Ellestad, S., Trahey, G. E.
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- Improved Sensitivity in Ultrasound Molecular Imaging With Coherence-Based Beamforming. *IEEE transactions on medical imaging*
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Li, Y. L., Hyun, D., Abou-Elkacem, L., Willmann, J. K., Dahl, J. J.
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Jakovljevic, M., Byram, B. C., Hyun, D., Dahl, J. J., Trahey, G. E.
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Hyun, D., Trahey, G. E., Jakovljevic, M., Dahl, J. J.
2014; 61 (7): 1101-1112

A GPU-based real-time spatial coherence imaging system
Hyun, D., Trahey, G. E., Dahl, J., Bosch, J. G., Doyley, M. M.
SPIE-INT SOC OPTICAL ENGINEERING.2013

Lesion Detectability in Diagnostic Ultrasound with Short-Lag Spatial Coherence Imaging ULTRASONIC IMAGING
2011; 33 (2): 119-133

Development and Evaluation of Pulse Sequences for Freehand ARFI Imaging
IEEE.2011: 1281–84