

# EQUITABLE MEDICAL IMAGING

honoring Prof. Muyinatu A. Lediju Bell

recipient of the 2025 Benjamin Franklin NextGen Award



Muyinatu Bell is the John C. Malone Associate Professor of Electrical and Computer Engineering, Biomedical Engineering, and Computer Science at Johns Hopkins University, where she founded and directs the [PULSE Lab](#). She holds a PhD in biomedical engineering from Duke University. Among her numerous awards and honors, she has been recognized with MIT Technology Review's Innovator Under 35 Award (2016), NSF CAREER Award (2018), NIH Trailblazer Award (2018), SPIE Early Career Achievement Award (2021), IEEE Ultrasonics Early Career Investigator Award (2022), and the NSF Alan T. Waterman Award (2024). Prof. Bell is a Fellow of AIMBE, SPIE, and Optica.

Medical imaging allows us to peer into the body to provide diagnostic or surgical guidance information. Ultrasound imaging transmits sound that is reflected and detected by a sensor array placed in contact with the skin, while photoacoustic imaging transmits light that is absorbed, causing thermal expansion, which generates sound that can be detected with the same sensor array. In both cases, the sensed signals are processed using beamformers to display images. Conventional beamformers, however, exclusively rely on signal amplitudes, ignore the impact of light transmission through darker skin tones, or assume uniform properties (e.g., sound speed) which overlook naturally occurring intra- and inter-patient variations. In this talk, I will provide real-world examples of the medical imaging inequities that result from conventional beamformer design choices. I will then describe techniques to address these inequities using signal processing innovations that consider spatial correlations rather than signal amplitudes. Specific clinical applications that have the greatest potential to benefit from a coherence-based imaging approach include cardiovascular health assessments, breast cancer diagnosis and treatment, biopsies, neurosurgery, teleoperated robotic surgery, and wearable health applications with flexible arrays.

**THURSDAY, MAY 1, 2025**

10:50 AM - Noon

Shusterman Hall, Temple University

1834 Liacouras Walk, Philadelphia, PA 19122

**SPEAKER:**

Prof. Muyinatu A. Lediju Bell  
*Johns Hopkins University*

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phone: (215) 204-7597

email: [nancy.burlan@temple.edu](mailto:nancy.burlan@temple.edu)

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