

SPIE/OSA Student Seminar Series



Arefeh Sherafati
(Washington University in St. Louis)

Separating Signal from Noise in High-Density Diffuse Optical Tomography

Tuesday, Oct. 27, 2020

10:00 am ~ 11:00 am (CDT)

ZOOM ID: 917 2493 0198

Abstract: High-density diffuse optical tomography (HD-DOT) is a relatively new neuroimaging technique that detects the changes in the hemoglobin concentrations following neuronal activity through the measurement of near-infrared light intensities. Thus, it has the potential to be a surrogate for functional MRI (fMRI) as a more naturalistic, portable, and cost-effective neuroimaging system. Similar to other neuroimaging modalities, head motion is the most common source of artifact in HD-DOT data that results in spurious effects in the functional brain images. Unlike other neuroimaging modalities, data quality assessment methods are still underdeveloped for HD-DOT. Therefore, developing robust motion detection and motion removal methods in its data processing pipeline is a crucial step for making HD-DOT a reliable neuroimaging modality. In this seminar, I will talk about the HD-DOT data processing pipeline and the data quality assessment measures that I have developed in the context of HD-DOT's clinical applications. These methods enable direct comparisons of HD-DOT images with those of fMRI and equip this modality to be used as a surrogate for fMRI when fMRI is contraindicated or not feasible. Finally, I will present my work on collecting and processing HD-DOT data for two clinical populations with metal implants in their brain and the preliminary results for these studies.

Bio: Arefeh Sherafati has earned her Ph.D. in Physics from Washington University in St. Louis in August 2020, and is currently a postdoc in Dr. Joseph Culver lab at the Department of Radiology at Wash U. Her research focuses on developing signal processing methods for high-density diffuse optical tomography.



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