Full Name (English):	Jingyi Zheng	Recent Photo
Affiliated Institution and Title (English):	Auburn University, USA Assistant Professor	

Biography
(Please provide in paragraph form within 500 words.)

Dr. Jingyi Zheng is an Assistant Professor in Statistics at Auburn University, AL, USA. Dr. Zheng obtained the Ph.D. degree in statistics from University of California, Davis in 2019. Her research interests include high-dimensional data analysis, manifold learning, signal and imaging processing, and machine learning. Dr. Zheng's research have been supported by National Science Foundation, National Institutes of Health, Department of Homeland Security, and Department of Veterans Affairs.

Speech Title (English):

Towards Classification of Covariance Matrices via Bures-Wasserstein-Based Machine Learning

Speech Abstract
(Please provide in paragraph form within 500 words.)

Spatial-temporal data is a prevalent data type in biomedical domains, encompassing instances like multi-channel EEG and fMRI. In the analysis of such data, the connectivity matrix (e.g., functional connectivity derived from fMRI, covariance matrix derived from EEG) is widely extracted and analyzed. Rather than analyzing these matrices within the Euclidean space, this paper considers each matrix as a point situated on the manifold of positive semi-definite (PSD) matrices coupled with Bures-Wasserstein (BW) distance. Within this framework, two machine learning models based on the BW metric are proposed for the classification of PSD matrices on the manifold. Specifically, novel Gaussian kernel and projection map techniques, based on the BW metric, have been introduced and integrated into machine learning models such as support vector machines and random forest. In comparison with Euclidean methods, our approach considers the geometry of the Riemannian manifold where PSD matrices reside. Moreover, compared with prevalent Affine-Invariant (AI) metrics, our framework does not require matrix regularization and is computationally efficient. To comprehensively evaluate the proposed methods, four fMRI datasets and two brain-computer interface datasets with varying dimensions and quantities have been utilized. The results demonstrate comparable and even superior performance of the proposed methods compared with Euclidean and AI-based approaches.