

Department of **Biomedical Informatics**

Arizona State University

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Biomedical Informatics Weekly Seminar Series

Detecting paralinguistic information from speech and language for clinical applications: Algorithms and information limits

Visar Berisha, PhD

Assistant Professor, Department of Speech and Hearing Science

Arizona State University

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Room Sj 1-149 , Samuel C. Johnson Research Bldg.

Mayo Clinic Scottsdale



Speaker's Bio: Visar Berisha is an Assistant Professor at ASU with a joint appointment in the School of Electrical Computer and Energy Engineering and the Department of Speech and Hearing Science. Prior to joining ASU, Berisha was a research scientist at MIT Lincoln Laboratory and then Principal Research Engineer for a Fortune 500 company. His research interests include speech analytics, statistical signal processing, and information theory. Much of his recent work spans all three of these fields to answer basic questions related to the limits of information in speech. His work has led to many publications, patents, and a revenue-positive startup company. His work has been featured in the New York Times, on NPR, and a number of other national media outlets.

Talk Abstract: The simplest verbal response requires a complex sequence of events. It requires thinking of the words that best convey your message; sequencing these words appropriately; and then sending signals to the muscles required to produce speech. The slightest damage to the brain areas that orchestrate these events can manifest in speech and language problems. These disturbances offer a window into brain functioning. In the first part of this presentation, I will present an overview of projects where we use interpretable measures of speech and language production as proxies for cognitive and motor health. The algorithms here have practical utility in clinical applications and can help answer research questions on dysarthric speech production.

In the second part of the talk, I will discuss new results from non-parametric statistical signal processing that allow us to characterize the information limits in speech. In contrast to existing methods based on machine learning, this work provides a framework to answer fundamental questions such as “What are the bounds on how well I can recover a parameter of interest from speech?” or “How well should an optimally trained classifier work for a particular application?”